CEEQNET PROJECT FINAL REPORT – FACTUAL PART

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WWW.CEEQNET.COM

CEEQNET (Central and Eastern Europe Quality Network) Unified Central and Eastern European Surveillance/monitoring System for Healthcare Quality and Efficiency Indicators

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Administrative healthcare data based system for healthcare quality performance evaluation – Austria, Czech Republic, Hungary, Poland and Slovak Republic. A Community of excellence of institutions using their data for quality performance improvement compatible with various quality management models.

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1. Abbreviations

Acronym	Explanation
EU	European Union
HC	Health care
CQN	CEEQNET (Central and Eastern Europe Quality Network)
AT	Austria
CM	Country Manager
CZ	Czech Republic
HU	Hungary
PL	Poland
SK	Slovak Republic
PQI	Performance Quality Indicator
AHRQ	Agency for Healthcare Research and Quality
AQOI	Australian Quality & Outcomes Indicators
RIL	Regional Indicator Report for SE Louisiana
SAC	SAC Instrument Review Criteria
WCCSU	Writing Center of Colorado State University

KEYWORDS:

administrative data, performance quality indicator, CEEQNET, benchmarking, health care, Austria, Czech Republic, Hungary, Poland, Slovak Republic, management, database

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3. Executive summary

What makes this project different from other quality indicator and performance management projects?

- First difference is in the use of primary data as is collected in each individual participating hospital (no additional data collection was required from the collaborating institutions in 4 countries of the project), the data can be uploaded continuously in real time and retrospective data is available. Since the data is not collated and reported by administrative personnel it is generally less manipulated. The identified indicator "candidates" (since the time limitation of the project did not allow for their validation) are computed from factual real world data, not from gamed data [44, 48]. It has been proven that these indicators can be produced in each of the participating countries (with the exception of Slovak Republic where – without additional data collection – it was impossible to construct performance quality indicators – PQI based on procedures). Thus the list of proposed indicators is neither a "wish list" nor a list of measures produced by opinion consensus.
- The CEEQNET collaborative is (to our knowledge) the only functional real-time benchmarking platform with the ability of extracting comparable measures from diverse existing country and hospital specific information systems handling administrative data (meaning all data that is already administrated electronically including clinical data) from four different European countries [39]. There exists reasonable evidence that the indicator "candidates" as identified by this project are extractable from currently electronically administered data sets of the majority of countries of the European Union and that they will have the same meaning although coming form different healthcare systems.
- Due to a very structured approach (specific structured forms devised and tested during the CEEQNET project duration for description of all parameters required, strict adherence and respecting of CEEQNET used glossary definitions) [5] any healthcare organization already administering data in a hospital information system is able to start comparing their own historical (archived) and current data with other members of the CEEQNET collaborative (with minimal effort as compared to benchmarking platforms requiring specialized data collection in order to construct

specifically defined indicators). The payoff for this ease is the relatively small number of quality related indicators (referred to as the CEEQNET Performance quality indicator (PQI) candidates) computable from the already existing data sets.

- The CEEQNET platform provides dynamic views of all collected, transformed and into the Central Database Repository uploaded data. The approach allows use of so-called "drill down" and "drill up" analysis of the presented measures based on the dimensions (age, ICD coding etc.) of the produced and used model. Rather than providing just a comparison of numbers – measures - indicators (from hospitals or from healthcare systems) it is possible to actively search for underlying facts leading to recorded differences (e.g. which subset of patients accounts for a recorded deviation). In some healthcare systems the system allows drill down to each individual case of hospitalization and its episodes (departmental stays). This functionality strongly facilitates the reflection process necessary for quality and safety improvement of healthcare services [13].
- The flexibility and analytical capabilities of the CEEQNET platform allows experimenting in the area of proposing and constructing of new measures (numbers) and their subsequent testing of their potential value for indicator purposes (any user is able to define and construct from the informational content of the database a specific measure indicating a certain condition).
- Because the system has been produced as a model (virtual simplified image) of the factual (real life) health-care systems of the collaborating countries, it enables basic (given the amount of data that the system already possesses) scenario creation and testing. The system is prepared to handle "what-if" scenarios and to test situations impossible to test in real life (reality). For instance it is possible (in the systems "virtual reality") to treat a group of Czech patients (or a "typical" Czech patient with an ICD code defined status) in the collaborating Polish hospitals and compare such treatment outcomes with the outcomes of the same group (or patient) treated in the Czech hospitals. This approach holds potential for use in the comparison of the health status of different European populations [8, 34].

What was achieved?

- The project enabled the formation of a team of experts from the domain of quality of care, data reporting and extensive database applications production
- A platform for online collaboration (based on share point services) was used for teamwork throughout the project
- A quarterly newsletter was produced and circulated to the CEEQNET community focused on performance measurement and quality and safety management [49]
- A thorough and vast researching of existing quality indicators was performed and "candidate" CEEQNET performance quality indicators (PQIs) have been proposed
- A complex survey and analysis (audit) of available electronically administered (in the healthcare environment) data from Czech Republic, Slovak Republic, Austria, Poland and Hungary was performed for the first time
- Vulnerable areas in healthcare related datasets were identified in some countries (e.g. non-existing coding of co-morbidities) This influenced subsequent systemic changes in data collection in at least one healthcare system of the collaborating countries.
- A selection of administrated data relating to the proposed quality indicators was done
- Data samples were tested to verify the accessibility and level of data content in the Czech Republic, Slovak Republic, Austria, Poland and Hungary
- Auxiliary national data models have been produced and subsequently used for the construction of a unified data model for all collaborating countries
- Sufficient knowledge was gained enabling the production of a new unified model after the inclusion of yet another country into the collaboration (each new included healthcare system calls for the production of a new unified model)
- Centralized project databases (data repository) robust enough for handling large data volumes was produced
- The re-mapping of dimensions (their amalgamation) for Czech Republic, Slovak Republic, Austria and Poland was performed
- The "candidate" quality indicators were redefined with the aid of nationally specific classifications

- The central database repository was populated by data from the Czech Republic, Slovak Republic, Austria and Poland
- The selected quality indicators were effected using reports generated from the real-world data contained in the database
- Reports were created enabling the orientation in all the data contained in the database leading to the possibility of modeling and testing other potential quality indicators
- The database and reports are accessible online (using a secure Internet connection) to all participants of the project and other authorized healthcare systems experts at the following URL http://mark05-asx.stapro.cz/discoverer/viewer

It is only possible to connect to the secure part of this website, if the connection parameters (user name, password, database name and end user layer name - EUL) is known. For security reasons these parameters are not included in this document and will be individually sent to all authorized users upon their request.

The general link to the CEEQNET project is the website http://www.ceeqnet.com

Many segments of this work form a part of the hardware-software-connectivity platform and the full functionality cannot be in detail described in this printed report. Their functionality may be tested and evaluated online only using authorized access to the CEEQNET platform (currently available to all CEEQNET participating individuals and organizations).

In essence this project can also be classified as a feasibility study for identification of a set of exactly defined measures that could be used in healthcare for quality improvement. The following diagram is a graphical representation of what was attempted:

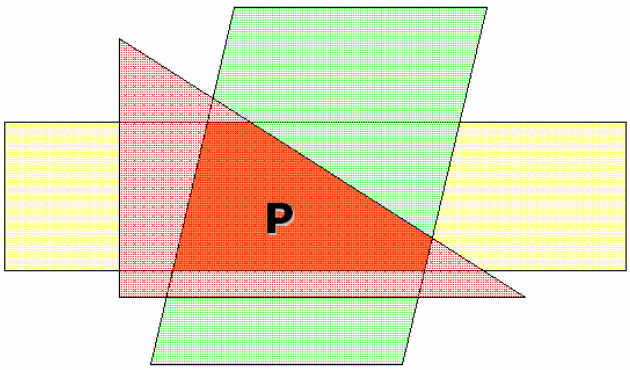

Figure 1 Search for intersection of HC administered data from several EU countries

The content of the „intersection P“ (identical or similar measures = identical or similar facts *related to* identical or similar dimensions) was considered decisive for the feasibility and the scope of the CEEQNET Project.

These measures have been extracted, transformed and uploaded from the hospital information systems of all the collaborating hospitals in all collaborating countries into the CEEQNET Central Data Repository (databases). The platform used for viewing the data allows a “multi-dimensional” approach [13], which is presented in a simplified way in the following diagram:

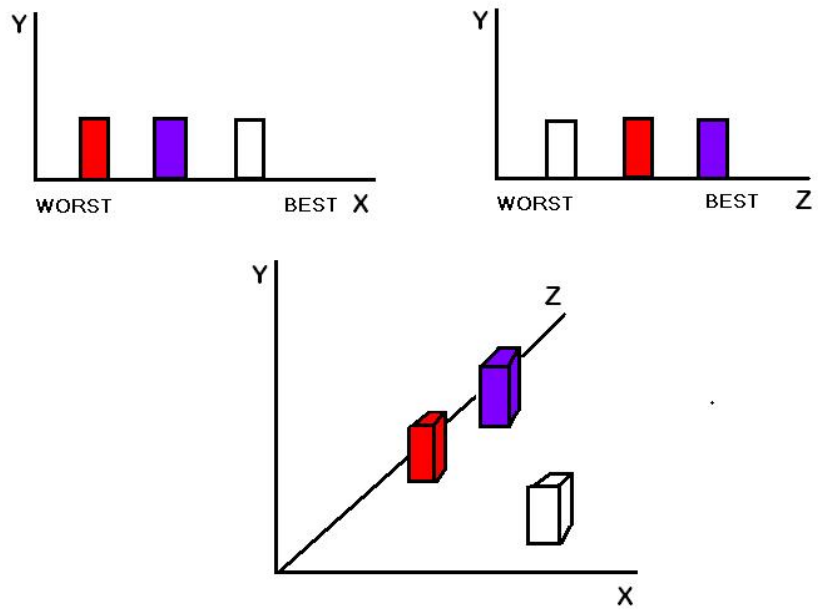

Figure 2 Different views of the same facts

Observation from different points of view (from different perspectives) of the same reality (data, facts) and measures – sometimes referred to as indicators – provides a different picture. By adding or changing a "dimension" the overall impression becomes different and decisions based on the different perspectives will need to be different. The construction of the "data cube" of the CEEQNET projects allows the viewing of all included and standardized facts in this way. There are basically two options provided for the user. One option allows the user to define exactly his own view and to rotate the data cube in a personalized way. The other option exports the data in the form of a contingency tables, thus again providing the user with a data cube (for example all recorded hospital cases related to the main diagnostic group, mortality condition – thus allowing the construction of a view of mortality from the perspective of a used medical procedure). This output of the system could be classified as multidimensional hard outputs and are represented by means of pivot tables. Pre-designed reports are described in detail in the separate document „CQN Catalog of reports". All views are provided to facilitate the managerial reflection process on the path to quality attributes of quality health care – safety, effectivity, patient-centeredness, timeliness, efficiency, and equity [24].

4. Project glossary

Term	Definition and/or Explanation	Source
Acceptability	The degree to which the service meets or exceeds the expectations of informed customers and consumers.	AQOI
Access	The capacity of individuals to obtain the same quality of service.	AQOI
Accuracy	Refers to how well your measurement of an object or phenomenon reflects its actual state. For example, it is important to have an accurate measurement of your feet in order to select well-fitting shoes. (See also Bias, Precision and Validity.)	RIL
Administrative data	Administrative data are routinely collected data for central purposes according to unified national methodologies.	CQN
Amenity to Independent Corroboration	Can indicator data be confirmed by others?	AQOI
Appropriateness	The extent to which potential benefits of an intervention exceed the risks involved.	AQOI
Association	a health outcome is associated with an intervention if the change in health status generally occurs following the intervention but has not been demonstrated through rigorous scientific study to cause the change	AQOI
Attribution	a health outcome is attributable to an intervention if the intervention has been shown in a rigorous scientific way to cause the change in health status	AQOI
Availability of Alternate Forms	Can the indicator be altered to allow its use in different target populations (e.g. those requiring language or cultural adaptations)?	AQOI
Bias	The systematic distortion of information, by over- or under - representation of certain kinds of information sources, or by data interpretation with pre-determined expectation or desired outcomes, consciously or unconsciously. This distortion can have a number of underlying causes. One example is the use of telephone surveys, which systematically exclude those without telephones, and may result in drawing	RIL

	an inaccurate sample of the population.	
Bias	Systematic differences in patient case-mix, including disease severity and comorbidity. In cases where such systematic differences exist, an adequate risk adjustment system should be available. See: Selection bias, Information bias	AHRQ
Selection bias	Selection bias results when the cases with a condition or procedure (ascertainable from administrative) data do not represent the universe of patients with that condition or procedure. As a result, the rate of an indicator may differ from the true value in the population. A related problem is that inadequate or variable coding of key diagnoses may interfere with consistent ascertainment of cases, such as for vaginal births after cesarean delivery.	AHRQ
Information bias	Some missing information may actually be important to evaluating the outcomes of hospital care. For instance, for some conditions, 30-day mortality has been shown to substantially exceed in-patient mortality. Without 30-day mortality data (ascertained from death certificates), hospitals that have short lengths of stay may appear to have better patient outcomes than other hospitals with equivalent 30-day mortality.	AHRQ
Burden	How difficult or costly is indicator data collection and indicator construction?	AQOI
Burden	is defined as the time, energy, and other demands placed on those to whom the instrument is administered. Administrative burden is defined as the demands placed on those who administer the instrument.	SAC
Construct validity	Construct validity seeks agreement between a theoretical concept and a specific measuring device or procedure. Construct validity can be broken down into two sub-categories: Convergent validity Discriminate validity. Convergent validity is the actual general agreement among ratings, gathered independently of one another, where measures should be theoretically related. Discriminate validity is the lack of a relationship among measures which	WCCSU

	theoretically should not be related. To understand whether a piece of research has construct validity, three steps should be followed. First, the theoretical relationships must be specified. Second, the empirical relationships between the measures of the concepts must be examined. Third, the empirical evidence must be interpreted in terms of how it clarifies the construct validity of the particular measure being tested.	
Construct validity	What relation does the indicator have to other measures of quality?	AQOI
Consumer	the population of potential customers	AQOI
Content Validity	Content Validity is based on the extent to which a measurement reflects the specific intended domain of content. The process becomes more complex as it moves into the more abstract domain of studies. For example, a researcher needing to measure an attitude like self-esteem must decide what constitutes a relevant domain of content for that attitude.	WCCSU
Content validity	How closely does the indicator relate to quality of care and how well are relevant aspects of care quality covered by the indicator?	AQOI
Continuity	The extent to which an individual episode of care is coordinated and integrated into overall care provision.	AQOI
Creaming	A pejorative term used to describe a form of gaming behavior that consists of serving the easiest-to-serve in order to improve an entity's performance measures without regard for the customer or clients' interest. As opposed to using capacity to benefit in screening and referring customers or clients to employment and training programs, creaming is discouraged by the way performance measures are mixed or is forbidden expressly by the way the application eligibility rules are monitored and enforced.	
Criterion related validity	Criterion related validity, also referred to as instrumental validity, is used to demonstrate the accuracy of a measure or procedure by comparing it with another measure or procedure which has been demonstrated to be valid. See - Predictive Validity	WCCSU
Cultural &	The cross-cultural adaptation of an instrument involves two	

Language Adaptations	primary steps: - assessment of conceptual and linguistic equivalence, and - evaluation of psychometric properties. - conceptual equivalence refers to equivalence in relevance and meaning of the same concepts being measured in different cultures and/or languages. Linguistic equivalence refers to equivalence of question wording and meaning in the formulation of items, response choices, and all aspects of the instrument and its applications. For evaluation of indicators properties, each cultural and/or language adaptation should be reviewed separately for evidence of reliability, validity, responsiveness, interpretability, and burden.	
Customer	the recipient of a service within healthcare or anyone who has expectations regarding healthcare delivery	AQOI
Effectiveness	The degree to which an intervention produces measurable increases in survival or improved quality of life (or improved outcomes) when applied in routine practice.	AQOI
Efficiency	Maximizing benefits (or outcomes) for a given cost: - Technical efficiency: the degree to which the least cost combination of resource inputs occur in production of a particular service. - Allocative efficiency: the degree to which maximum benefit (or outcomes) are obtained from available resources.	AQOI
Equivalency reliability	Equivalency reliability is the extent to which two items measure identical concepts at an identical level of difficulty. Equivalency reliability is determined by relating two sets of test scores to one another to highlight the degree of relationship or association. In quantitative studies and particularly in experimental studies, a correlation coefficient, statistically referred to as r, is used to show the strength of the correlation between a dependent variable (the subject under study), and one or more independent variables, which are manipulated to determine effects on the dependent variable. An important consideration is that equivalency reliability is concerned with correlational, not causal, relationships.	WCCSU
External validity	External validity refers to the extent to which the results of a study are generalizable or transferable.	WCCSU

Face validity	Does the indicator appear to relate to quality of care?	AQOI
Face validity	Face validity is concerned with how a measure or procedure appears. Does it seem like a reasonable way to gain the information the researchers are attempting to obtain? Does it seem well designed? Does it seem as though it will work reliably? Unlike content validity, face validity does not depend on established theories for support. Content validity should not be confused with face validity. The latter is not validity in the technical sense; it refers, not to what the test actually measures, but to what it appears superficially to measure. Face validity pertains to whether the test "looks valid" to the examinees who take it. the administrative personnel who decide on its use, and other technically untrained observers	WCCSU
Gaming	The behavior or strategies of program administrators or service providers to achieve performance standards through means that do not necessarily provide intended benefits to customers or clients. Includes but is not limited to creaming.	
Health Intervention	any action which is intended to improve someone's health (or reduce the rate at which it deteriorates), whether the action is aimed at health promotion, disease prevention, early diagnosis, a clinical intervention, counseling or social service support, educational or preventive measures, a change in administrative or budgetary responsibilities, regulations relating to safety, the relief of poverty, better housing or whatever.	AQOI
Health Outcome	a change in the health of an individual or a group of people or population which is attributable to an intervention or series of interventions	AQOI
Health Status	an integrated indicator of health (i.e. well-being), typically incorporating biological function, physical and mental health, social and role functioning	AQOI
Health-related Quality of Life	that component of quality of life related to the sense of health (i.e. well-being) of the individual concerned	AQOI
Indicator	A measurement that reflects the status of some social, economic, or environmental system over time. The term Indicator is derived from the Latin verb indicare, meaning "to point out or proclaim." Generally an indicator focuses on a	RIL

	small, manageable, tangible and telling piece of a system to give people a sense of the bigger picture.	
Indicator - the differential application	Terms such as "quality indicator" and "quality measure" are effectively used interchangeably by some - yet are regarded as substantially different by others.	AQOI
Indicators	statistics or other units of information which reflect, directly or indirectly, the performance of the healthcare system in maintaining or increasing the well-being of its target population	AQOI
Internal consistency	Internal consistency is the extent to which tests or procedures assess the same characteristic, skill or quality. It is a measure of the precision between the observers or of the measuring instruments used in a study. This type of reliability often helps researchers interpret data and predict the value of scores and the limits of the relationship among variables. For example, a researcher designs a questionnaire to find out about college students' dissatisfaction with a particular textbook. Analyzing the internal consistency of the survey items dealing with dissatisfaction will reveal the extent to which items on the questionnaire focus on the notion of dissatisfaction.	WCCSU
Internal validity	Internal validity refers to (1) the rigor with which the study was conducted (e.g., the study's design, the care taken to conduct measurements, and decisions concerning what was and wasn't measured) and (2) the extent to which the designers of a study have taken into account alternative explanations for any causal relationships they explore. In studies that do not explore causal relationships, only the first of these definitions should be considered when assessing internal validity. Several types of internal validity are: (Face Validity) Criterion Related Validity Construct Validity Content Validity	WCCSU
Interpretability	Does the indicator make sense? Does it communicate a consistent message to those who use it?	AQOI
Interpretability	Interpretability is defined as the degree to which one can	SAC

	assign qualitative meaning to an instrument's quantitative scores. Interpretability of a measure is facilitated by information that translates a quantitative score or change in scores to a qualitative category that has clinical or commonly-understood meaning.	
Interpreted	understood in a certain way; made sense of; "a word taken literally"; "a smile taken as consent"; "an open door interpreted as an invitation".	
Interrater reliability	Interrater reliability is the extent to which two or more individuals (coders or raters) agree. Interrater reliability addresses the consistency of the implementation of a rating system.	WCCSU
Measures	seek to directly quantify quality of care or health outcomes	AQOI
Noise	Any quality indicator consists of both signal ('true' quality, that is what is intended to be measured) and noise (sampling variation or other non-persistent factors that is what is not intended to be measured). However, it is possible to apply additional statistical techniques to improve the precision of these indicators. These techniques are called signal extraction, and are designed to "clean" or "smooth" the data of noise, and extract the actual signal associated with provider or area performance.	
Outcome	the significant result or end product of care delivery, such as improved survival, functional health status or quality of life	AQOI
Performance - the differential application	Terms such as „outcome indicator" and "outcome performance indicator" are effectively used interchangeably by some - yet are regarded as substantially different by others.	AQOI
Performance Measurement	Measurement of data that show the progress toward specific results that are the intended outcome of specific actions, thus providing a way to evaluate the actions.	RIL
Precision	The fineness of the measurement. Values from an instrument that measures parts per million are more precise than one which measures in parts per hundred. More precise measurements are not necessarily more accurate. (See Accuracy and Bias.)	RIL
Predictive validity	How well does an indicator of good/poor care predict that good/poor care was delivered?	AQOI

Predictive validity	If an instrument is purported to measure some future performance, predictive validity should be investigated. A comparison must be made between the instrument and some later behavior that it predicts. See - Criterion related validity	
Process	refers to the actual delivery of care. The series of linked, often (but not necessarily) sequential steps that convert an input into an output, cause some set of outcomes to occur, generate useful knowledge or add value	AQOI
Relevance	1) The usefulness of a response to a query 2) The capability of a system to select and retrieve data appropriate to a user's needs based on the user's request;	
Reliability	Reliability is the extent to which an experiment, test, or any measuring procedure yields the same result on repeated trials. Without the agreement of independent observers able to replicate research procedures, or the ability to use research tools and procedures that yield consistent measurements, researchers would be unable to satisfactorily draw conclusions, formulate theories, or make claims about the generalizability of their research. In addition to its important role in research, reliability is critical for many parts of our lives, including manufacturing, medicine, and sports. Reliability is such an important concept that it has been defined in terms of its application to a wide range of activities. For researchers, four key types of reliability are: Equivalency Reliability Stability Reliability Internal Consistency Interrater Reliability	WCCSU
Reliability	The degree to which an indicator is free from random error, is reproducible (or stable) over time and shows interrater agreement at one point in time. Reliability will be largely dependent on the adequacy of the operational definition for the indicator and the rigor of data collection, data analysis and data audit. Reliability includes the concepts of: · Internal consistency	AQOI

	· Test/retest stability · Interrater reliability	
Reliability	The extent to which a change in value of an indicator is caused by a change in what it measures and not due to measurement error. Reliability of polls or surveys is often an issue, since small changes in the wording of questions can elicit remarkably different responses.	RIL
Responsiveness	How does the indicator change as quality of care changes? Is the indicator capable of detecting the sorts of differences in quality of care typically experienced in acute healthcare services?	AQOI
Responsiveness	How sensitive an indicator is to a change in the system it represents.	RIL
Risk adjustment	Some quality measures may be influenced by patients' attributes unrelated to quality of care. Risk adjustment is the term commonly applied to those methods that account for patient-related attributes, making measurement of health care quality as comparable as possible across providers or organizations seeing different mixes of patients	
Risk stratification	Some quality measures may be influenced by patients' attributes unrelated to quality of care. Risk adjustment is the term commonly applied to those methods that account for patient-related attributes, making measurement of health care quality as comparable as possible across providers or organizations seeing different mixes of patients	Ferraris VA, Ferraris SP. Risk Stratification and Comorbidity.
Safety	Risk stratification means arranging patients according to the severity of their illness. Implicit in this definition is the ability to predict outcomes from a given intervention based on preexisting illness or the severity of intervention. Risk stratification is therefore defined as the ability to predict outcomes from a given intervention by arranging patients according to the severity of their illness. The usefulness of any risk stratification system arises from how the system links severity to a specific outcome.	AQOI
Sensitivity	Within validity determinations lies knowledge of quality indicator sensitivity, its "true positive" rate and specificity, its "true negative" rate	AQOI
Significance	1) A probability measure of how strongly the data support a	SAC

	certain result (usually of a statistical test). If the significance of a result is said to be .05, it means that there is only a .05 probability that the result could have happened by chance alone. Very low significance (less than .05) is usually taken as evidence that the data mining model should be accepted since events with very low probability seldom occur. So if the estimate of a parameter in a model showed a significance of .01 that would be evidence that the parameter must be in the model. 2) A significant issue means that it is of importance.	
Significance	Does the indicator reflect aspects of care that matter to users of the indicator and are relevant in current healthcare contexts?	AQOI
Specificity	Within validity determinations lies knowledge of quality indicator sensitivity, its "true positive" rate and specificity, its "true negative" rate	AQOI
Stability reliability	Stability reliability (sometimes called test, re-test reliability) is the agreement of measuring instruments over time. To determine stability, a measure or test is repeated on the same subjects at a future date. Results are compared and correlated with the initial test to give a measure of stability.	WCCSU
Structure	Comprises the characteristics of care or resources compiled to deliver care to the patient. It includes the physical facilities, the staff and the licensing and credentialing of healthcare providers and selected patient characteristics	AQOI
Subjective Indicator	(Also known as a "Perceptual" or "Qualitative Indicator"): An indicator that is based on individual community members perceptions of an issue. For example, instead of measuring public safety by the number of crimes in a neighborhood, a community might rely on surveys that report how safe community members feel after dark.	RIL
Technical Proficiency	The extent to which the performance of interventions by healthcare professionals is consistent with contemporary standards and knowledge of skills relevant to that intervention.	AQOI
Utility	Has the indicator been proven to be of value when used in acute healthcare (either for accountability, directing consumer decisions or quality improvement)?	AQOI

Utility	The quality of being of practical use. E.g. a diagnostic test could have high sensitivity, specificity and good likelihood ratios and still have low utility if it is very invasive or poses other risks or inconvenience to the patient.	
Validity	Given the quality monitoring purpose for which it is intended, do inferences regarding quality of care based upon the indicator accurately reflect the quality of care delivery? Validity is a matter of degree and must be judged with an understanding of the intended application of an indicator (that is, is it valid for its intended purpose?). Validity includes the concepts of: Content validity Construct validity Predictive validity	AQOI
Validity	How well an indicator actually represents what one intends to measure. This is similar to accuracy but refers more to the relation between the measurement and its underlying concept.	RIL
Validity	Validity refers to the degree to which a study accurately reflects or assesses the specific concept that the researcher is attempting to measure. While reliability is concerned with the accuracy of the actual measuring instrument or procedure, validity is concerned with the study's success at measuring what the researchers set out to measure. Researchers should be concerned with both external and internal validity.	WCCSU
Vulnerability to Undesired Effects	What is the likelihood that use of the indicator would create perverse incentives for healthcare providers (such as to corrupt indicator data or alter healthcare provision in undesirable ways)?	AQOI

Source	Source – in full
AQOI	Australian Quality & Outcomes Indicators,
RIL	Regional Indicator Report for SE Louisiana
SAC	SAC Instrument Review Criteria
WCCSU	Writing Center of Colorado State University

5. Introduction

5.1. Objectives of the CEEQNET project

- Project offers a unification methodology for efforts of five Central European countries (Austria, Czech Republic, Hungary, Poland, Slovak Republic) in the quest for standardization and harmonization of measurement methods used for evaluation of healthcare performance.
- Collaborating countries have a certain volume of data collected for various reasons in the process of providing health care.
- Project focuses on proper use of these existing relevant data sources.
- Project aims at forming a „community of excellence“ of institutions using their data for quality performance improvement. The end result is seen in strengthening the role of health care consumer of Europe (eHealth application for hospital performance measurement and reporting) enabling appropriate informed choice of health care service providers by the consumer.

5.2. Technical information

AREA OF ACTIVITIES / WORKING PARTY Health care surveillance and evaluation/ Health Systems Working Party of DG SANCO
TITLE OF PROJECT **Unified Central and Eastern European surveillance/monitoring system for healthcare quality and efficiency indicators (CEEQNET)**
START DATE OF THE PROJECT 1. 5. 2004
DURATION OF THE PROJECT 26 months
PROJECT LEADER / ORGANISATION Aleš Bourek / IHIS Slovak Republic (Institute of Health Information and Statistics)
PROJECT NUMBER Agreement number 2003105
SANCO REPRESENTATIVE Steffen Zenner (with several subsequent changes related to restructuring of the project

management within the Health Strand of the European Commission)
COUNTRIES INVOLVED
[x] AT (Austria) [x] CZ (Czech Republic) [x] HU (Hungary) [x] PL (Poland) [x] SK (Slovak Republic)

EVENT TIMELINE

Stages of project/Deliverables	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Month 13	Month 14	Month 15	Month 16	Month 17	Month 18	Month 19	Month 20	Month 21	Month 22	Month 23	Month 24	Month 25	Month 26
Data sources analysis Deliverable: Putting in place mechanisms for collecting data and information	x x	x x	x x	E X	X	X	x	x																		
General design of information system Deliverable: Putting in place mechanisms for disseminating data and information			x x	x x	X X	E X	x	x																		
Production of information system Deliverables: 1) Development of indicators 2) Development of information technology (IT) systems and applications 3) Development of quality measures and standards in specific areas					X	X	x x	x x	x x	x x	x x	E X	x	x	x	x										
Implementation of information system Deliverable: Development and promotion of strategic approaches and measures in specific areas													x	x	x	x	x x	E X								
System maintenance Ongoing																		X x	x x	x x	x x	x x	x x	x x	x x	X X
Evaluation of project results Deliverable: Evaluation and assessments of specific issues carried out																		S	x	x	x	x	x	X	x	X X
Framework establishing Deliverables: 1) Creation and operation of networks and platforms 2) Linkage of networks	x x	x x	x x	x x	X x	x x	x x	x x	x x	x x	x x	X x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	X X
Training Deliverable: Training of key staff										x	x	x	x	x	x	x	x x	x x	x x	x x	x x	x x	x x	X X	x x	x x
Project termination																										X

Month 1 = July 2004 (Kick-off meeting Bratislava 30.06.2004) , x – Planned Work, x – Finished Work, x – In Progress

5.3. Project summary

Subject area

Performance measurement and monitoring of the healthcare quality and efficiency in Central and Eastern Europe (Slovak Republic, Czech Republic, Poland, Austria and Hungary)

End-point

Improvement of quality and efficiency of healthcare in selected institutions, acceptance and development of principles of quality management and excellence

Methods

The method for arriving at the described causes the implementation and practical verification of measurement methods for quality and efficiency of care targeted in the first phase predominantly on acute hospital care. In the participating countries` healthcare systems there is a relatively wide variety of data now usable for this goal. The project will be initially targeted on the analysis of data sources and evaluation of their usability for the above-described end point. We will further devise a method for the data sources standardization, computational algorithms of indicators, and a report system containing standardized and structured indicators. One of modules of the used method is implementation of a real information system capable of:

- Import and parameterization of data in the framework of the devised dataset
- Processing the data in relational database fulfilling criteria of performance measurement system in the accreditation process
- Computing and in the form of tables and graphs presenting values of the computed indicators in a multidimensional system
- Evaluate the use of the system in selected pilot institutions bearing in mind that the results of implementation of this method will be a management support
- Produce and run a central reference database enabling institutions benchmarking in the various national frameworks
- Implement a standardized information environment (system) for benchmarking and inclusion of the benchmarking method into the tool box of management instruments for institutions [14, 15].

Deliverables

- Methods of data source standardization enabling the implementation of performance measurement systems. This will be disseminated in the form of data standards in printed and electronic form and in the form of application software
- Design of a multidimensional reference database needed for data management. The deliverable will be implemented in the form of technical documentation and in the form of distributed software
- Design of reporting system based on standardized PQI's (Performance Quality Indicators). The deliverable will be distributed in the form of documentation and distributed software
- Protocol informing about the results of evaluation methods of measurement in the framework of use in collaborating institutions in the pilot phase
- Database of reference values of PQI's publicly available (to authorized individuals and institutions) by means of a secure Internet protocol

5.4. Project description

Starting points:

Field of healthcare quality and efficiency improvement this continuously being addressed by all countries. And it's a problem of countries in Central and Eastern Europe as well. One certain aspect is that each country is at a different evolution phase and is searching for appropriate solution. The proposed project offers a unification method for the efforts of four Central European countries in the quest for standardization and harmonization of the measurement methods used for evaluation of healthcare quality and efficiency. All of the collaborating countries have at their own disposal certain volume of data collected for various reasons (but similar in many ways) in the process of providing health care. The project is focused on the proper use of these relevant data sources.

Main aim of the project:

Assure - through the proposal production and practical evaluation of an information system - conditions for the standardized unified performance measurement of quality and efficiency of healthcare as one of the tools of quality management.

Main project objectives:

1. Analysis of the conditions of data sources in the collaborating countries and their evaluation for use of performance measurement. Detailed analysis of all measurable facts, their dimensions and their hierarchical levels useful for analytical evaluation of information contained in the data used.

2. Design of an information system assuring:

a/ Collection and standardization of data and their import into a relational database (ETL process - extraction, transforming, loading procedure)

b/ Proposal of an efficient relational and multidimensional database

c/ Proposal of algorithms and computation for obtaining PQI's (Performance Quality Indicators)

d/ Proposal of reporting based on use of standardized key performance indicators

e/ Proposal of the technological implementation of an information system

3. Design of an information system:

a/ Import modules

b/ Relational and multidimensional database

c/ Software application of a relational multidimensional analysis enabling visualization of the results

d/ Reporting application focused on key indicators

4. Implementation of information systems in:

a/ Health institutions participating in the pilot study

b/ Data and Reference Center

5. Full-time system maintenance

6. Evaluation of the usefulness of the proposed solution for quality management

7. Instrumented framework of institutions from various countries focused on a problem of standardization and unification of performance measurement of the quest towards healthcare quality and efficiency improvement.

5.5. Tasks description

1. Input analysis

a/ Initial analysis of data sources in the collaborating countries. National data sources will be evaluated including sources from health insurance companies, healthcare system statistics and individual data sources of institutions (human resources, fiscal and economical data)

b/ Evaluation of their usefulness for performance measurement - their compatibility, similarity and dissimilarity will be evaluated, and their common denominator will be sought after through the use of parameterization and systemization.

c/ Detailed analysis of all measurable facts that dimensions and their hierarchical levels present in each specific country and which are useful for analytical evaluation of information obtained in the data used. The whole spectrum of information contained in the data, all available and used datasets and databases will be described in detail.

2. Proposal of an information system assuring:

a/ Collection and standardization of data and their import into a relational database (ETL process - extraction, transforming, loading procedure). Proposition of the data interface and proposal of standards concerning methods of reporting of various activities (healthcare provision, costs allocation, economical results etc.)

b/ Proposal of an efficient relational and multidimensional database. Technical implementation of facts and dimensions.

c/ Implementation of algorithms and computation of key performance indicators. Computation of relation between costs and production, case costs etc.

d/ Proposition of reporting based on standardized key performance indicators. Proposition of the factual content, dimensions of view and methods of presentation of information resulting from the computed PQI's.

e/ Proposal of technical solution of an information system. Proposition of optimized technological solution, practically evaluated system for data analysis and data mining.

3. The factual production of an information system

a/ Import modules assuring standardized ETL processes

b/ Relational and multidimensional databases assuring efficient organization of imported standardized data.

c/ Software applications enabling relational and multidimensional analysis including result visualization. Technical OLAP, ROLAP and MOLAP solutions, assurance of drill up/down analysis, etc.

d/ Reporting application is focused on key indicators. Technical and graphical implementation of output information.

4. Implementation of information systems in:

a/ Institutions participating in pilot evaluation (hospitals, National institutions, statistical institutions assuring data collection and evaluation in the frameworks of National healthcare statistics).

b/ The Central Data Repository (Data and Reference Center). The technological solutions and a production of a system assuring functions of indicator benchmarking from various institutions. Risk adjustment stratification (if possible) as a method minimizing occurrence of false or incomparable results.

5. System maintenance

Follow-up, technical and analytical support of the system.

6. Evaluation of the usefulness

Evaluation of the usefulness of the proposed solution for quality management. Testing of practical impact on management methods.

7. Formation of a framework of institutions

Formation of a framework of institutions from various countries focusing on the problem of standardization and unification of performance measurement and search of pathways leading to healthcare quality and efficiency improvement.

5.6. Team description

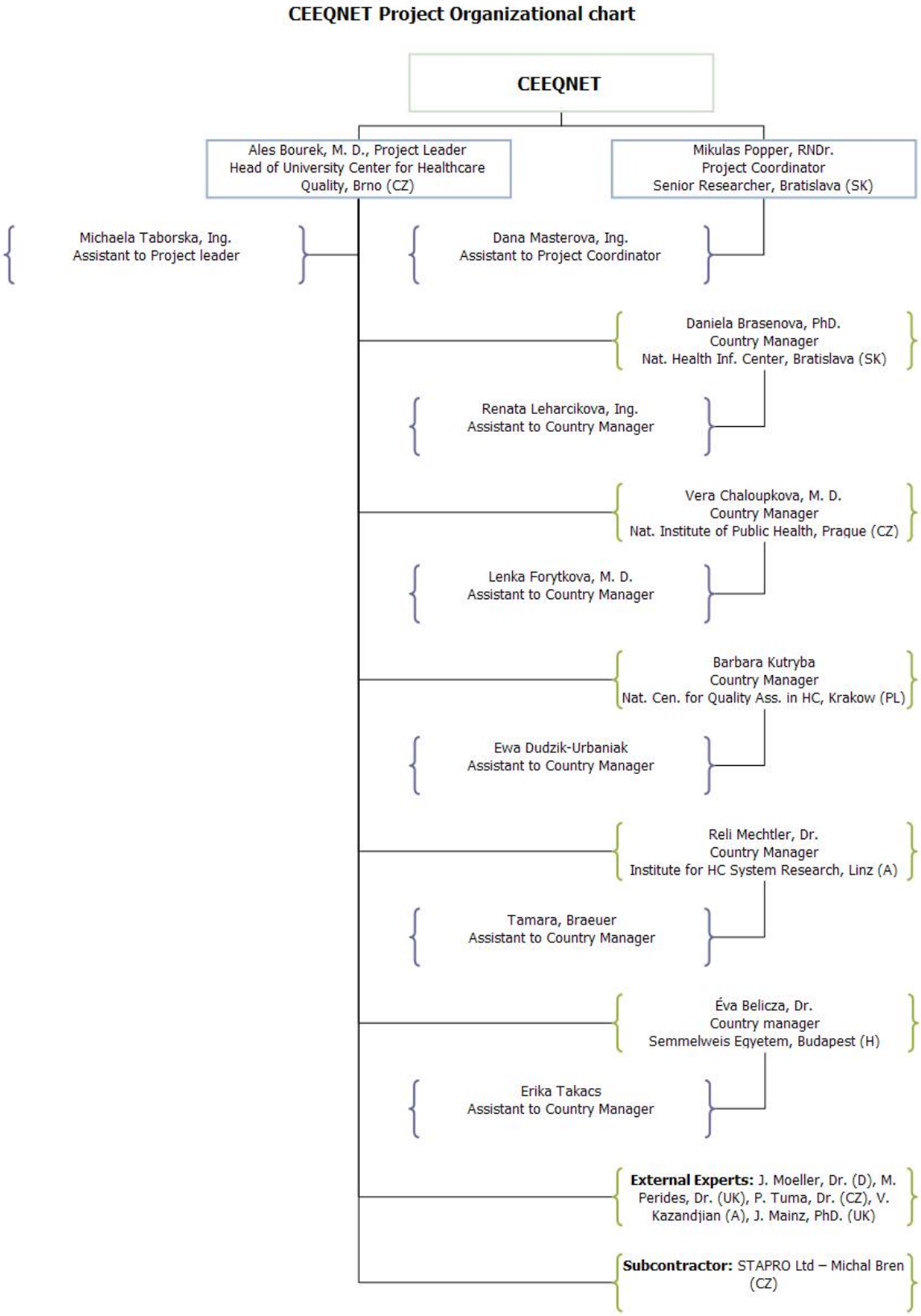

Figure 3 Organizational chart of the project

Grant Holder:

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Collaborating hospitals:

Czech Republic

General Faculty Hospital in Prague

Hospital in Karlovy Vary

Hospital in Chomutov

Hospital in Vyškov

Poland

The Barlicki University Hospital in Łódź

District Hospital in Sucha Beskidzka

Provincial Hospital in Elbląg

Slovak Republic

MFN – Faculty Hospital in Martin

NsP Nové Zámky – Regional Hospital in Nové Zámky

NsP Žilina – Regional Hospital in Žilina

NMO SR, a.s., Bratislava – Hospital of Ministry of Defense

5.7. Methodology description

5.7.1. Hospital selection

Basic requirements on the hospitals participating in the CEEQNET project

There were 3 to 4 hospitals involved in each participating country. These hospitals provided selected data for the central database. In the database, performance and quality indicators were be generated. Furthermore, the hospitals provided information on type of quality and efficiency measurements performed in the hospital, and which other data sources for further measurement are available. In the first phase 2 hospitals were involved in each country later on one or two more were added in each country. Country managers were responsible for the selection of appropriate hospitals.

Selection of hospitals was dependent on the following criteria:

A) Composition of patients (case-mix) and procedures performed

Existing quality indicators, based on evaluation of routinely collected data, are mostly related to the following specializations: surgery, obstetrics, abdominal surgery, cardio surgery, and invasive cardiology.

Existing outcome quality indicators, based on evaluation of routinely collected data, are mostly based on measurement of mortality after infrequent procedures (pancreas resection, oesophagus resection).

The selected hospitals were required to have corresponding departments (wards) and composition of patients (case-mix) and to perform routinely procedures needed for indicators evaluation.

The hospitals and country managers were supplied with a list of some existing indicators used throughout the world that deemed to be suitable for testing during the CEEQNET project. This list helped selecting the appropriate hospitals. The whole process was dependent also on the knowledge of the hospitals and their staff by the country managers and hospitals selected were judged as having implemented or having an interest in quality management systems.

B) Technical requirements

The hospitals were ideally required to use the same hospital information system (HIS) or at least one HIS for the entire hospital. No HIS changes that would have resulted in changes of data interface should have been planned for the time of the Project duration (until June 2006).

C) Organizational requirements

The selected hospitals were requested (and contracted in a way) as to cooperate actively in the Project. They were required not to undergo any extensive reorganization process accompanied by management staff instability and impossibility to give appropriate attention to the Project.

5.7.2. Information retrieval

CEEQNET Questionnaire (Data Sources)

Introduction

The aim of the questionnaire was to identify data sources conformities and discrepancies (or extent of their similarity or dissimilarity)
While compiling the questionnaire, we preferred extensiveness to intensiveness. If, based on the answers arises there was a need to examine any given field deeper, project leader selected a relevant approach (e.g. a more detailed follow-up questionnaire)
The questionnaire was constructed to be highly sensitive for uncovering potential sources of subsequent misunderstandings.
Before the questionnaire was distributed, it underwent revisions and was amended to

assure two crucial requirements:
- The questionnaire covered all the domains of data sources
- The questionnaire used unambiguous and comprehensible terminology

Guidelines for filling in country specific information

The questionnaire "form" was intended for participating partners (respective country managers and their collaborators) in participating countries. It was not intended for the use by hospitals.

The questionnaire formed a part of the initial audit of data sources (resources).
The aim of the questionnaire was to provide the basis for the description of data resources in the context of each individual participating health care system.

Definition of the CEEQNET "dimension"

The description of data resources and of the country specific system was performed through the use of dimensions. By the term "dimension" we understand a list of elements, which has (or could have) a classification (categorization) and analytical function (role) for entities such as hospitals, hospital wards, patients, procedures, healthcare technologies (drugs and medical devices). Instead of the word "dimension" it would be possible to use the word categorization (listings, lists). Some dimensions can be closely related to quality indicators (for example ICD codes, procedures, hospitalization outcome), other dimensions are not so closely related but rather describe the system as such.

Dimensions in each of the participating health care system may be quite obvious but they also may be "latent" (existing but not widely used).
It is impossible, beforehand (prospectively), to explicitly state what is and what is not (for the use of the project) a dimension.

The probability of the "usefulness" of a dimension grows if the following conditions are fulfilled:

- The dimension was (in the respective country) declared by an authority
- The data (items) collection of the respective dimension is centralized

- The dimension reflects a view (perspective) commonly shared in the respective country
- None of these conditions are a pre-requisite for a "list" to be a dimension

It is also not a condition that the dimension is represented by a coded list of elements. The vast (voluminous) lists are usually coded (for example ICD), short lists. When coded it is an advantage but this is not a necessity because they may be coded at the time when the data will be processed.

The most important aspect (from the point of view of usefulness for the project) of a dimension is, that data (items) are accessible (either easily or through some amount of effort)

Where limitations in the accessibility of data for the use of this project was identified, it was absolutely necessary to differentiate technological limitations (interfacing – data exchange platforms, encryption) and legislative limitations.
This circulated questionnaire (form) that was filled in assessed the existence and availability of lists (the dimensions). Upon returning the form it was not necessarily to accompany the form with (all) available country specific lists. The inclusion of available lists with the returned filled in "form" were nevertheless appreciated.

Minimal Basic Data Set (MBDS) questionnaire:

MBDS definition and background

The MBDS has been defined as the core of patient information with the most commonly available set of items and the most extensive range of usage.
The MBDS concept for hospitalized patients was first formalized in USA (1973, updated 1980).

In Europe the MBDS concept was presented in 1981 in Brussels CEC (Commission of the European Communities) Conference.
According this conference

- MBDS should be collected for every patient hospitalized.

- Attention should be given to:
    - Feedback to clinicians
    - Linkage of clinical information to financial information.
    - Supra-institutional view
    - Epidemiology and research

MBDS_EU - items included

The following 13 items have been included

01 - Hospital identification
A unique identifier by hospital by country
Each code should identify (indirectly) the type of hospital (size, teaching, acute/chronic, general/special, location)
02 – Patient number
Anonymous, unique by hospital
03 – Sex
04 – Age on admission
For international exchange only age computed • as the last birthday-age • for infants <24 m - number of months • for infants <1 m - number of days
05 – Marital status
06 – Residence
07 – Month and year of admission
For international exchange the day is omitted
08 – Duration of stay = Length of stay (LOS)
The departmental period (DP) of stay (DPS)
The hospital period (HP) of stay (= Sum of DPS)
(Exact hours of admission and discharge could be recorded)
09 – Discharge status
Recommended: home / discharge against medical advice / death / transfer – another institution / transfer – another department
10 – Principle diagnosis

= the main condition treated (or investigated) during the relevant episode of care and/or explained the best resources used
The main diagnosis should be chosen for each DP
11 – Other (secondary) diagnoses
All condition affecting the treatment received and/or LOS
There is no limitation given to the number of other diagnoses
12 – Surgical and obstetric procedures
All surgical and obstetric procedures are to be recorded
(Conversion tables to a uniform classification system should be used)
13 – Other significant procedures
E.g. cardiac catheterization, endoscopy, chemotherapy…)

Other discussed items

(14) – The type of admission
Minimally: Planned admission / emergency
(15) – Department identification
Specialties
(16) – Occupation / social group
(17) – Destination at discharge
Type of hospital, Nursing home
(18) – Case mix group
DRG code, Severity of case, Inlier / outlier
(19) – Intensity of care

Table 1 MBDS EU (Minimal Basic Data Set)

Definition of the MBDS_Q

This definition of the MBDS_Q for hospitalization is only for the purpose of the Questionnaire attached below (this definition has nothing or little to do with final CEEQNET solutions):

MBDS_Q is the set of items which

- Are the part of one document
- Have a defined electronic format
- Filling out is obligatory

The MBDS_Q (mandatory) items:	
▪ Hospital identification	Unique by country
▪ Patient identification	Unique (at least unique by hospital)
▪ Sex	
▪ Age on admission	Or data from which the age could be computed
▪ Month and year of admission	
▪ Length of stay (LOS)	Or data from which LOS could be computed
▪ Discharge status	At least – dismissed – transferred - death
▪ Principle diagnosis	Regardless the principle diagnosis definition *

* The principle diagnosis definition will be discussed later

Table 2 MBDS CEEQNET (Minimal Basic Data Set) for questionnaire

Questionnaire:

	For the MBDS definition (see Definition of the MBDS_Q)	
1	Is the concept of the MBDS for hospitalization adopted and implemented in your country?	Please, choose the option from ▪ yes ▪ no
→ 1-yes	If the concept **is** adopted and implemented...	
2	Is the MBDS departmental and/or institutional?	Please, choose the option from ▪ departmental only ▪ institutional only ▪ both departmental and institutional
3	Please add some details about MBDS document (addressee, purpose, further aggregated outcomes...)	
→ 1-no	If the concept **is not** adopted...	
4	Is it some data set (one document), which is more or less similar to the MBDS?	Please, choose the option from ▪ yes ▪ no
5	If yes, please specify it.	
→ 1	MBDS alternative or additional sources	
6	Is it possible to compound an equivalent of the MBDS from different data sources?	Please, choose the option from ▪ yes ▪ no
7	If yes, please specify these sources	

Table 3 MBDS CEEQNET (Minimal Basic Data Set) questionnaire

Departmental MBDS	A Items form a mandatory part of the (national) MBDS (Specify the data characteristic)	B Items obtainable from other sources (Specify the data characteristic and data source)
Hospital identification		
Patient identification		
Sex		
Age on admission		
Month and year of admission		
Length of stay (LOS)		
Discharge status		
Principle diagnosis		
Other (secondary) diagnoses		
Surgical and obstetric procedures		
Other significant procedures		
The type of admission		
Department identification		
Destination at discharge		
Case mix group		

Table 4 Departmental MBDS questionnaire

Institutional MBDS	A Items form a mandatory part of the (national) MBDS (Specify the data characteristic)	B Items obtainable from other sources (Specify the data characteristic and data source)
Hospital identification		
Patient identification		
Sex		
Age on admission		
Month and year of admission		
Length of stay (LOS)		
Discharge status		
Principle diagnosis		
Other (secondary) diagnoses		
Surgical and obstetric procedures		
Other significant procedures		
The type of admission		
Department identification		
Destination at discharge		
Case mix group		

Table 5 Institutional MBDS questionnaire

Hospital data and structure

Questionnaire - Hospitals, their classification and structure [22]

COUNTRY	
Hospital classification	
Is there any basic (that means regularly, widely used) classification of hospitals used in your country?	Yes/No
What kind of classification is it?	Classifications (please describe): 1. Based on the services provided and the level of minimum requirements satisfied 2. Based on ownership 3. Based on other criteria
Do you use bed-size characteristic (number of beds) for the purpose of hospital classification? e.g. ▪ fewer than 100 beds, ▪ 100 - 300 beds, ▪ 300 + beds	Yes/No
If so, what is the scale?	
If not using this characteristic, is the data available anyway?	Yes (describe)/No
Do you use ownership characteristic for the purpose of hospital classification? e.g. ▪ Private for profit ▪ Private non for profit ▪ Public	Yes (describe)/No
If so, could you specify?	
If not using this characteristic, is the data available anyway?	Yes/No

Do you use "general versus specialty" characteristic for the purpose of hospital classification? e.g. ▪ General hospital ▪ Specialized hospital (psychiatry, tuberculosis...)	Yes (describe)/No
If so, could you specify?	
If not using this characteristic, is the data available anyway?	Yes/No
Do you use hospital teaching status as a characteristic for the purpose of hospital classification? e.g. ▪ Teaching hospital ▪ Other	Yes (describe)/No
If so, could you specify?	
If not using this characteristic, is the data available anyway?	
Do you use emergency grade as a characteristic for the purpose of hospital classification? e.g. ▪ Acute care hospital ▪ Sub acute care hospital ▪ Chronic care hospital	Yes (describe)/No
If so, could you specify?	
If not using this characteristic, is the data available anyway?	Yes/No

Do you use (average) lengths of stay as a characteristic for the purpose of hospital classification? e.g. ▪ Short term care hospital ▪ (Medium term care hospital) ▪ Long term care hospital	Yes/No
If so, could you specify?	
If not using this characteristic, is the data available anyway?	
Do you use hospital geographic area as a characteristic for the purpose of hospital classification? e.g. ▪ Urban hospital ▪ Rural hospital	Yes (describe)/No
If so, could you specify?	
If not using this characteristic, is the data available anyway?	Yes/No
Do you use any other hospital characteristic for the purpose of hospital classification?	Yes (describe)/No
If so, could you specify?	
Hospital structure	
Is there a uniform list (or widely used list) of specializations (specialties)?	Yes/No
If so, is it regularly used?	Yes/No
Is there a uniform list (or widely used list) of healthcare units? (Outpatient dept., standard bed, endoscopy, x-ray unit etc.)	Yes (describe)/No

If so, is it regularly used?	Yes/No
Human resources	
Is there an uniform list (or widely used list) of professions? e.g. ▪ physician ▪ pharmacist ▪ nurse ▪ laboratory ▪ other paramedical ▪ administrative non medical ▪ technical non medical	Yes/No
If so, is it regularly used?	Yes/No

Table 6 Hospital classification questionnaire

Health Insurance Companies	
Is there a system of health insurance implemented?	Yes/No
If so, is the health insurance for the citizens compulsory?	Yes/No
If so, is a citizen entitled to be insured by more than one health insurance company?	Yes (describe)/No
Hospitalization Case	
Is there any classification list to describe types of admission to the hospital based on the subject, which has referred patient to the hospital? e.g. Czech coded list (in approximate wording) ▪ Born in the hospital ▪ Referred by general practitioner	Yes (describe)/No Admission from/referred by 1. back from other hospital 2. from other hospital 3. within institution, from one department to another 4. from primary care, GP and other

▪ Referred by ambulatory emergency physician ▪ Referred by another physician from ambulatory sector ▪ Referred by another bed care facility ▪ Referred by social worker ▪ Without reference	5. from outpatient from other institution 6. from outpatient same institution 7. ambulance – no referral 8. no referral (‘from the street’) 9. readmission by same department – planned A. back from adaptation B. other admission Born in hospital: it could be defined with other data (every newborn in hospital has MBDS data, and it is defined where was born) Data contain the exact code of provider who transfer the patients to hospital. C. continued record
If so, can you specify?	
Is there any classification list to describe types of admission to the hospital based on the emergency level (grade)? e.g. Czech coded list ▪ Urgent (emergency) admission ▪ Planned admission ▪ Another type of admission	Yes (describe)/No
If so, can you specify?	
Is there any classification list to describe types of admission to the hospital based on the aim of the hospitalization? e.g. Czech coded list ▪ Protective treatment (= legal act) ▪ Social reason	Yes (describe)/No

▪ Diagnostic purpose ▪ Therapeutic purpose ▪ Other purpose	
If so, can you specify?	
Is there any classification list to describe the way of termination of hospitalization (discharge)? e.g. Czech coded list (Abbreviated) ▪ Dismissed to the ambulatory (outpatient) care ▪ Transferred to the institutional care – social welfare facility ▪ Transferred to the institutional care – long term care facility ▪ Transferred to the institutional care – short term care facility ▪ Deceased (died)	Yes (describe)/No
If so, can you specify?	
Do you use classification of cases (case-mix, DRG) for the acute inpatient care?	Yes (describe)/No
If so, can you specify?	
Do you use classification of cases (case-mix,) for another than acute inpatient care?	Yes (describe)/No
If so, can you specify?	
Patient Identification	
Is there a uniform (or widely used) patient identification?	Yes (describe)/No
If so, can you specify?	
Can you specify an identifier of a patient?	

e. g. ▪ Code assigned to the citizen while born ▪ Code assigned by a health insurance company	
Is there a uniform (or widely used) way of identifier coding?	Yes/No
If so, how is the identifier encrypted?	
Enables the way of identifier encrypting to interface two hospitalizations of one patient?	Yes/No
Description of patient condition, demands on healthcare resources	
What version of the ICD (International Classification of Diseases) do you use?	
Do you use any national modification of the ICD?	Yes (describe)/No
Do you use any classification list to describe patient's social status? e.g. Czech coded list ▪ unemployed or child or student ▪ manager ▪ scientist, research brainworker ▪ technical, medical or pedagogic worker ▪ administrative worker ▪ worker in service business ▪ skilled worker in agriculture, forestry ▪ another skilled worker ▪ auxiliary worker	Yes (describe)/No
If so, can you specify?	
Do you use any classification list to describe patient's marital status?	Yes (describe)/No

If so, can you specify?	
Do you use any classification list to describe patient's demands on healthcare resources in an intensive care department? e.g. Czech coded list ▪ 50+ TISS / bed day ▪ 40-49 TISS / bed day ▪ 30-39 TISS / bed day ▪ 20 -29 TISS / bed day ▪ 15-19 TISS / bed day ▪ 9-14 TISS / bed day (TISS = Therapeutic Intervention Scoring System)	
If so, can you specify?	
Are there any other classification lists you use to describe patient's health condition or his demands on healthcare resources during the hospitalization?	Yes (describe)/No
If so, can you specify?	
Description of healthcare details (procedures, materials)	
Are all of the procedures (operative, biochemical etc.) parts of one classification list?	Yes/No
If not, please state the particular classification lists.	
If so, was the list composed as a (purely) national one, or was it extracted from a foreign (international) list? Which one was it?	
Was the list of operative procedures (if it is not part of the list of all procedures) composed as a (purely) national one, or was it	Yes (describe)/No

extracted from a foreign (international) list? Which one was it?	
Does the list of procedures include quantitative statement of procedure demands on resources?	Yes (describe)/No
If so, are the demands stated relatively (in points) or absolutely (in cash)?	
Is the list of procedures hierarchical?	Yes/No
State particular lists of drugs, blood derivates, and medical supplies.	Yes (describe)/No
Do these lists include prices?	Yes/No
If so, is it fixed price or maximal price?	
If so, does the price include profit margin (for suppliers, pharmacies etc.)?	
Data Collected	
Is there a standard data interface for data exchange?	Yes (describe)/No
If so, can you specify? e.g. ▪ HL7 ▪ DICOM, ▪ other	
Is there a national data model in your country?	Yes (describe)/No
Is MBDS (Minimum Basic Data Set) for hospitalizations unambiguously defined in your country?	Yes (describe)/No
If so, is it based on a national standard or any other standard? Which one?	Yes (describe)/No
If not, is there any other data set corresponding to MBDS? Or more data sets like that?	
Is there any legislative limitation for transfer	Yes (describe)/No

of (encrypted) healthcare data into a foreign country?	
Are there different types (levels) of subjects processing the data from the legislative point of view?	Yes (describe)/No
Healthcare Indicators	
Are there any recommended sets of quality and performance indicators?	Yes (describe)/No
If so, is a documentation of their validation kept?	Yes (describe)/No
If so, are these indicators standardized (Risk adjusted)?	Yes (describe)/No
Benchmarking	
Is there a National Healthcare Data Centre in your country?	Yes/No
Are the data needed for benchmarking regularly published?	Yes/No
Is there an institution in charge of collecting, processing and publishing of data needed for benchmarking?	Yes/No

Please, insert extra lines into the table and provide details in any part of the questionnaire (if relevant) if:	
There any possible regional or local variations	
There any possible variations in the time = any changes in the past (approx. two years) or any changes planned or assumed	

Table 7 Hospital case classification questionnaire

Attachments for inclusion into the MBDS Questionnaires

In case you have following documentation at your disposal, please provide it:

1. Description of methodology of data collecting for statistical purposes (what kind of data is collected, who collects them, how often…)
2. Description of hospital funding
3. Description of methodology of data collecting for purposes of reimbursement
4. Legislative defining data collecting and data processing

5.7.3. Information and data samples requested

Clinical data

Data source	Specification	Comment
Hospital Chart of Hospital Treatment	1 month sample	MZ/Szp-11 (MZ/Szp-11B)
Data provided to the payer	1 month sample All patients (including outpatients)	

Organization structure		
Data source	**Specification**	**Comment**
Organization structure	Hierarchical	
Economical data		
Data source	**Specification**	**Comment**
Accounting system	(Chart of accounts)	
Bookkeeping	1 month sample – monthly	(not all account entries)

	turnovers for each account	
Personal data		
Data source	**Specification**	**Comment**
Personal Figure – Aggregates	1 month sample	
Other data		
Data	**Specification**	**Comment**
Bed Capacity	Speciality break-down	
Inpatients Figure	Total - One year	
Incomes	Total - One year	
Costs	Total - One year	
Other information requested		
Encoding All personal identifiers should be encoded in the way that: - clinical data chaining is feasible (for one patient) - only the hospital providing the care is apt to decode it **Electronic format description** - Provide information on the electronic format used		

Table 8 Data sources requested

5.7.4. Hospital involvement

Manual on cooperation of hospitals participating in the CEEQNET Project

Data Sample

For this phase, it is essential to have the administrative data in the country defined (at least approximately), in cooperation with the Country manager.

Hospitals shall send a data sample for a one-month period (starting December 2004). In case the data are not collected monthly, then the data for the shortest period (relevant to the given data sample) shall be transferred – e. g. quarter-year, half-year or year.
The data samples do not have any compulsory interface. They can be transferred in different interfaces (according to the possibilities and conditions in the hospitals), preferably .txt or .xls.

If the project leadership is absolutely sure that the administrative data show equal characteristics in all the hospitals in the country, then one data sample from one reference hospital shall be sufficient. If it is not entirely sure, all the participating hospitals shall provide their data samples. The data samples from the other hospitals can be limited to the fields where these hospitals differ from the reference hospital.

The aim of this phase is to verify on the real data the knowledge gained on the general level - about the structure of the administrative data, coding lists and other aspects.

Protection of Personal Data in the Data Sample

Regarding possible legislative limitations of personal data collection, it is possible to erase the identity of the person (code, personal number, name etc.) in the sample.

Specific information on Hospital related to the Data Processing

Some information, essential for the following data processing, is to be gained from all the hospitals, especially information on:

- Organizational structure
- Accounting system and its „mapping“ on the cost and income categories (these are unified for all the subjects in the Project)

Data

Based on the knowledge gained from the data samples, following conditions will be agreed for data transferring and processing.

- Extent
- Interface
- Periodicity
- Way of personal data protection

Extent

Generally, the extent * can be described as follows:

- Data on hospitalization cases; especially primary and secondary diagnoses, major procedures; way of admission and discharge; total length of stay; care intensiveness (TISS, number of days in the intensive care unit)
- Data on care provided in the outpatient sector
- Data on costs and incomes of particular cost centres according to the cost and income categories
- Data on working hours belonging to the particular cost centres according to the profession categories

Comment:

From our as well as of country managers' experiences, which are described in the Second Interim Report, the most relevant for the aim described below and at the same time the least problematic for collecting seem to be the clinical data. At first, we suggest focusing on them a trying to find the easiest and quickest way how to import them into the project

database. If it is possible and we have enough time, we will continue with collecting and importing the rest data.

Data will be processed for the years 2004, 2005, (2006)

The aim is to gain data enabling to define measurements which could become candidates on:

- Quality indicators
- Efficiency indicators; efficiency measurement means definition of relations between output (clinical production) and input (sources used – costs and working hours)

*General description is based on the assumed goals and on identification of administrative data in the Czech Republic, Slovak Republic and Poland.

Interface

Regarding different technical levels and possibilities of cooperating hospitals, the easiest text data format has been selected. Detailed description of interfaces will be delivered after the transferred data sample analysis.

Periodicity

Periodicity of data transfer is subject to arrangement. Yearly transfer would be preferable.

Personal Data Protection

It is essential to identify the patient unambiguously for the purposes of hospitalization cases set-up. The administrative identity is encrypted through a provided encrypting module. Then only the encoded number and non-identifying data (sex; date of birth) are transferred.

Further Aspects of Participation of the Hospitals

Specific Information on Efficiency and Quality Measurement in Hospitals (not related to the data processing)

Hospital provides information on efficiency and quality measures (indicators) used and on other methods of quality and efficiency evaluation. These data will not be used by data processing. The aim is:

- To get to know in what kind of environment will be the CEEQNET measurement implemented
- To use existing measurements if available – and find results correlation between existing and proposed measures tested in the Project

We assume that the hospital (except for providing real data) would contribute to the Project by validation of the process (after the data for the year 2004 have been processed) and by providing additional information if necessary:

- On conditions of data collection and on data quality
- On correct interpretation of measurements in the given context
- On possible deformations related to the data or selected measurements (candidates on indicators)
- On correlations between measurements or other knowledge in the same field
- At the end, the hospital shall provide its point of view on usefulness, correctness (scientific soundness) and practical feasibility of selected measurements

Role of the Contact Persons in the Hospitals

For an efficient communication it is vital to ensure cooperation of following persons:

- IT person – guarantees technological information and data set-up
- Other contact person – guarantees information and further communication in the „non-technological“ fields to the extents approximately limited by this document

Time Schedule

First step	(Information from CM)	(Definition of the administrative data in the country – does not apply for the hospitals)
Second step	Data sample Specific information on hospital related to the data processing	
Third step	Data	See also: Periodicity
Fourth step	Specific information on efficiency and quality measurement in the hospital (not related to the data processing)	Can proceed simultaneously with the first and second steps
Fifth step	Further aspects of hospitals´ participation	

Table 9 Hospital time schedule for collaboration

Summary of hospital involvement

The hospital shall become

- The informed guide and interpreter in the local environment (as the Country manager should be the informed guide and interpreter on the general, national level)
- The tester and opponent of selected measuring and monitoring [9, 41]

5.7.5. *Data Warehousing System*

The system is represented by a collection of database objects, including tables, views, indexes, and synonyms. Our data warehouse uses a dimensional model for online application processing (OLAP) as shown in the following schematic diagram.

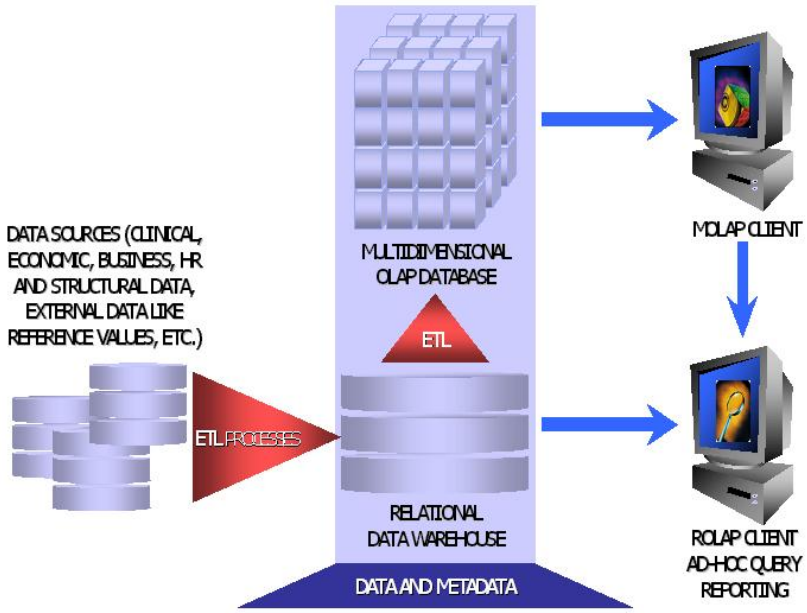

Figure 4 Diagram of the used Data warehousing system

5.7.6. *External Expert Involvement*

Explanation of project concepts to the external expert community (Underlying principles of the CEEQNET platform)

The used methodology, based on the processing of clinical data used in the description of in-patient care (all patients, all departments of acute hospital care) and exploitation of a "multidimensional" concept and technology distinguishes this project form usual national projects based on the processing of limited datasets and targeted at the production of several or several dozens of relatively specific indicators narrowly defined by the use of clinical definition components. This used approach was pre-defined for this study and was strictly adhered to during the project without modification.

Nevertheless should we decide to reconstruct the reasons leading to the selection of this approach then the following should be voiced:

- The system is to be based (constructed) on administrative (routinely collected and historically accessible) data. Should the indicators (clinically and narrowly) had been pre-defined at the time of the beginning of the project, there was a risk of not identifying needed data in the hospitals of the five participating countries to construct the indicators, or the participating hospitals would not be performing the procedures. The chosen approach allows exploring, which data components co-occur in the participating countries and hospitals, thus expressively increasing the chances for reaching an end result.

- System enables (because it contains all the data elements in a subsequently "processable – flexible" format) experimenting and fine-tuning and modifications of the indicators through adding/deleting procedures or diagnoses, or by eliminating some cases based on admission/discharge criteria, age etc.

- The chosen approach requires the full understanding of the national data-model used in healthcare as well as understanding the way data collection is performed and facilitates the process of know-how "focusing".

- The result of such activity is a system enabling the search for "common" indicators, experiment with their definition and add new indicators to indicators already existing.

Reasons for involvement of external experts

Above outlined approach leads to challenges and questions during the realization phase as well as during the finalization of outputs to meet the project goals.

Possible problems tied to the realization phase

- The data-model is relatively complicated and needs to be modified (and because of that re-programming of the database is needed) every time a new country joins the project (at that point of the project we still lacked the data from Hungary and though we had a description of the Hungarian healthcare data interface, it was expected, that a partial database reconstruction will be needed.)

- Any user of the system has the possibility of searching for (and in this way defining) indicators of potential interest to him. In order to be able to do this, he needs to have the understanding of the model, which of course needs training (here we had problems relating to the still "temporary data model due to lack of Hungarian data", short amount of time with the view of the nearing end of the project (April 2007) and the lack of common use of efficient communication platforms with the external experts, who were not using the SharePoint Services platform.)

Possible problems relating to the concept of the project

- The multidimensional database enables the definition and re-definition of indicators and allows even for the stratification according to the risks (meaning of course those risks included in the coded administrated data such as co-morbidities, age.) On it's own the database does not enable the risk adjustment according to the usual methods of standardization (e.g. indirect standardization) meaning the re-calculation of the indicators resulting in one synthetic indicator (and not several indicators as is the case of simple risk stratification) [11].

Possible problems relating to finalizing outputs

- Should the project require strict validation of the system of performance and quality measurement then this would be extremely problematical (frankly stating – unreachable requirement). Generally validation of measurements means bringing a proof that the measurement measures exactly that, what it declares it is measuring. Thus if as the measure of quality the AMI mortality rate is chosen, validation means producing the proof that a hospital with higher AMI mortality rate has a lower quality level. - So the question is better rephrased in the following way: "Are there, among the many thousands of recorded measures (numbers) administered in the healthcare environment at least some, that can be considered as valid quality indicators?". The best candidates would be such, which have been validated in other countries (Intra-hospital mortality AMI, Intra-hospital mortality pancreatic resection ...). We were able to identify roughly 20 of such "international indicators = candidates". The usual method of validation is "construct validity" based on mutually compliant and supportive findings, that our studied measure is concordant with other findings known or assumed to reflect the quality of care in a given clinical domain. An example may be found in hospitals in the US, where standards of care for AMI have been introduced and the mortality rate has decreased when compared with hospitals not

using the standards. In other words, construct validity proves the causal connection between the measure (low mortality) and processes (EBM therapy). It is unrealistic to perform the construct validity in the framework of the CEEQNET project (for several reasons - it would require the collaboration with clinical experts, e.g. cardiologists for AMI, abdominal surgeons for pancreatic resection etc.; due to the fact, that this type of "evidence" has a relative value and is not what we can consider as perfect logical evidence, it is usually produced by a panel of experts, moreover this "evidence" would have to be produced for each and every participating country).

The whole project provides an array of interesting and useful findings. The output nevertheless is not to be a theoretical study, but a living and used system.

Tasks for expert involvement

What was the expected role of the external experts in the CEEQNET project:

- The evaluation and if possible a certain degree of support for the selected approach. On one hand nothing can be changed in the concept at this point, on the other hand, it would be beneficial to have some external views as a balance to the "internal" opposition (voices saying that it is very hard to understand what is to be done and that no evident results have been produced).
- Aid in the selection of the appropriate terminology (terms). The problem is not on the level of the overall multidimensional measure-matrix accessible (these are simply measures - a neutral term not addressing the validity). The problem is how to "call" - what term to assign - to the selected measures based on "foreign - overseas" examples of Quality Indicators. We see no problem in calling them Quality Indicators (given the fact, that even these “measures” have their life cycle of development), but for some internal project experts this seems to be unacceptable (maybe they are right). In any case it will be necessary to terminologically separate the 21 identified candidates from calling them simply "measures". Would "Quality Indicator Candidates" be acceptable?

  Aid in questions relating to the need of instrumenting indicator validation. What approaches and methodologies could be used? How to - in the framework of this project - to validate at least one Indicator? Using what methodology? (The Project Management assumes that this is hardly performable, but it would be greatly

welcomed if external experts attempt to produces a more optimistic answer or a suggestion for action to take).

- The project needs the inputs of the external experts also for detailed explanation of indicators (Face validity, Precision, Minimum bias, Construct validity, Encourages true quality improvement, Prior use, Comments)
- To propose other possible usage of the CEEQNET database?
- To reflect on development (potential future) of the concept of using healthcare system administered data as opposed to constructing new (specific) healthcare related measures from Scratch.

6. Project products

6.1. CEEQNET Clinical data set

Item: (Institutional)	Specification	Comment
Hospital identification		
Patient identification		
Sex		
Age on admission		
Month and year of admission		
Length of stay (LOS)		
Discharge status		
Principle diagnosis		
Other (secondary) diagnoses		
Surgical and obstetric procedures	Procedure date	Or hospitalization day serial number of every procedure listed
Other significant procedures	Procedures essential for DRG grouping	Optional
Case mix group (DRG)		Optional
The type of admission		Optional
Destination at discharge		Optional
Domicile region		Optional

This dataset reflects mandatory data from all collaborating hospitals.

Table 10 Clinical dataset of CEEQNET

6.2. Detailed primary data description of HC systems of CQN countries

The Synopsis was performed after collation of all filled in forms from individual healthcare systems. It is expected that this material and framework will be helpful for following projects requiring HC data utilization.

CEEQNET primary data used in health care (HC) systems – Synopsis

Abbreviation explanation

y	**Yes**
n	**No**
y / n	**predominantly "yes", but from some points of view "no"**
n / y	**predominantly "no", but from some points of view "yes"**
(y)	**yes, but not exactly in that sense, in which question was intended**
(n)	**no, but not exactly in that sense, in which question was intended**
?	**further information is needed**

	AT	CZ	HU	PL	SK
Hospital classification					
Is there any basic (that means regularly, widely used) classification of hospitals used in your country?	**y**	**N**	**y**	**n**	**y**
What kind of classification is it?		**not applicable**		**not applicable**	
Do you use bed-size characteristic (number of beds) for the purpose of hospital classification?	**(y)**	**N**	**n**	**n**	**n**

If so, what is the scale?		**not applicable**	**not applicable**	**not applicable**	**not applicable**
If not using this characteristic, is the data available anyway?		**Y**	**y**	**y**	**y**
Do you use ownership characteristic for the purpose of hospital classification?	**y**	**y / n**	**y**	**y**	**y**
If so, could you specify?	**y**	**Y**	**y**	**y**	**y**
If not using this characteristic, is the data available anyway?	**not applicable**	**not applicable**	**not applicable**	**not applicable**	**not applicable**
Do you use "general versus specialty" characteristic for the purpose of hospital classification?	**y**	**y / n**	**y**	**y**	**y**
If so, could you specify?	**y**	**Y**	**y**	**y**	**y**
If not using this characteristic, is the data available anyway?	**not applicable**	**not applicable**	**not applicable**	**not applicable**	**not applicable**
Do you use hospital teaching status as a characteristic for the purpose of hospital classification?	**N / y**	**Y**	**n / y**	**y**	**n**
If so, could you specify?			**y**	**y**	**not applicable**
If not using this characteristic, is the data available			**y**	**not applicable**	**(n)**

anyway?					
Do you use emergency grade as a characteristic for the purpose of hospital classification?	**n**	**n**	**n**	**n**	**n**
If so, could you specify?	**not applicable**	**not applicable**	**not applicable**	**not applicable**	**not applicable**
If not using this characteristic, is the data available anyway?	**n**	**n**	**n**	**n**	**n**
Do you use (average) lengths of stay as a characteristic for the purpose of hospital classification?	**n**	**n / y**	**n**	**y**	**(n)**
If so, could you specify?	**not applicable**	**y**	**not applicable**	**y**	**not applicable**
If not using this characteristic, is the data available anyway?	**-**	**-**	**-**	**not applicable**	**(n)**
Do you use hospital geographic area as a characteristic for the purpose of hospital classification?	**n**	**n**	**(y)**	**(y)**	**n**
If so, could you specify?	**not applicable**	**not applicable**	**(y)**	**(y)**	**not applicable**
If not using this characteristic, is the data available anyway?	**n**	**n**	**not applicable**	**not applicable**	**n**

Do you use any other hospital characteristic for the purpose of hospital classification?	**n**	**n**	**n**	**(y)**	**n**
If so, could you specify?	**not applicable**	**not applicable**	**not applicable**	**(y)**	**not applicable**
Hospital structure					
Is there an uniform list (or widely used list) of specializations (specialties)?	**y**	**y**	**y**	**y**	**y**
If so, is it regularly used?	**y**	**y**	**y**	**y**	**y**
Is there an uniform list (or widely used list) of healthcare units? (outpatient dpt., standard bed, endoscopy, x-ray unit etc.)	**n**	**(y)**	**y**	**y**	**y**
If so, is it regularly used?		**y**	**y**	**y**	**y**
Human resources					
Is there an uniform list (or widely used list) of professions?	**(y) physicians only**	**y**	**y**	**y**	**y**
If so, is it regularly used?	**?**	**y**	**y**	**y**	**y**
Health Insurance Companies/Sickness					

Funds					
Is there a system of health insurance implemented?	y	y	y	y	y
If so, is the health insurance for the citizens compulsory?	y	y	y	y	y
If so, is a citizen entitled to be insured by more than one health insurance company?	y	n	(y)	n	n
Hospitalization Case					
Is there any classification list to describe types of admission to the hospital based on the subject, which has referred patient to the hospital?		y	y	y	y
If so, can you specify?		y	y	y	y
Is there any classification list to describe types of admission to the hospital based on the emergency level (grade)?		y	y	y	y
If so, can you specify?		y	y	y	y
Is there any classification list to describe types of admission to the hospital based on the aim of the hospitalization?		y	(y)	y	n
If so, can you specify?		(y)	ICD-10	y – hospital	not

			Z codes	specific	applicable
Is there any classification list to describe the way of termination of hospitalization (discharge)			y	y	y
If so, can you specify?			y	y	y
Do you use classification of cases (case-mix, DRG) for the acute inpatient care?	y	y	y	n	n
If so, can you specify?	LKF	IR-DRG	Hungarian version	not applicable	not applicable
Do you use classification of cases (case-mix,) for another than acute inpatient care?	n	n	n / (y)	n	n
If so, can you specify?	n	n	one-day cases	not applicable	not applicable
Patient Identification					
Is there a uniform (or widely used) patient identification?					
If so, can you specify?					
Can you specify an identifier of a patient?					
Is the patient identifier encrypted?					

Is there a uniform (or widely used) way of identifier coding?					
If so, how is the identifier encrypted?					
Enables the way of identifier encrypting to interface two hospitalizations of one patient?					
Description of patient condition, demands on healthcare resources					
What version of the ICD (International Classification of Diseases) do you use?	**ICD-10**	**ICD-10**	**ICD-10**	**ICD-10**	**ICD-10**
Do you use any national modification of the ICD?	**n**	**n**	**y**	**n**	**n**
Do you use any classification list to describe patient's social status?		**y**	**y**	**n**	**y**
If so, can you specify?		**y**	**y**	**not applicable**	**y**
Do you use any classification list to describe patient's marital status?		**y**	**y**	**n**	**N?**
If so, can you specify?		**y**	**y**	**not applicable**	**not applicable**
Do you use any classification list to describe patient's demands on healthcare resources in an intensive care department?		**y**	**n?**	**n / y?**	**n**

If so, can you specify?		**y**	**not applicable**	**-**	**-**
Are there any other classification lists you use to describe patient's health condition or his demands on healthcare resources during the hospitalization?		**y**	**n?**	**(y)**	**(y)**
If so, can you specify?		**y**	**not applicable**	**y**	**y**
Description of healthcare details (procedures, materials)					
Are all of the procedures (operative, biochemical etc.) parts of one classification list?		**y**	**y**	**y**	**y / n**
If not, please state the particular classification lists.		**not applicable**		**not applicable**	**-**
If so, was the list composed as a (purely) national one, or was it extracted from a foreign (international) list? Which one was it?		**National**	**National**	**International Classification of Medical Procedures – ICD-9CM, second edition (1999)**	**National**

				National modification	
Was the list of operative procedures (if it is not part of the list of all procedures) composed as a (purely) national one, or was it extracted from a foreign (international) list? Which one was it?		**(National)**	**National**		**Operative procedure list is hospital specific ?**
Does the list of procedures include quantitative statement of procedure demands on resources?		**y**	**?**	**n**	**y**
If so, are the demands stated relatively (in points) or absolutely (in cash)?		**points**	**?**	**not applicable**	**points**
Is the list of procedures hierarchical?		**n / (y)**	**n / y**		
State particular lists of drugs, blood derivates, and medical supplies.	**-**	**-**	**-**	**-**	**-**
Do these lists include prices?		**y**	**y**	**y**	**y**
If so, is it fixed price or maximal price?		**maximal**	**fixed**	**maximal**	**maximal**
Data Collected					
Is there a standard data interface for data exchange?		**n**	**y but not yet in use**	**n?**	**n**
If so, can you specify?		**not**	**Y**	**not applicable**	**not**

		applicable			applicable
Is there a national data model in your country?		n		y?	?
Is there any legislative limitation for transfer of (encrypted) healthcare data into a foreign country?			Y	n	y?
Are there different types (levels) of subjects processing the data from the legislative point of view?		y	Y	?	?
MBDS					
Is MBDS (Minimum Basic Data Set) for hospitalizations unambiguously defined in your country?	y	y	Y	y	y
If so, is it based on a national standard or any other standard? Which one?		national standard	Y	national standard recommended by EU	national standard
If not, is there any other data set corresponding to MBDS? Or more data sets like that?		y		not applicable	not applicable
Healthcare Indicators					
Are there any recommended sets of quality and performance indicators?	y		y	n	n

If so, is a documentation of their validation kept?	**n**		**n**	**not applicable**	**not applicable**
If so, are these indicators standardized (Risk adjusted)?	**y**		**n**	**not applicable**	**not applicable**
Benchmarking					
Is there a National Healthcare Data Centre in your country?	**y**	**y**	**y**	**y**	**y**
Are the data needed for benchmarking regularly published?	**n**	**n**		**n**	**(y)**
Is there an institution in charge of collecting, processing and publishing of data needed for benchmarking?				**n**	**(y)**

Table 11 CEEQNET primary data used in health care (HC) systems – Synopsis

Indicators extractable from administrated data in 5 CEEQNET countries

(Proposed for testing in the CEEQNET Database and Model, Hungarian data not included)

Clinical group	Mortality Rate	Annual Volume	Utilization Rate	ALOS	Transfer Rate
Acute myocardial infarction (AMI)	PQI	A		A	A
HIP Fracture	PQI	A		A	A
Congestive Heart Failure (CHF)	PQI	A		A	A
Gastrointestinal (GI) Hemorrhage	PQI	A		A	A
Acute Stroke	PQI	A		A	A
Pneumonia	PQI	A		A	A
PTCA	PQI	A		A	A
Pancreatic Resection Mortality Rate	PQI	PQI		A	A
Esophageal Resection	PQI	PQI		A	A
Abdominal Aortic Aneurysm (AAA) Repair	PQI	A		A	A
Carotid endarterectomy (CEA)	PQI	A		A	A
CABG	PQI	A		A	A
Hip Replacement	PQI	A		A	A
Craniotomy	PQI	A		A	A
Laparoscopic Cholecystectomy Rate	A	A	PQI	A	A
Primary Cesarean Delivery Rate	A	A	PQI	A	A

A = Additional Information

Table 12 Indicators extractable from data administrated in the 5 CQN countries

6.3. CEEQNET Project identified healthcare quality related indicators

The CEEQNET Project identified the following HC quality related indicator candidates. These have the same meaning in the collaborating HC systems and are extractable from primary data (HC information systems) already administered in 5 European countries (most likely available in most EU HC systems)

CEEQNET IDENTIFIED HEALTH CARE QUALITY RELATED INDICATOR CANDIDATES		
1.	Abdominal Aortic Aneurysm (AAA) Repair Volume	**Volume Measures**
2.	Carotid Endarterectomy (CE) Volume	
3.	Coronary Artery Bypass Graft (CABG) Volume	
4.	Esophageal Resection Volume	
5.	Pancreatic Resection Volume	
6.	Pediatric Heart Surgery Volume	
7.	Percutaneous Transluminal Coronary Angioplasty (PTCA) Volume	
8.	Cesarean Section Delivery Rate	**Provider-Level Utilization Measures**
9.	Laparoscopic Cholecystectomy Rate	
10.	Acute Myocardial Infarction (AMI) Mortality Rate	**In-Hospital Mortality Measures**
11.	Congestive Heart Failure (CHF) Mortality Rate	
12.	Gastrointestinal (GI) Hemorrhage Mortality Rate	
13.	Hip Fracture Mortality Rate	
14.	Pneumonia Mortality Rate	
15.	Acute Stroke Mortality Rate	
16	Abdominal Aortic Aneurysm (AAA) Repair Mortality Rate	**Post-Procedural Mortality Measures**
17.	Coronary Artery Bypass Graft (CABG) Mortality Rate	
18.	Craniotomy Mortality Rate	
19.	Esophageal Resection Mortality Rate	
20	Hip Replacement Mortality Rate	
21.	Pancreatic Resection Mortality Rate	

Table 13 CEEQNET Project identified HC quality related indicator candidates

6.4. Online accessible functional database and Data Reference Center

Online accessible functional database of data „extracted and transformed into a standard format“ from primary data sources of collaborating HC systems and a Reporting tool (based on Oracle Discoverer technology) enabling different views of database using the „dimensions“ of CEEQNET (Period, Country, Hospital, Primary Case Diagnosis, Gender, Urgency (Case Planning),Type of Case Admission, Type of Case Ending, Turnover Type, Profession Types, Clinical Specialty, Type of Expenses (cost centers), Procedures). This resource is accessible online (using a secure Internet connection) to all participants of the project and other authorized professionals and can be reached via URL http://www.ceeqnet.com.

6.5. CQN Newsletters

The CEEQNET (quarterly) was produced throughout the Project by the Office of the Project Leader to prime and facilitate the use of performance measurement and benchmarking in everyday life in HC facilities. Benchmarking culture was presented not as means to “see your relative position in a league-table” [19, 28, 37], but as a tool (means / platform) for discussions and collaboration for improvement – benchmarking is implemented as an enabler to become the best [14, 15, 16, 38]. Archives of the Newsletter are available via URL http://www.ceeqnet.com.

6.6. Description of HC quality approach in CQN institutions and countries

Description of HC quality management in CQN collaborating institutions and countries (as provided by Country Managers and based on hospital surveys or available documents)
For the description of quality management approaches in collaborating HC institutions – in order to obtain a view of initial conditions before potential use of the CEEQNET dBase – a Self-Assessment Tool for quality and efficiency approaches in HC institutions (based on the framework of the WHO Health Promoting Hospitals see:

http://www.euro.who.int/healthpromohosp - link last checked 30.03.2007) was produced. Country managers were also requested to provide free-form information on the healthcare "quality culture" in the respective countries of the Project.

CEEQNET HOSPITAL QUALITY MANAGEMENT ASSESSMENT TOOL
In order to document the status of Quality management and efficiency of the hospitals, please use either this self-assessment tool to provide the CEEQNET Project with structured evaluation (based on the WHO Health Promoting Hospitals framework www.euro.who.int/healthpromohosp) or provide as concise as possible description of the state of hospital quality management in format you prefer. Ideally you will manage to inform on evaluation of a HC facility (hospital) in the CEEQNET project before the beginning of CEEQNET benchmarking database. PLEASE highlight what changes in quality management and efficiency improvement took place in each respective hospital in the last 30 months. Material will be forwarded to the external experts for comments. One person has to take the overall responsibility (Assessment Project Leader). Additional responsibilities may be distributed for the various standards, according to the hospital's structure and human resources available
Assessment Project Leader
Signature
Name
Function
Date: / /
Description of the framework for the organization's activities concerning the organization's quality management system.
The organization has a written policy for quality management. The policy is implemented as part of the overall organization quality improvement system, aiming at improving health outcomes. This policy is aimed at patients, relatives and staff.
No Partly Yes
Comments:
The organization identifies responsibilities for the process of implementation, evaluation and regular review of the policy.
No Partly Yes
Comments
The hospital's stated aims and mission include quality management

[Evidence: time-table for the action or list of activities].
No Partly Yes
Comments:
Minutes of the governing body reaffirm agreement within the past year to participate in the CEEQNET project
[Evidence: date for the decision].
No Partly Yes
Comments:
The hospital current Quality and business plans include quality assurance
[Evidence: quality management explicitly in the plan of action]
No Partly Yes
Comments:
The hospital quality assurancepolicy has been formally adopted or revised by the executive management within the past two years.
[Evidence: minutes or instructions from the CEO or other responsible member of the management]
No Partly Yes
Comments:
The policy explicitly refers to quality assurance for patients, staff and community
[Evidence: guidelines for action for patients, specific plan for staff and community].
No Partly Yes
Comments:

The organization allocates resources to the processes of implementation, evaluation and regular review of the policy. A program for quality assessment and the CEEQNET relating activities is established.
[Evidence: time schedule for surveys is available]
No Partly Yes
Comments:
There is an identifiable budget for the evaluation of quality assessment services and materials .
No Partly Yes
[Evidence: budget or staff resources]
Comments:
Operational procedures (e.g. clinical practice guidelines or pathways) available in clinical departments incorporate quality assurance
[Evidence: check guidelines]
No Partly Yes
Comments:
Staff is aware of the quality management policy and it is included in introductory programs for new staff. The hospital organization structure identifies personnel and functions for the coordination of quality assurance.
[Evidence: staff member nominated for the coordination of quality assurance].
No Partly Yes
Comments:

The organization ensures the availability of procedures for collection and evaluation of data (including the CEEQNET) in order to monitor the quality of quality management activities. Data are routinely captured on quality assurance interventions and available to staff for evaluation.
[Evidence: availability assessed in staff survey]
No Partly Yes
Comments:
There is documented evidence of ongoing systematic audit including implementation of the quality assurance policy in each department.
[Evidence: time schedule for the audit]
No Partly Yes
Comments:
Staff in all departments are aware of the content of the quality policy.
[Evidence: annual performance evaluation or staff's participation in the quality assurance program]
No Partly Yes
Comments:
The quality policy is accessible to staff in all departments and all shifts.
[Evidence: newsletters, posters or brochures]
No Partly Yes
Comments:
The organization ensures that staff has relevant competences to perform quality management activities and supports the acquisition of further competences as required.
[Evidence: Lists of people trained]
No Partly Yes
Comments:

Job descriptions for all staff members specify relevant quality improvement activities.
[Evidence: for individuals or well-defined groups. Familiarity with job description documented by survey or interview]
No Partly Yes
Comments:
Continuing professional development program includes education in quality assurance.
[Evidence: training program on quality assuranceattended]
No Partly Yes
Comments:
The organization ensures the availability of the necessary infrastructure, including resources, space, equipment, etc. in order to implement quality management activities.
Specific structures and facilities can be identified.
[Evidence: facilities available]
No Partly Yes
Indicate % of staff aware of quality management policy
Indicate % of patients aware of standards of quality management
Comments:
Management Policy
The organization ensures procedures to assess specific needs for quality management for diagnosis-related patient-groups. Guidelines are present on how to identify needs for quality assurancefor groups of patients (e.g. asthma patients, diabetes patients, chronic obstructive pulmonary disease, surgery, rehabilitation).
[Evidence: for groups of patients specifically treated in the clinical department]
No Partly Yes
Comments:
The organization ensures the establishment and implementation of a comprehensive Human Resources Strategy that includes the development and training of staff in quality management skills
[Evidence: Documented management meetings on HRS]

No Partly Yes
Comments:
A performance appraisal system and continuing professional development exists.
[Evidence: documented by review of staff files or interview]
No Partly Yes
Comments:
Training plans are set up and fulfilled by the end of the year.
[Evidence: check with staff]
No Partly Yes
Comments:
Working practices (procedures and guidelines) are developed by multidisciplinary teams.
No Partly Yes
[Evidence: check procedures, check with staff]
Comments:
Staff's knowledge on quality management is assessed through surveys.
[Evidence: check questionnaire used for and results of staff survey]
No Partly Yes
Comments:
Readmission rate for ambulatory care sensitive conditions within 5 days is monitored [4, 29]
[Evidence / collection and reporting of the data]
No Partly Yes
Comments:

Number of guidelines developed or revised with collaboration of external users and care providers
Indicate the number per year:
Comments:

Table 14 CEEQNET hospital quality management assessment tool

AUSTRIA - Self-Assessment Tool for Pilot Implementation CEEQNET – quality and efficiency evaluation

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To describe the framework for the organization's activities concerning the organization's quality management system. The MBDS Hospital data provided to the CEEQNET-Project are data from Hospitals of Upper Austria. Following the description will mirror the situation, policy and management System of those hospitals.

The organization identifies responsibilities for the process of implementation, evaluation and regular review of the policy.
Based on legal rules all hospitals of Upper Austria have to take part in an international QI-Project – clinical outcome measuring system. Goal is the Self Assessment to force continuous quality improvement strategies.
Structure and process-indicators (within the MBDS-data) are only used for planning.
Each hospital has a so called Q-Commission, responsible for all Quality issues within the hospital-Quality targets and each hospital has a Quality plan.

Hospitals state missions in regard to administration, resources, staff and performance are available.

The hospital's stated aims and mission include quality management
[Evidence: time-table for the action or list of activities].
Comments: *Strategic goals and the use of internal and external indicators are part of the Q-management system*.

The hospital current quality and business plans include quality assurance.
[Evidence: quality management explicitly in the plan of action]
Yes (see above)

The hospital QUALITY ASSURANCE policy has been formally adopted or revised by the executive management within the past two years.
[Evidence: minutes or instructions from the CEO or other responsible member of the management]
Yes

The policy explicitly refers to QUALITY ASSURANCE for patients, staff and community
[Evidence: guidelines for action for patients, specific plan for staff and community].
Yes (see above)

The organization allocates resources to the processes of implementation, evaluation and regular review of the policy. A program for quality assessment of the promoting activities is established.
[Evidence: time schedule for surveys is available]
Comments: *As mentioned above quality self assessment has to be established by law. Partly there are defined budget and/or staff resources for Quality Management. Operational procedures concerning the Organisation are available. Clinical guidelines for Hygiene, for instance. Pathways are partly established and/or in development.*

Staff is aware of the quality management policy and it is included in induction programs for new staff. The hospital organization structure identifies personnel and functions for the coordination of quality assurance

[Evidence: staff member nominated for the coordination of quality assurance].
Comments: *Each hospital has established an interdisciplinary Quality commission (by law).*
The Q-commission is responsible for "information, coordination" in regard to Quality issues. The Q-commission initiates Quality circles for improvement projects.

The organization ensures the availability of procedures for collection and evaluation of data in order to monitor the quality of quality management activities. Data are routinely captured on quality assurance interventions and available to staff for evaluation.
[Evidence: availability assessed in staff survey]
Comments: *Within the international performance measuring system each organisation of Upper Austria collects data for each implemented indicator routinely (monthly and quarterly) and receives feedback in comparison with aggregated data (Austrian, European, US) quarterly.*

There is documented evidence of ongoing systematic audit including implementation of the quality assurance policy in each department.
[Evidence: time schedule for the audit]
Comments: *see above*

Staff in all departments are aware of the content of the policy.
[Evidence: annual performance evaluation or staff's participation in the quality assurance program]
Comments: *partly*

The hospital introduction program for new staff specifies health promotion activities.
[Evidence: the program includes introduction to the QUALITY ASSURANCE plan]
Comments: *no*

The policy is accessible to staff in all departments and all shifts.
[Evidence: newsletters, posters or brochures]
Comments: *yes*

The organization ensures that staff has relevant competences to perform quality management activities and supports the acquisition of further competences as required. Job descriptions for all staff members specify relevant quality improvement activities.
[Evidence: for individuals or well-defined groups. Familiarity with job description documented by survey or interview]
Comments: *All members of the Q-commission have to be trained in quality management.*

Continuing professional development program includes education in quality assurance.
[Evidence: training program on quality assurance attended]
Comment: *partly*

The organization ensures the availability of the necessary infrastructure, including resources, space, equipment, etc. in order to implement quality management activities. Specific structures and facilities can be identified.
[Evidence: facilities available]
Comments: *Resources are partly available (like equipment)*
There exists no policy document which covers issues like training or resources.

% of staff aware of quality management policy

% of patients aware of standards of quality management

Management Policy
The organization ensures procedures to assess specific needs for quality management for diagnosis-related patient-groups. Guidelines are present on how to identify needs for quality assurance for groups of patients (e.g. asthma patients, diabetes patients, chronic obstructive pulmonary disease, surgery, rehabilitation).
[Evidence: for groups of patients specifically treated in the clinical department]
Yes
Comments: *Management Policy - In principle clinical guidelines are available and used; developed by physician association and/or organizations (e.g. asthma patients, diabetes patients).Education and training possibilities are given. Procedures and Guidelines are developed by multidisciplinary teams. No training assessment will take place.*

The organization ensures the establishment and implementation of a comprehensive Human Resources Strategy that includes the development and training of staff in quality management skills
[Evidence: documented by review of staff files or interview]
Comments: *Only for the members of the Q-commission.*

New staff receives an introduction training.
[Evidence: interviews with new staff]
Comments: *Partly*

Training plans are set up and fulfilled by the end of the year.
[Evidence: check with staff]
Comments: *partly*

Working practices (procedures and guidelines) are developed by multidisciplinary teams.
[Evidence: check procedures, check with staff]
Comments: *partly (see above)*

Staff's knowledge on quality management is assessed through surveys.
[Evidence: check questionnaire used for and results of staff survey]
Comments: *no*

Readmission rate for ambulatory care sensitive conditions within 5 days is monitored
Comments: *Cannot see the relation to the other questions.*

Number of guidelines developed or revised with collaboration of external users and care providers
Comments:

The System of Quality Management and Information on Quality in Health Care in the Czech Republic

1. International aspects taken into account

There is no specific uniform concept of management and assessment of quality and efficiency in health care and its international acknowledgement within the EU to date. Accordingly, the quality of health care is managed directly at national levels of the respective countries. The current activities in the health sector in the Czech Republic are based on the basic conceptual requirements of the EU and WHO, which means that the health sector must be focused on results and the provision of medical services should correspond to the needs of society. The concrete approach to the solution is implemented, however, within the powers of the Czech medical institutions and specialists. The common international goal acknowledged by the CR today is quality, safety and efficiency of the provided medical services including the progressive provision of international comparability of the standard of the provided care [16].

Within the concept of quality in health care, the CR now prefers an internationally coordinated comprehensive model of professional and managerial qualification of the medical facility to provide quality, efficient and safe care at adequate scientific level which is perceived as quality care also by the clients and which is economically effective as well. This model was defined globally by the International Society for Quality in Health Care (ISQua) in cooperation with WHO and the World Bank. This model of accreditations of medical facilities contains the basic international principles of the approach to quality and efficiency in care that should be elaborated in the national accreditation standards of individual countries.

The National Health Accreditation System is expected to be established in the CR to ensure a uniform access to the accreditation activity in health care in accordance with the ISQua international accreditation principles. The accreditation evaluation must be ensured by accreditation commissions, i.e. commissions of specialists with long-standing experience in the field, knowledge of management principles and a high level of professional and personal prestige. The accreditation system of medical facilities is defined

in the legislation being prepared by the Ministry of Health of the CR, specifically in the proposed Health Care Act.

2. Initial situation in the Czech Republic

Situation until 1989

There were certain features of health care quality assurance even in the past system of our health care. They included, e.g. monitoring and control of vaccination, analysis of mother and infant mortality rates, activity of the commission for purposeful pharmacotherapy, dispensary care system, establishment of antibiotic centers, implementation of the functions of the chief, regional and district specialists and their guidance sheets. The guidance sheets represented standards of quality of care that now form the basis of the existing systems of quality monitoring. However, these sheets have not been updated and today they are not useable because of their obsolete content.

There was a scheme of further education of physicians and intermediate medical staff the result of which was comparable with health care abroad. In connection with the effort to improve quality we cannot omit the existence and fulfillment of the so-called all-society health programs interlinked with similar programs of the World Health Organization.

Situation after 1989

Our country underwent certain development after the year 1989 and the provided health care has changed also in this context. Many established mechanisms were abolished with revolutionary enthusiasm without any new ones being created. The system of district and regional specialists was abolished, for instance. The weakening of the influence of regional specialists, the legal subjectivity of medical facilities and the establishment of non-state medical facilities from the Regional and District Health Centers makes it difficult to monitor and increase the quality in health care. The economic pressure on medical facilities caused by the change in the funding of medical facilities from the budget is still growing. The Ministry of Health started a more comprehensive quality monitoring in 1994 when the project of "Accreditation of Hospitals in the CR" was included in the ministerial program of the health care reform. The project of "Accreditation of Hospitals in the CR" was prepared within the program to provide and increase health care quality in cooperation with foreign experts from the Joint Commission on Accreditation of Healthcare Organizations (JCAHO). The Ministry of Health accomplished the project of "Accreditation of Hospitals in the CR" by the establishment of the "Joint Accreditation

Commission of the Czech Republic" as a non-governmental organisation under the leadership of the two associations of hospitals. In support of the accreditation, the Ministry of Health (MoH) published in 1998 the methodological instruction on accreditation and the first comprehensive accreditation standards in its official Bulletin.

In addition, the National Board for Medical Standards was established in 1998. This Board was created based on the agreement on cooperation between the MoH, the Czech Medical Chamber and the Czech Medical Association of J. E. Purkyně. It is a coordinating body established with the aim of creating organizational background for all the members of these two medical organizations wishing to participate in the formulation and periodical renewal of the Czech National Medical Standards. The goal of the National Board for Medical Standards and the MoH is to create a uniform method of elaborating the standards of effective health care in accordance with scientifically supported facts of the contemporary world medicine.

Situation after 2000

The Czech government adopted the program "National Policy of Quality Support" (NPQS) in 2000 as the basic set of objectives, methods and tools to influence the quality of products and services. The aim of the program is to consolidate the activities aimed at quality enhancement in all areas of society in accordance with the EU quality support policy.

Within the scope of the NPQS, the ministers were given the task of preparing quality support projects on an annual basis. These projects of the individual departments are monitored by the Quality Council of the CR, which informs the Czech government on all activities regarding quality.

On the recommendation of the NPQS, the Council for Quality in Health Care was created in the Ministry of Health in 2000 (hereinafter the "Council"). The Council is the main guarantor and competent body of the management of health care quality development and support. Its task is to prepare a health care quality concept in accordance with the NPQS, the programs of the EU countries, WHO and the internationally recognized programs in health care. In accordance with the above, the Council for Quality in Health Care prepared four basic areas of the health care quality program:

1. Concept of health care quality programs.
2. Performance measurement of medical facilities.
3. Standardization in health care.
4. Quality and availability of health care in the process of transfer of competences to the regions.

In this way, the Council for Quality in Health Care created the basic framework for the development of the National Programme of Health Care Quality.

The fulfilment of the objectives of the National Programme of Health Care Quality is contributed by the MoH's official subsidy programme of "Projects to Support Quality in Health Care." The factual goal of the National Programme of Health Care Quality is to develop a uniform comprehensive programme of quality, effectiveness and efficiency of the provided health care including its evaluation to ensure international comparability of the performance of medical facilities. The financial contribution of the Czech Ministry of Health should support in this respect the implementation of quality projects.

It is necessary to point out that these are intervention projects rather than research projects and their solution must be usable for the whole health sector. The aim of the projects is to ensure long-term cooperation and involvement of workers at all levels of the provided medical services (intermediate medical staff, physicians, management of medical facilities, regional self-government, state administration) and verification of the usability (or uselessness, as the case may be) of various quality instruments and procedures designed for the management and improvement of quality, efficiency and safety of the provided health care. Finally yet importantly, these activities include also efforts to address the projects and the non-professional public.

3. Activities of the Ministry of Health in 2006

The main principles for the assessment and lasting increase in **the quality of health** care are implemented in the health sector in accordance with:

- Accreditation programme coordinated by the International Society for Quality in Health Care ("ISQua") in cooperation with the World Health Organisation ("WHO")
- Requirements for systematic improvement of the quality of medical services defined by

WHO in the document Health 21 intended for the European region which was adopted by the Czech government as the "Long-term Programme for the Improvement of the Health Condition of the Population of the Czech Republic – Health for All in the 21st Century".

- Communication of the High Level Group on health services and medical care of the Council of the EU.
- Resolution of the Government No. 458/2000 on the National Policy of Quality Support.
- Resolution of the Government No. 824/2004 on the Strategy to Support Availability and Quality of Public Services.

- The Bonus and Sanction Regulations, the rules for the monitoring of the quality of the provided care and the monitoring of economic indicators in large directly managed hospitals, issued based on the Order of the Minister No. 52 on 21/12/2005. These regulations stipulate the basic objectives and priorities, which must be observed by the top managements of individual hospitals. The tasks are selected in such a way so that it would be possible to fulfill them within several months. Some of them have an exact date of fulfillment while others – those relating to the whole year – will be evaluated semi-annually with the payment of the adequate part of bonus. Annexes to the Regulations:

1. List of directly managed hospitals subject to the Bonus and Sanction Regulations.
2. Assessment of the quality of provided care:
   I. List of monitored care quality parameters
   II. Assessment by diagnoses
   III. Monitoring of patient satisfaction (+ questionnaire of the MoH)

4. Key implemented national projects of conceptual character

I. Modular system of quality assurance of medical services

Draft national standards of quality and safety in health care, i.e. accreditation standards based on the principles developed by the International Society for Quality in Health Care (ISQua) were prepared within the MoH's project to support quality in health care.

It is a new concept of the basic generic model containing accreditation standards already developed by the MoH in 1998 and published in the MoH's Bulletin by which the work of the Joint Accreditation Commission of the CR is governed today.

After the finishing and selection of the relevant standards, the new generic model can be used for all types of medical facilities. The development of standards should continue both at the level of selection of the standards according to the spectrum of provided medical services and at the professional level, i.e. identification of measurable criteria and use of recommended procedures, specific assessment methodologies, quality indicators, etc. The main objective of the project was to prepare a basic document about how to proceed when ensuring safety and quality of the activity of medical facilities and how to prove the quality of services in relation to the patients, insurance companies, the state, the EU, etc.

The new concept of standards was critically evaluated by teams of practitioners, clinical laboratories and representatives of the Association of Teaching Hospitals. These teams deal with the development of the standards of care with respect to their professional and organizational aspects.

The finished model of national standards should be used for the conceptual activities of the MoH and for the preparation of the official National Accreditation System of the CZ.

The following tools for quality management of the activities in medical facilities were analysed and recommended within the project:

Performance measurement system (PMS)

Performance measurement represents standardised methods of data collection and calculation of (key) indicators describing performance as a volume of performance, quality, productivity, effectiveness and possibly other special evaluation of a complex of activities.

Activity based costing (ABC)

Method of allocating overhead and indirect costs (for a specific product) to activities (processes) within the care. Since in common accounting systems the costs are recorded with respect to the operating (cost) units and sufficient records of the incurred costs with

respect to the care processes are not available, it is necessary to use a standardised method to carry out the budget.

Balanced scorecard (BCS)

BSC represents a concept of the approach to strategic planning and management based on the balance of 4 key areas: financial stability (consumption evaluation), achieving client (patient) satisfaction, optimising internal processes and developing the organisation and its employees.

Guidelines (recommended procedures)

The aim of the guidelines is to describe how to proceed in diagnostics, therapy and treatment of a patient with a particular disease. The guideline is a part of the standard of effective medical care – its development stage.

Standard of efficient medical care (SEMC)

They are created by means of additional defining of the terms and measurable criteria and indicators of quality and efficiency for the guidelines. Then the standard can be included in the quality measurement system and used for the assessment of the economic aspects of care. So far over 150 standards have been published [Forýtková,L., Bourek, A. Programs of Quality and Standards of Medical Procedures, Verlag-Dashofer, Praha, 2006]. Samples of the standards may be reached using URL http://www.mediquali.cz - last checked 30.30.2007.

Accreditation Standards 1998

Managerial and specialised standards defining the required level for the management and performance of health care provided by hospitals. (Bulletin of the Ministry of Health of the CZ, 1998). This model is currently used by the Joint Accreditation Commission of the CZ for the evaluation of hospitals.

Accreditation Standards 2003

Managerial and specialised standards defining the required level for the management and performance of quality and safe health care provided by medical facilities. (Amended

accreditation standards in accordance with the accreditation principles of the International Society for Quality in Health Care – ISQua).
This scheme includes as its integral part the accreditation standards of clinical laboratories, which are focused on quality, ethics and safety of comprehensive laboratory services provided within health care.

JCI International Accreditation Standards
A model of managerial and specialised requirements for the assessment of quality and safety in health care and its continuous improvement developed by the Joint Commission International (JCI) in accordance with the ISQua principles. JCI is the main component of the international subsidiary JCAHO USA. Several CZ hospital have been accredited using the JCI Standards, see also URL http://www.cskz.cz - last checked 30.30.2007 – of the Czech Society for Quality in Healthcare.

EFQM Excellence Model
A model defining clear links and relations between the financial and non-financial results, satisfaction of clients and employees and the impact on society on the one hand and high-quality comprehensive management within the whole organisation on the other hand.

ISO 9001:2000
A generic TQM model leading in the organisation to the provision of product quality from the customer's point of view.

ISO 15189
A model forming the basis for proving technical qualification of a medical laboratory covering all aspects of laboratory investigation conducted in the laboratory, including interpretation of results and provision of consultancy services.

ISO 17025
A model based on which the laboratory proves its professional qualification in the area of the laboratory-defined spectrum of tests and/or sampling, if the sampling is conducted by the laboratory.

All these approaches can be included in the concept of the National Accreditation Standards of medical facilities, which – according to the ISQua international principles – must be focused both on the quality of the medical services and on the quality of management and supporting activities.

Hierarchy of the basic system models according to the extent and content of their requirements

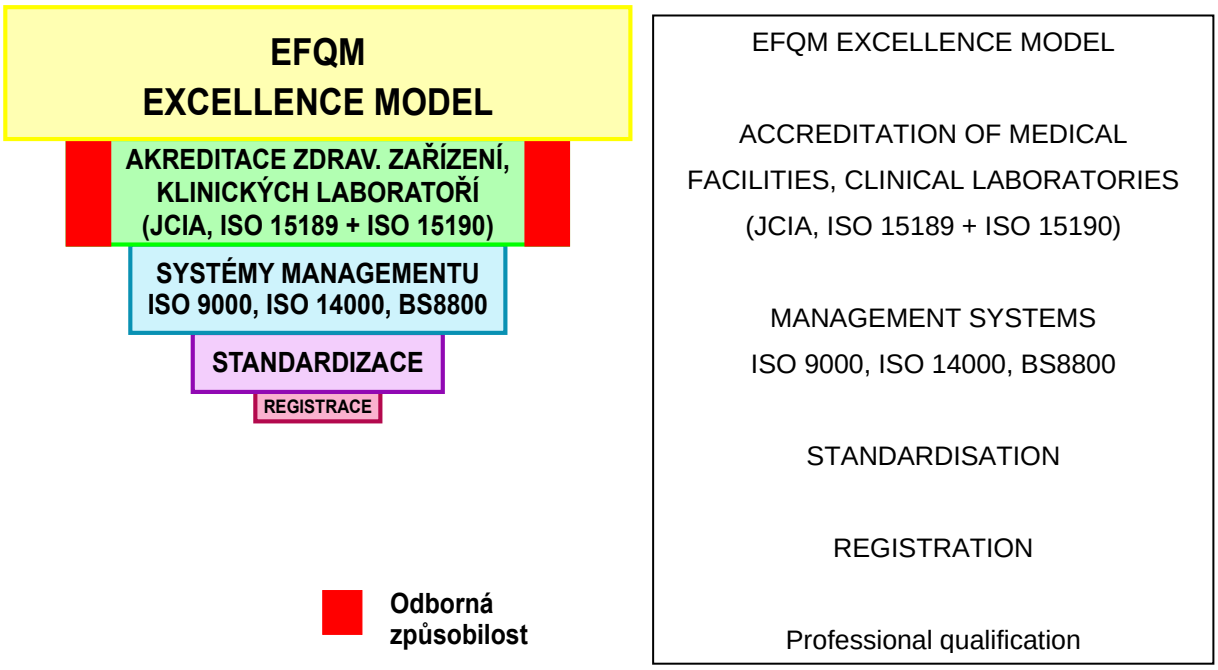

Figure 5 Czech Republic hierarchy of QM models

One of the results of the project is that the attention of the medical community has been drawn to the fact that for the time being, there is no general awareness of the specifications of the quality tools, their interpretation in the particular branches and the guarantee of working with such tools. The prevailing approach is that the implementation of certain models is contracted to consultancy and certification firms, which often have no experience with the operation of medical facilities and the use of quality principles in health care. This includes specifically the implementation of the systems pursuant to the ISO standards. As a result, a number of quality certificates are granted but the implemented systems prove to be non-functional and, in addition, applicable only to partial areas of the activity of the particular medical facilities. In these cases, it is rather a problem of the entrepreneurial ethics in the CZ.

II. Projects for the preparation of the national set of indicators of quality and efficiency in care – Development of the national indicators of quality in care for the Czech Republic – draft basic set

Many medical facilities have involved themselves actively in the preparation for the monitoring of the quality and efficiency in health care in the form of developing the quality and efficiency indicators. However, there was no national guarantee for this development. The aim of the project was to process and test the draft minimum set of quality indicators for the basic health care specialisations, which would be declared as national indicators of quality.

The starting point was the outputs of the following projects implemented in 2003: *"The set of analytical works to create a system of efficiency and quality indicators for the Czech health care system"* and *"Analysis of the quality and efficiency indicators set by clinical laboratories"*. Within these projects, a methodology for the proposal and selection of indicators was suggested and approximately 100 basic indicators were recommended based on foreign experience with respect to the specific features of the Czech environment; at least twenty of them were selected for further testing and validation.

The output of the project of the development of national indicators was the preparation of the documentation of selected indicators including the evaluation and data definition of each of them.

The anticipated next stage of the project – if the MoH approves its implementation – will be the suggestion, selection, testing and validation of additional indicators, which will be facilitated by the fact that available methodology, database, web application and selected collaborating health care subjects will be in place.

The following examples were used as foreign models for the development of the indicators and for the testing methods:

- OECD
- NHS [10.]
- AHRQ – HCUP [1]
- Maryland Quality Indicators Project [45]

- HEDIS [35]
- IMSystem
- DEMPAQ
- International Quality Indicator Project (iQUIP)

and others

The results of this project gave rise to the first set of standardised indicators of quality and, in particular, to the methodology for further maintenance and development of the set. Unfortunately, there was no official assignment in 2006 with respect to any works on the implementation of the proposed procedures so that the so much needed set of national indicators of quality could not have come into existence.

III. Integrated programme of implementation of quality management in Czech teaching hospitals (TH)

Within the scope of the grant of the Internal Grant Agency of the Ministry of Health of the CR, the Association of Teaching Hospitals worked in 2002–2005 on a project dealing with the system of quality improvement with mutual exchange of experience, tools and knowledge. The directors of the participating teaching (faculty) hospitals (THs) have become the co-managers of this project. A common general manual of quality and other management documents and master record documentation were developed during the cooperation. The achieved progress in the quality of the care was measured on a regular basis by the use of standardised questionnaires and in the form of mutual visits of the grant participants. Work was done on the preparation and testing of the indicators of quality of the activities of hospitals and their application. The draft National Accreditation Standards of Medical Facilities prepared in accordance with the requirements of ISQua were used for the evaluation of the results. It is clear from the project results that most of the THs have satisfactorily prepared their organisational documentation and management of the processes of patient treatment, including the protection of patients' rights. It appears that the compliance with the standards regarding the monitoring of managerial and clinical performance is not much satisfactory in some of the THs. Several other hospitals have shown interest in the results achieved during the performance of the grant.

IV. Evaluation of primary care

The project "Development of Primary Care" took place in 1995–1997 within the scope of the Phare programme; it was focused on the description of the structure of the system of primary care and on defining its particular elements. Another Phare project "Development of Integrated Health Care" followed in 1999–2000. This project was focused on the development of system processes and evaluation of the quality of care and monitoring; it made use of the working versions of the assessment tools, in particular the WONCA International Classification of Primary Care (ICPC 2), the questionnaire on patient satisfaction (EUROPEP) and the International Glossary for General Family Practice (I. M. Hofmans-Okkes and H. Lamberts). The work on the adaptation and validation of international approaches and tools in the project "Introduction of Tools for the Harmonisation of the Evaluation of Primary Care" continues since 2001. The project is aimed at testing a whole range of new methods and procedures – ICP-2, including validation of rather thorny methods, such as fault in medical practice, or the procedures prepared for the management of quality of care and accreditation in the whole health service system. Pilot study regarding the methodology of audit of antibiotics prescription by practitioners was carried out within the project. All the validated tools have proven their worth in the project and they should be included in the gradually developed set of tools for the evaluation of primary care in the CR.

V. Programme of quality improvement in clinical laboratories

In view of the lack of exact data on the activity of clinical laboratories, the requirements for quality of testing and examination in laboratories specified in the ISO standards were analysed and confronted with the requirements for quality and safety in health care determined in the accreditation principles of ISQua. The standards have clearly proven to contain outdated approach to quality management dealing mostly with the technical quality of laboratory performances and to be at variance with a comprehensive apprehension of quality and safety of health care. Therefore, the requirements of the technical standards were used in the preparation of quality standards pursuant to the ISQua principles. These standards are already fully compatible with the requirements for the other health care branches and they are interconnected with them. A uniform interpretation of these standards was prepared within the activity of the Board for Accreditation of Clinical Laboratories of the Czech Medical Association of J. E. Purkyně in cooperation with specialised societies. A proposal was prepared for the structure and function of medical reference laboratories and for quality assurance of this special activity.

- The outputs are included in the preparation of the concept and structure of the national accreditation standards of medical facilities.
- The laboratories participating in the validation and fulfilment of the requirements of the standards are included in a special register.

5. Evaluation of the current state of quality of medical services

Quality of care

The question of quality in care is not at the forefront of interest of the responsible authorities in the CR. Quality has not been monitored sufficiently, good quality has not been rewarded and poor quality has not been sanctioned. There is low or no differentiation between institutions and physicians of different quality also in the area of remuneration. Neither the insurance companies nor the Czech Medical Chamber has dealt with this problem systematically [8].

Information on quality of the care in medical facilities is not subject to obligatory monitoring and automatic publishing. The monitoring and publishing of the results of care are a matter of the individual medical facilities' own activities or, as the case may be, of the approaches of the individual regions. The Czech health care sector rather tends to belittle, conceal or hush up the mistakes. These are not just mistakes of the medical practice but also mistakes in economy, personnel policy and management.

The problem lies also in the fact that the mistakes of physicians are very difficult to prove. The Czech legislation has not specified unequivocally how the patient documentation should look like.

The non-standard and uncertain quality in care results also from the fact that certain demanding treatments are performed also by physicians who have not reached the required professional qualification.

Low respect for different quality of care is very harmful in terms of systematic approach. If, for instance, high-quality care does not receive better financial evaluation than care of lower quality then the higher quality of many providers necessarily decreases in the course of time and approximates the average.

Quality and availability of information

Mutual consistency of information in the area of medical services and sometimes also their quality are problematic. If we want to compare – based on the obtained information – e.g. two or more institutions the problem that we encounter is that the content structure of information referred to by the same terms could vary. It is very difficult, for instance, to compare mutually the costs of different medical facilities. The big differences between some of the cost items need not result necessarily from different quality of work of the compared institutions but from the different structure of the particular information.

So far, the providers, the insurance companies and the patients do not have sufficient information for their decisions. Some data are not monitored at all; some other data are monitored but are considered confidential and may not be published without the consent of the institution or person concerned. This makes it impossible for the patients to make a qualified decision when choosing the provider.

There is insufficient communication among the numerous elements of the system. This is true for the relations between the institutions of various health care sectors taking care for the same patient, for the contact between the insurance companies and their insured subjects, for the contact between the Ministry of Health and its subordinated organisations, etc.

A very serious defect in terms of the systematic approach is represented by the incomplete sets of information on important facts, their not always good quality and the insufficient communication between the respective parts of the system. Lack of information and insufficient communication can represent a source of serious defects in the system.

Characteristics of the CEEQNET project participants in terms of approach to the management of quality and efficiency in care

CEEQNET is a project financed from the funds of the European Commission. Its participants include specialists and health institutions from five countries: Czech Republic, Slovak Republic, Hungary, Poland and Austria. Its aim is to define a set of indicators that can be calculated from existing data sources of all hospitals. This project uses the method of identification, testing and selection of quality related indicators proposed in the CZ and provides information relevant for the compatibility of the solution in the CZ and the neighbouring European states.

Participating hospitals:
General Faculty Hospital in Prague
Hospital in Karlovy Vary
Hospital in Chomutov
Hospital in Vyškov

With their voluntary active approach lasting for many years, all the participating medical facilities have proven their interest in the system of measurement of the performance and quality of health care and they take part in the development of this system in the CR. They use the results of the indicators as an internal tool for the management of their organisational units and the quality of the provided care. Their higher level of apprehension of the importance of the evaluation of medical facilities by use of validated indicators and the interest in expanding their information by the possibility of comparing their activities with the activities of similar health care providers abroad is evidenced by their willingness to take part in the solution of the CEEQNET project at the time when the quality evaluation concept has not been resolved in the CR and when the values of the indicators could serve not only as a source of information but also as a basis for sanctions.

Due to these reasons, it was rather a problem in the CZ to ensure the required four participants in the project. Many medical facilities, which have been addressed and talked to, refused their participation in the project for the reasons of their solving the issue of their appropriate organisational and economic arrangement and assessing the possible impacts of the comparison at international level.

Reported by: Věra Chaloupková, CEEQNET Czech Republic Country Manager, Prague, CZ

Quality framework in CEEQNET hospitals in Poland

Information below has been acquired from communication with 4 hospitals, participating In CEEQNET Project and the results of accreditation reports, resultant from the voluntary Polish National Accreditation Program for Hospitals (JCAHO based. All 4 participating hospitals have implemented ISO Quality Management and 3 have valid accreditation certificate.

The compliance to requirements below for 3 HCOs concerned was between 78% and 89% (78%-87% and 89% respectively).

The remaining hospital has just undergone accreditation survey and the decision is recently being processed.

Accreditation framework is the only one in Poland that enables relatively detailed presentation of quality and efficiency implementation.

Further information, if needed, can only be provided in the general form as accreditation reports are not published and remain the property of hospital management.

Country Manager (CM) remarks are marked in italics.

General Management

Hospitals have defined their mission statements which comprise elements of quality but not yet safety. The mission is known to hospital staff.

There are strategic goals and strategic plan; the goals correspond to the hospitals' mission.

The strategic plan is updated and modified at least once a year**.**

Hospital management has defined responsibilities for top management.

Overall responsibilities and supervisions are graphically presented in the organizational hospital scheme (inherent part of the hospital Statute).

There is information on main organizations cooperating with the hospital with respect to the particular dept.

There is an individual appointed with responsibility to manage and supervise every type of hospital services.

Hospital CEO defines the cost and quantity of services with respect to quality (*though it is mostly still the economic focus that counts).*

Heads of the Depts. actively participate in quality improvement of the services they provide (*in case of clinical depts. it is data re hospital infections rate; readmissions; reoperations; mortality and morbidity in their clinical environment).*

The procedures and regulations regarding particular depts. are available for hospital staff at that dept. and stored where easily available.

All hospitals procedures are validated and modified at least once every 3 years.

Human Resources Management

Hospital management has defined qualifications for all hospital staff (*hospital's own or defined by the Ministry of Health. If own, these are higher level requirements).*

There is a clear description of job position.

Every staff member is a licensed professional and legitimate to perform

Hospital conducts regular staff evaluation (this applies to all staff groups). The program contains self evaluation element

Hospital has developed and implemented induction program for the new employees. The program includes relevant information on hospital mission, procedures, services, range of responsibilities; system of staff remuneration and evaluation..

Staff files are properly stored and managed according to the defined requirements.

Staff have easy access to their personal files.

Information Management

There are guidelines defining the content of medical records (doctors and nursing records)

There are defined elements of medical record, like e.g patient status documented with every day observation; authorization of each entry; plan of care defined 24 hs. following the admission, by interdisciplinary team and modified when necessary.

The content and completeness of medical record is verified (*usually hospital sets up a team who reviews randomly selected sample of closed medical records. However there are difficulties with sustainability of feedback and personal awkwardness related to commenting on the work of colleagues, often of different specialties. Crucial is the frequency of reviews and membership of the Review Team. Best when nurses simultaneously review their nursing records.*

Medical records follow certain defined storage conditions of the Archive.

Patient records are completed within 3 days after patient discharge (and *this requirement is not always met*.)

Polish hospitals usually have considerable difficulties with complying to the requirements listed above. Information Management is one of the lowest scored areas of hospital performance.

Patients Rights

Hospital has defined patient rights. Patients are informed about their rights (*no obligations at this stage yet; usually passive information; long list and small letters; often no information about the patient right to access own medical records).*

Hospital has defined medical procedures (apart from informed consent to surgery and anesthesia), usually invasive, which require additional patient consent.

This is very subjectively defined and differs among hospitals. No official mandatory list of risky procedures.

Patient consent is a prerequisite for participation in clinical trials.

Patient family/relatives may participate in patient care.

There are visiting hours defined, as broad as possible

Hospital provided system of staff identification

There is a defined system of patient restraint.

Hospital enables access to religious services *(like list of contacts with clergymen of different religions*)

There are possibilities of telephone communication for bedridden patients

Hospital developed mechanism for secure storage of patient valuables

Infection Control

Hospital developed and implemented coordinated procedures for reducing the infection risk for patients and hospital staff.

There is a definition of hospital infection (or guidelines that enable identification of different types of nosocomial infections)

The definition is known to medical and supporting staff

Hospital has implemented the surveillance of hospital infections.

Staff undergoes regular training and education in the field of hospital infections.

There are rules and principles of isolating patients with dangerous infections like MRSA; VRE etc.

These requirements are also very difficult and the compliance is usually not satisfactory.

Assessment of Patients

Medical professionals assess and document the assessment of patient medical, psychical and social status.

Patient assessment is done with respect to patient privacy (*examination rooms; screens between patient beds; especially not observed at ICU and Emergency units)*

Patient assessment is performed within 24hs after admission;

Patient health status is assessed every day, which is documented in the patient records

Nursing assessment is documented at the end of each nursing shift

Hospital has defined the content of docs' and nurses' assessment

Care of Patients

There is plan of care for every patient, developed by the multidisciplinary care team and appropriately modified, documented in patient record.

The plan includes defining the goal of care,

Health services are provided by qualified providers (*like USG, laparoscopy certificates - verified during interview with head of Human Resources Dept.)*

Medical staff has undergone regular resuscitation training once a year (*hospitals tend to concentrate on nurses training mostly. The training requires use of a phantom)*

Life saving equipment is easily accessible to medical staff (*meaning also being complete and ready to use)*

Anesthesia

Patient undergoes examination prior to anesthesia and surgery (*and this is documented and a part of patient record).*

Before surgery, anesthesiologist verifies patient identification data.

In case of unexpected adverse events that posed risk of harm or prolonged hospitalization, hospital makes a report and analysis.

Patient is monitored during surgery

Responsibility is defined after surgery and transferring patient from the OR.

There is a post operative room with qualified staff and appropriately equipped and supervised.

OR equipment undergoes regular check ups

Continuity of Care

Hospital developed the procedure for admitting patients

There is procedure for transferring patients between HCOs and departments.

All discharged patients receive information about hospital stay, diagnosis, medications and further recommendations on their health.

Hospital assures continuity of care for transferred patients

Medication Management

There is regular pharmacy's surveillance and monitoring of drugs validity and storage.

Medicines are accessed and distributed only by the qualified professionals.

There is a Therapeutic Team of medical professionals that develops and annually modifies hospital formulary.

Hospital defined drugs that are emergency medicines and the modes how to obtain these. Such medicines are always available.

Hospital defined what drugs and how may be provided by nurses without the docs' order (specified in legislation but ot always followed, depending on culture in hospitals and departments).

Hospital defined the procedure for dealing with no used narcotic drugs. The procedure is known to medical staff.

Quality Improvement

There is no separate quality strategy per se and hospitals do not provide any quality report.

Hospital establishes Quality Team (Committee). There is top management representative in the Quality Team.

The Team has annual program for QI activities.

Hospital has adopted at least a single clinical guideline or algorithm involving medical professionals *(at least nurses and docs*)

The algorithm is implemented in the hospital practice.

Hospital conducts regular mortality analysis *(though usually this is just statistics, not allowing the reflection upon hospital performance and safety*)

Hospital conducts regular analysis of perioperative deaths *(also difficult as often there is no local definition adopted of perioperative death, which makes such analysis impossible)*

There is regular survey of patients' opinions.

Results of the survey are practically used for QI in hospital.

Environment of Care

Most of the requirements refer to fire safety, water safety, assuring continuity of electricity *(UPS and regular check ups of electricity emergency supply generators)*and medical gases provision

There is a plan for medical equipment maintenance and periodical equipment reviews are performed and documented by the authorized individuals.

Hospital developed policy re waste management *(segregation, storage and handling of different types of hospital waste)*

The policy principles are observed by hospital staff .

Patient rooms are clean, ventilated and properly heated when necessary.

There is a system of visual information (how to move around for patients, families and all unfamiliar with hospital design)

Admission and Emergency Dept.

Hospital has developed the system for mass emergency

Staff are knowledgeable about the procedures and emergency communication.

Emergency Dept is clearly signposted and easy to get to.

There are procedures of performance for different modes of patient services

There are procedures defined for cooperation with emergency transport

Reported by Barbara Kutryba, Polish CEEQNET Project Country Manager

Quality and efficiency of health care in Slovakia and in facilities of selected health care providers

Improvement of the health status of the population, extension of the life expectancy and improvement of life conditions belong to the priorities of the Government of Slovak Republic. Carrying out of tasks is covered by several Departments; however the pilot Department is the Ministry of Health. One of the measuring tools of these priorities is assessment, monitoring and evaluation of quality indicators at the providers of health care. The sense of the quality indicators has several dimensions:

- Quality of the provider
- Health status of the population
- Patient safety
- Economy of the health care
- International standardization

Quality indicators were initiated by the Ministry of Health and built in the Directive of Government No: 752/2004. The aim of the Directive is the improvement of evaluation of health care providers in range of those diseases, which occurrence in the population is globally severe, i.e. oncologic, cardiovascular, and surgical and others. This Directive is updated on demand and a group of experts actively cooperates on the revision of the documents in sense of getting updated set of indicators in Slovak health care closer to the range and structure of HCQI by OECD.

Evaluation of the stipulated quality indicators in Slovak Republic is assured by the Health Insurance Companies. These indicators concern mainly availability of the care, their efficiency, fairness, health care results and opinions of the patients.

Quality indicators are subject to interest of the Government, together with WHO, OECD and World Bank. Slovak Republic became a regular member of OECD in 2004 and started to work in selected expert groups. One of those groups was the HCQI Expert Group – the group for Health Care Quality Indicators. The goal of the Group is to identify and harmonize indicators of health care provision, to enable collection of selected statistical data, followed by evaluation and final ranking among the member countries of OECD.

First phase of the project was to choose indicators available for the majority of member countries.

If Slovakia is able to update their national indicators, it will become the eleventh country with active participation in creation of international quality standards (there are more countries, who didn't contribute to the OECD database yet). Slovakia has a potential to spread the number of monitored indicator, because a lot of data for indicators will be soon available in national health registries. Part of data necessary for the quality indicators are already being submitted for Health Data of OECD.

Regular submitting and publishing of quality indicators in materials of OECD contributes to the evaluation of transformation results of our health service in sense of provider quality, patient safety, sources efficiency and health status of the population.

Slovak Republic handles these items also by the means of international and national projects – MATRA, CEEQENET, etc.

Project CEEQENET is realized in five cooperating countries of Central Europe. Based on a professional selection, four hospitals from Slovak Republic are involved in the project, MFN – Faculty Hospital in Martin, NsP Nové Zámky – Regional Hospital in Nové Zámky, NsP Žilina – Regional Hospital in Žilina, NMO SR, a.s., Bratislava – Hospital of Ministry of Defense. The selected hospitals are placed in different territorial units of SR. Capacity of these facilities in not the same, and they represent several types of care providers. One of the providers does not report to the Ministry of Health. Mutuality with the given care providers in the project is influenced by the level of support from the side of the hospital managements. The collaboration of the subjects during the period of project is evaluated positively.

After the final evaluation of the results of the care providers we may declare, that the facilities identified themselves responsible for the process of implementation, assurance and governance of management quality both in total and partial units. The hospitals involved in the Project assigned quality targets, which have been regularly scored and based on the results they worked out further steps to improve the specialist work. The

hospitals were gradually trying to implement system of health care service quality managing according to their focus (§2 of Act No. 576/2004) i.e. to prolong the life expectancy, improve quality of life and ensure healthy development of the future generation.

Faculty Hospital in Martin incarnated their range of action in line with the recommendation of WHO – Summary from the conference in Paris 1994. The tasks are scheduled until end 2009. Currently they have a quality management system ready for certification at the Clinic of Children Surgery.

The project documentation contains detailed record from negotiation meetings of superior bodies, confirming approval with participation in CEEQNET. Care providers created teams for cooperation and coordination of the tasks arising from the project. Teams consisted of permanently delegated employees and in case of need the crew was flexibly completed with further members from areas where the system of quality managing was introduced. The time schedule of team building took from October 2004 till March 2005.

Commercial intentions in individual health care facilities are included in their current quality plans supporting the Program of Quality Assurance. They are also a part of the business plan of the hospitals, however they are confidential.

With respect to the process of transformation (Faculty Hospital in Martin is changing to University Hospital Holding Company) it absents in the program of Quality Assessment. This fact is explained also with lack of financial sources. Tasks resulting from the project are applied only at the Clinic of Children Surgery. Problem is identified in engaging whole hospital in the project without preliminary solution of the output pricing based on appreciated level of health care result quality. A complex introduction of quality managing system of health care services is judged as redundant, because prices of health care outputs are not in line with the administration of the care facility and inconsistent with the quality requirements. Therefore the current introduction of quality managing systems in hospitals and care providers as such is condemned as less effective. The agenda in action plan of the Faculty Hospital is explicitly temporarily suspended.

The action plan resulting from the program of Quality Assessment in the Hospital of

Ministry of Defense is set up to secure health care and other provision for the patients, clients, employees and broad public. The hospital has introduced internal rules and instructions, unified patterns for nursing and treating processes. Intranet is utilized for internal coordination, and for the public outside of the hospital a website is established. Scoring of certain services by the patients, clients, suppliers and users is performed regularly through questionnaires.

Action plan in Regional Hospital Nové Zámky refers to everybody – patients, employees and public (e.g. regularly updated working rules, patient leaflets, and regular recognition of patient satisfaction through questionnaires).

The Health Care Quality Program in Slovak Republic is gradually implemented in hospitals and their departments (clinics) and working units with applied system of quality management according to ISO 9001:2000 moreover regularly checked by an auditing unit quarterly with reconsideration of the results by the management of the hospitals. The time schedule is revised by the executive management since last two years.

The leadership of the Quality Assessment Program in Slovak health facilities is assured on ethical principles. This process is concentrated on working out and adjusting definitions, rules, policies and development strategies. Leader determines the unity of purpose and heading of the hospital creates and maintains internal environment so that the employees can be fully integrated in the intentions of the hospital.

Basic tools:

- Policy of quality determined by global direction of the hospital in terms of quality as a part of global policy and strategy and its understanding by all employees.

- ethical principle of leadership; members of the management have to adopt responsibility, and those responsible must be able to meet correct decision. It is a must to occupy all positions by persons with required qualification. Base for a correct decision making is to put quality values in front of impulses.

Managing of resources in Slovak Republic is based on people involvement and principle of subsidiarity. Employees on all levels are the key to system of quality management in health care and their full engagement with correct and effective motivation will enable to exploit their skills for the benefit of the hospital.

Particular activities after their recognition are transformed to processes so that the units and the whole hospital may perform effectively. The processes are reciprocally linked to enable fulfilling of basic intentions of health care. Output of one process often creates a direct input for another process. Systematic identification and process management applied in hospitals create interaction between those processes. Process is a set off cross linked sources and activities which turn inputs to outputs with required quality.

Each action in range of the process in health care facility is organized so that they create an optimal sequence and generate required value of useful outputs from various input options.

Such sequence is specified and recorded in a way to perform activity or process. It consists of:

- Purpose and subject of activity;
- What, why and who has to act;
- When and how to act;
- What material, equipment and documents to use;
- How to manage, check, measure and record the action;

A system approach in managing, identification, understanding and driving of linked processes is used in Slovakia at achieving efficiency of targeted health care. To treat the disease, maintain a good health status of the population with gradual improvement of life quality are basic principles of the Quality Assessment Program lined out also in §2 Act No. 576/2004 Col.

A permanent target of all health care providers in our country is the continuing improvement of global performance, improvement of life quality connected with optimal expenditure to meet this basic target. At the current prices for health care performance it is impossible to meet targets of health care and hospital performance, because they are contradictory.

This is the reason why Slovakia prefers decision making based on facts, which is supported by the reality that effective decisions are based on analysis of data and information (EBM, DRG, ABC, EFQM/CAF etc.).

Balanced relationship of all concerned parties multiplies the ability to create a common value. Partners involved in provision of health care services:

- Health care facilities, or network of health care providers with complex services in Slovakia
- client, patient, insuree or direct purchaser;
- health insurances, and private insurances;
- society, government, parliament, president of SR;
- industries actively influencing health status of their employees.

All concerned parties should try for a systemic environment; focus on the task of maintaining or improving health status and quality of life. This will support creation of GDP and overall quality of life in Slovak Republic.

As an example we introduce the bellow file of Quality Management System from Faculty Hospital in Martin (MFN) for the Clinic of Children Surgery (CCS):

Quality Handbook of CCS
Organizational Order of CCS
Marketing of CCS
Managing CCS
Document MANAGEMENT of CCS
Human Resources Development of CCS
Working Rules of MFN
Record Card – for all job positions of CCS
Teaching in CCS
Health Care in CCS
Implementation of Science and Research in CCS
Functioning of CCS
Catering in CCS
IT in CCS
Internal Audit in CCS
Management of Claims, Corrective and Preventive Measures in CCS

Hygienic and Sanitary Schedule. Chemical Disinfection

Hygienic-Epidemiologic Schedule

Sterilization

Operational Rules of CCS

Presurgical examination and preparation of pediatric patient

Standard of Complex Nursing Care for Children with ATRESIA ANORECTA

Standard of Complex Nursing Care for Children with HIRSCHPRUNG'S DISEASE

Standard of Complex Nursing Care for Children with PECTUS EXCAVATUM and CARINATUM

Standard of Complex Nursing Care for Children with Hypertrophic Pylorostenosis

Nursing case-history and physical examination by the model of M. Gordon at children with cramped right sided inguinal hernia

Standard of Complex Nursing Care for Children with HERNIA UMBILICALIS

Standard of Complex Nursing Care for Children with FUNCTIONAL OBSTIPATION

Nursing sequence at examination of esophagus passage

Mucus removal from the upper respiratory ways

Standard for cleansing enema

Irrigation of colostomy

Replacement of colostomy disposables

Stomach evacuation

Instillation of nasogastric catheter

Prevention of decubites

Nebulisation

Intramuscular vial

Bandage of lower extremities

Enteral nutrition

Besides these basic documents the file contains templates for instructions, measures, reports, meeting minutes, etc.

Health care providers involved in the project in Slovak Republic **invested** remarkable financial sources in processes of introduction, assessment and regular checking of the Quality Assessment Program. Exact volume of spent sources was not itemized at any of the addressed hospitals.

Hospital of Defense Ministry invested financial sources in introduction of ISO Standard 9001:2000 and execution of surveillance program for supportive activities.
Regional Hospital in Nové Zámky reported that their assessment program for supportive activities is regularly checked by the authorities (Bureau for Supervision upon Health Care, Regional Institute for Public Health).
The top management of Faculty Hospital in Martin suspended further extension of QMS after it was introduced at the Clinic of Children Surgery unless the pricing of health care performance will reflect the fairly increased level of health care quality in line with the targets.

Time table and agenda for evaluation of supportive activity quality are worked out in all hospitals.

The question of applicable budget for evaluation of services resulting from the Program of Quality Assessment was answered as follows:

Hospital of Defense Ministry has an applicable budget for evaluation of services in Program of Quality Assessment.
Regional Hospital in Nové Zámky reported that in case of need it would be possible to calculate the budget.
In opinion of Faculty Hospital in Martin it is not realistic to calculate the budget since there is a fundamental collision between the price of care performance and the aim of health care. They have a method ready to run a questionnaire survey on measuring of the hospital success in line with the methods of EFQM/CAF. The budget could be submitted in one month after solution of the above problem.

This activity is assured in budgeting and human resources.

The concerned health care facilities in Slovak Republic have written directives for surgical outputs (handbooks of clinical sequences) including Quality Assessment Program and containing rules for securing ISO Standard 9001:2000.
Rules and clinical sequences are established only for the Clinic of Children Surgery in Faculty Hospital in Martine – it is finalized in full range and applicable in other units with surgical character.

Evidence could be found in departments and clinics, where continual revision of handbooks is performed.

Slovak care providers put stress on announcement of the Quality Assessment Program to the employees. The involved hospitals worked out detailed policy, which is available to every employee through intranet. The consequent promotion is handled by quality managers who supervise, secure and coordinate keeping of the Quality Assessment Program in range of the whole facility. There are more other employees who pass the information on unit leaders according to the organization chart. Availability of the outputs for data collection and measuring is assured by regular monitoring of the quality management activity and data are regularly rated by the Quality Assessment Program. Data for assessment are available in information systems mainly on a quarter basis. Results are assessed by quality managers and passed to the hospital management and supervising institutes. Results and comments are published on intranet.
Faculty Hospital in Martin expressed, that "health care quality indicators are monitored according to a government directive – however these data have nothing in common with quality! We assure these tasks through Department for communication with health insurance companies".
It is impossible to judge:

- Quality of health care in line with § 2 Act No. 576/2004;
- Quality of health services provided by certain hospital units;
- Cost of provided care.

Review of regular monitoring is available.

System audit of Quality Assessment Program introduction exists only in the Hospital of Defense Ministry since 2004 and at the Clinic of Children Surgery of Faculty Hospital in Martin.
The form of the review is a part of auditing schedule.
The employees are adopting the global content of the Quality Assessment Program at regular meetings with the management.

Review: Annual assessment of employee's contribution to the Quality Assessment Program.

Training process of new recruits contains also health supporting activities. Hospitals have different approach in coaching employees:
- Hospital of Defense Ministry trains newcomers in quality policy and ISO standard 9001:2000.
- Regional Hospital Nové Zámky informs the employees with working rules, safety at work, and offers programs for recovering of the working power.

- Faculty Hospital in Martin declares, that "it is impossible to create a program of health care provision in line with the § 2 Act No. 576/2004 and therefore it is impossible to create a training program for new employees. Price list of health care services created at the Ministries of Health and Finance regardless on the upgraded care quality is the reason."

Review is assured continually.

Unified form of Quality Assessment Program availability is processed by our selected facilities through studying of ISO standards displayed on intranet, pin boards, printed on leaflets, distributed in circular notes.

Review: leaflets, posters, folders

Resulting from a survey in health care facilities in Slovakia, the responsible authorities carry out tasks of quality management, secure and support further education of specialists. This process is embedded in the corporate contract. This authorization is limited to selected departments (clinic) in some hospitals.

Documents are archived.

Job descriptions and job titles of all employees involved in the project include indicators encouraging improving quality. Those indicators refer to bonus system and flexible part of salary. Not all hospitals apply this principle, or they select certain units where it is put in force.

Review Professional development - for individuals and defined working teams.

In the majority of Slovak hospitals there is permanent program of professional development completed with a program of systematic education of employees through Quality Assessment Program. Regional Hospital in Nové Zámky intends to build and formulate a working team, which should cover special training courses for guarantors and quality managers. Faculty Hospital in Martin didn't launch the Quality Assessment Program yet.

Review: Existing elaborated programs of systematic education of employees in process of Quality Assessment Program.

We assessed the availability of necessary infra structure, human and financial resources, rooming, technical equipment for introduction of quality management. It is clear, that practicing in health care facilities is strongly influenced by motivation tools. Results are visible in case of management support (building of PC networks, training rooms, increased access to internet and intranet). Faculty Hospital in Martin relates this task to the capacity of financial resources at the condition of realistic ratio between incomes from care performance and costs of overall performance of the hospital.

Review: evidence of used financial sources in book keeping, availability of technical equipment

Percentage of information awareness about Quality Assessment Program varies from 80 to 90 per cent. A focused survey concerning awareness of Quality Assessment Program didn't take place among patients and public. Awareness of some facilities is limited to certain units.

Comparing amounts used by certain hospitals for the Quality Assessment Program we state, that hospitals invited in the project were unable to identify all expenses directly linked to introduction and managing of the program.
- Regional Hospital Nové Zámky estimated their costs as 0,5 to 1% of the total budget.
- Faculty Hospital in Martin regards all budgeted financial sources directly or indirectly influencing the system of quality management and suggests leaving out only those operations which don't influence the quality. Following their opinion the Clinic of Children Surgery uses 100 % of the budget to assure quality of health care provision.

DRG for special processes is not worked out in Slovakia yet, we keep standard diagnostic and treating methods given from Ministry of Health SR. Identifying outputs of health care results from the financial limits. Slovak health service is applied almost without marketing, which could analyse:

- Status of health (level of quality);
- Needs of health care to achieve instant targets of health improvement;
- Life quality level, including genetic factors, and factors of living, working and family environments.

Health care establishments in Slovakia implement the strategy of human resources, containing development and training of employees for the qualification of quality management (ISO 9000:2000). A system to weight permanent professional development exists for all professions, however in the level of handling.

Review: approvable employee files, recorded interviews

Training programs are being set up in Slovakia. Education plans and increasing of education level in Slovak Republic are assured by means of institutional seminars and are measured continually. Some health care providers score them quarterly and the whole program by the end of the year. Manuals and booklets created by multiprofessional teams are used for practicing.

Review: available

Targeted surveys in Slovakia on Quality Assessment Programs concentrate on awareness of the employees, patients, and public. Their results are presented mainly for employees in range of their hospital. On the other hand we may state, that special questionnaires are being prepared to measure awareness of patients and public.

Review: survey results

According to the representatives of health care providers, Slovakia doesn't measure the rate of repeated visits in out patient units during five days.

Number of ready or revised manuals for the Quality Assessment Program in hospitals is different because of pending transformation. Certain manuals are being edited in cooperation with the Slovak Society for Quality.

Review: available

This report describing the course and results of Quality Assessment Program introduction in health care facilities of Slovak Republic is elaborated on base of a questionnaire survey driven in involved hospitals, from information obtained from annual hospital reports, from structured interviews with hospital managers, and from telephone consultations. The report contains also opinions of patients and public. Certain information was presented in professional papers and media in Slovak Republic.

In conclusion we offer figures expressing transformation of the inputs to the required quality of outputs. Opinions of hospitals indicate, that if price lists of care performance don't reflect the quality, then the survival of the providers depends on their adaptability to the given pricing and payment terms in health care. If these substantial appurtenances in health care wouldn't be handled, then the introduction of QMS is a dummy event.

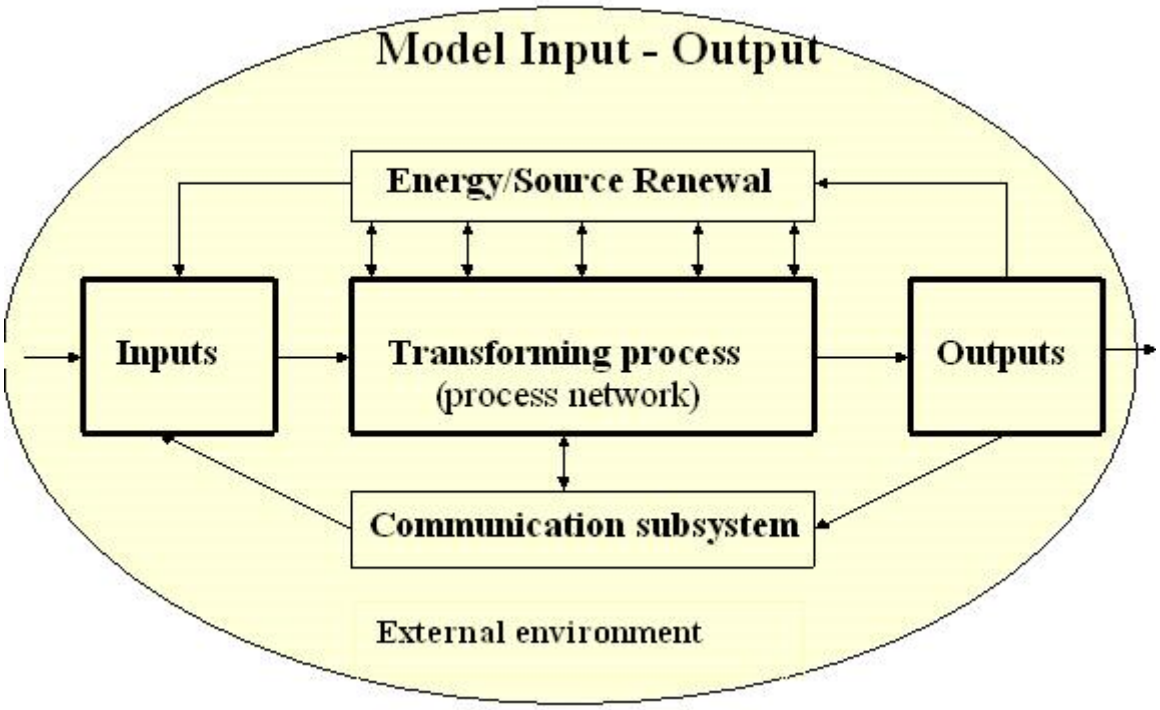

Figure 6 **Transformation of the inputs to the required quality of outputs**

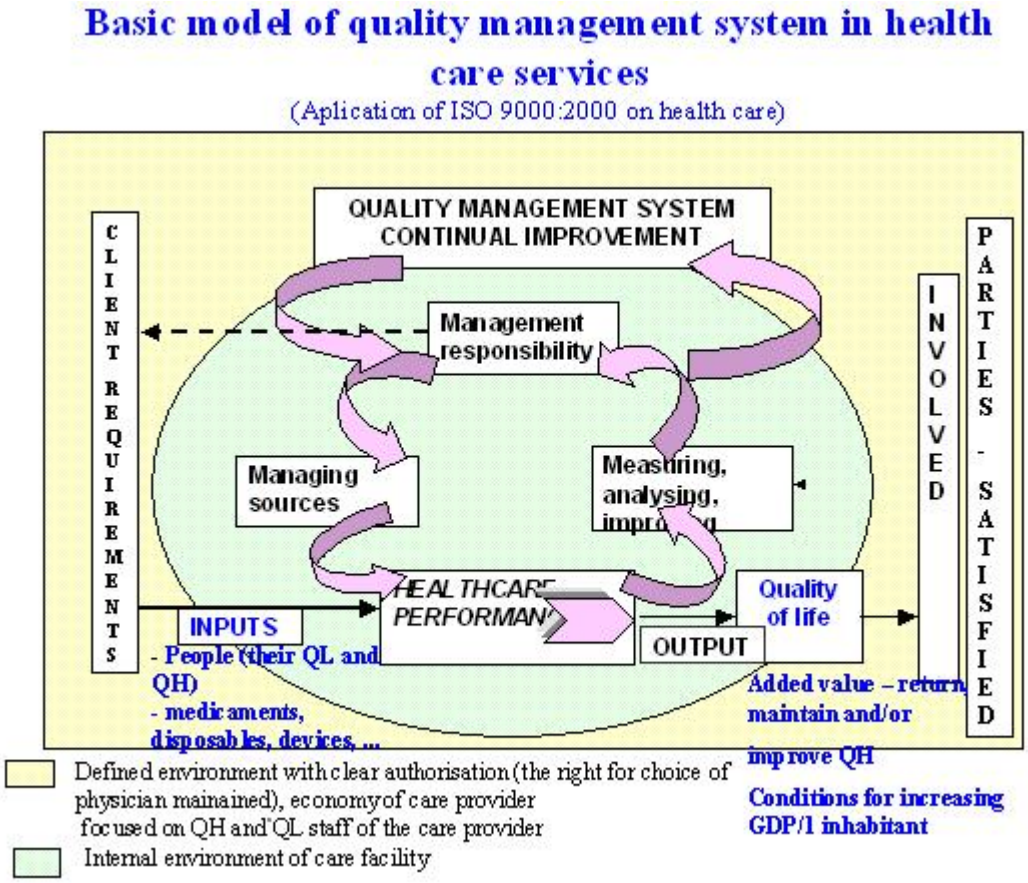

Figure 7 Basic model of QMS in HC services (Slovakia)

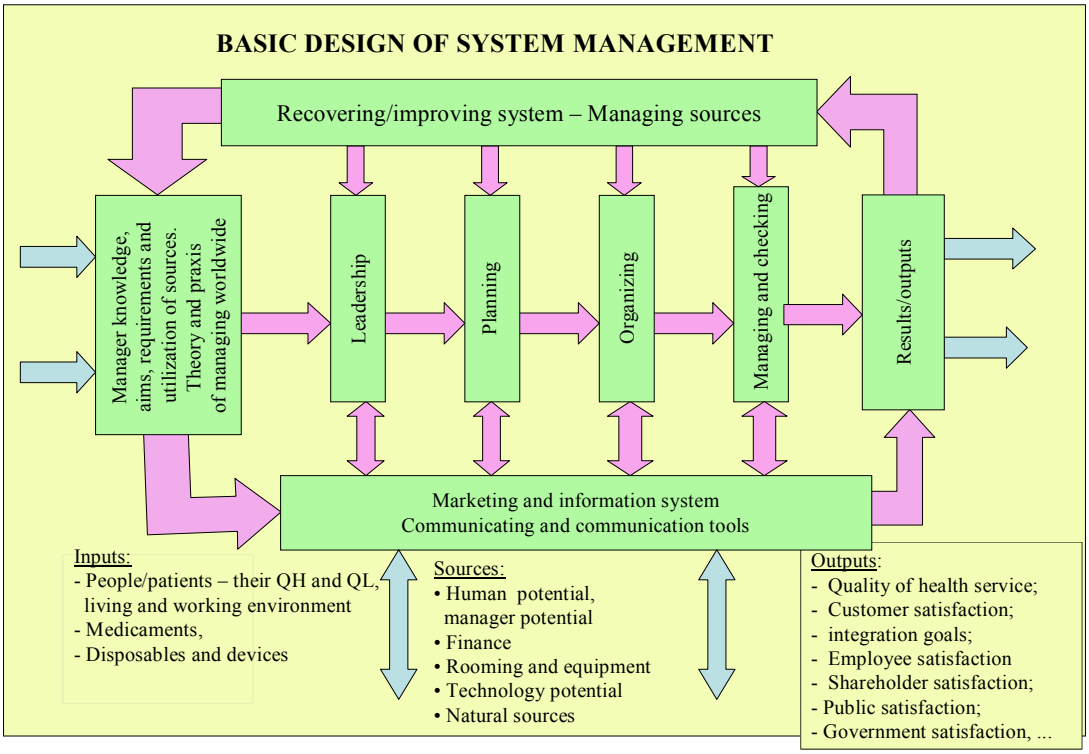

Figure 8 Basic design of system management (Slovakia)

Standards used in Slovak HC

STN EN ISO 9000: 2001, Systems of quality management. Basics and glossary (ISO 9000:2000)

STN ISO 10007: 2005, Systems of quality management. Guidelines for managing configuration

STN EN ISO 9001: 2001, Systems of quality management. Requirements (ISO 9001:2000)

STN EN ISO 9004: 2001, Systems of quality management. Guidelines for improving outputs ISO 9004:2000)

STN ISO 10005: 1998, Quality management. Guidelines for quality planning

STN ISO 10006: 2004, Systems of quality management. Guidelines for managing quality in projects

STN EN ISO 19011: 2003, Guidelines for auditing systems of quality management and/or system of environmental management (ISO 19011:2002)

STN EN ISO 10012: 2004, Systems of quality management. Requirements on measuring processes and devices (ISO 10012: 2003)

STN ISO/TR 10013: 2003, Návod na dokumentáciu systému manažérstva kvality

STN ISO/TR 10014: 2002, Guidelines for managing economy of quality

STN ISO 10015: 2002, Quality management. Guidelines for employee preparation

STN 01 0380: 2003, Risk management (AS/NZS 4360:1999)

Reported by: PhDr. Daniela Brašeňová, Country Manager,CEEQENET, Slovakia

6.7. Framework for detailed data descriptions and country related evaluation

CEEQNET Performance Quality Indicator Rating Framework

The Method used for rating each CEEQNET "Core indicator" is defined as follows:

1. Each member of the Expert Group (External Experts and Country Managers) rates each CEEQNET "Core indicator" using the developed "Scheme for evaluation of CEEQNET "Core indicators" (below). You must rate the indicator on a scale ranging from 1 to 9 for each of the dimensions: "Relevance", "Validity and Reliability" and "Feasibility".
2. Ratings of each indicator will be discussed (Using the Microsoft SharePoint services platform managed by the NCZISK) and ratings added and the total mean value calculated as well as means values for each dimension.
3. The total mean indicator score forms the basis for discussion of recommendations for application in countries of the CEEQNET and geographical areas covered by each Expert according to whether the CEEQNET "Core indicator" is either workable
    a. Immediately throughout the covered geographical areas
    b. Immediately in parts of EU
    c. Immediately in the collaborating countries of the CEEQNET project
    d. Workable in the future.

SCHEME FOR EVALUATION OF CEEQNET PQI candidate"

CEEQNET CORE INDICATOR SCORING MATRIX		
Dimension	**Definition**	**Score**
Relevance and Appropriate-ness	Does the indicator cover areas of significance (severity and frequency) in terms of Healthcare quality management within its specified domain (group of organizations and/or organization)?	1-3 Low degree of relevance 4-6 Medium degree of relevance 7-9 High degree of relevance
Validity and reliability	Is the indicator satisfactory in terms of: - Construct validity (evidence based) - Internal consistency - Exhaustiveness/exclusiveness - Reliability	1-3 Low degree of validity 4-6 Medium degree of validity 7-9 High degree of validity
Feasibility	What is the: - Availability of data - Burden of data collection	1-3 Low degree of feasibility 4-6 Medium degree of feasibility 7-9 High degree of feasibility
Suggested Quality Management System or QMS tool where indicator has potential use	QMS name (e.g. ISO, CAF, EFQM)	1-3 Low usefulness 4-6 Medium usefulness 7-9 High usefulness
	QMS name:	1-3 Low usefulness 4-6 Medium usefulness 7-9 High usefulness
	QMS name:	1-3 Low usefulness 4-6 Medium usefulness 7-9 High usefulness

Table 15 Evaluation scheme of CQN Performance Quality Indicator candidates

SCORING SHEET OF CEEQNET "Core Indicator" No.:				
Indicator Name:				
Scores			**Additional comments/ Overall evaluation of the indicator**	
Relevance and appropri-ateness	**Validity and reliability**	**Feasibility**		
(Score from 1-9)	(Score from 1-9)	(Score from 1-9)	(Free text)	
Suggested Quality Management System or QMS tool where indicator has potential use	QMS name: (e.g. ISO, EFQM, FMEA, PA)		SCORE: 1-3 Low usefulness 4-6 Medium usefulness 7-9 High usefulness	
	QMS name:		SCORE: 1-3 Low usefulness 4-6 Medium usefulness 7-9 High usefulness	
	QMS name:		SCORE: 1-3 Low usefulness 4-6 Medium usefulness 7-9 High usefulness	

Table 16 Evaluation score-list for CQN Performance Quality Indicator candidates

Rating Form for Evaluation of CEEQNET PQI candidates

		CQN_No. Relevance and appropriateness	CQN_No. Validity and reliability	CQN_No. Feasibility
N	Valid			
	Missing			
Median				
Mode				
Percentiles				

In case of multiple modes, the smallest value will be shown

Table 17 Evaluation score-list for CQN Performance Quality Indicator candidates

CQN_No. Relevance and Appropriateness

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Score 9: High degree				
	Score 8: High degree				
	Score 7: High degree				
	Score 6: Medium degree				
	Score 5: Medium degree				
	Score 4: Medium degree				
	Score 3: Low degree				
	Score 2: Low degree				
	Score 1: Low degree				
	Total				
Missing	System				
Total					

Table 18 Relevance and appropriateness synopsis form for CQN PQI candidates

CQN_No. Validity and reliability

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Score 9: High degree				
	Score 8: High degree				
	Score 7: High degree				
	Score 6: Medium degree				
	Score 5: Medium degree				
	Score 4: Medium degree				
	Score 3: Low degree				
	Score 2: Low degree				
	Score 1: Low degree				
	Total				
Missing	System				
Total					

Table 19 Validity and reliability synopsis form for CQN PQI candidates

CQN_No. Feasibility

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Score 9: High degree				
	Score 8: High degree				
	Score 7: High degree				
	Score 6: Medium degree				
	Score 5: Medium degree				
	Score 4: Medium degree				
	Score 3: Low degree				
	Score 2: Low degree				
	Score 1: Low degree				
	Total				
Missing	System				
Total					

Table 20 Feasibility synopsis form for CQN PQI candidates

LIST OF CEEQNET "PQI candidates" – for expert evaluation according to preceding schemes

Indicator 01: Abdominal Aortic Aneurysm (AAA) Repair Volume	Volume Measure
Indicator 02: Carotid Endarterectomy (CE) Volume	Volume Measure
Indicator 03: Coronary Artery Bypass Graft (CABG) Volume	Volume Measure
Indicator 04: Esophageal Resection Volume	Volume Measure
Indicator 05: Pancreatic Resection Volume	Volume Measure
Indicator 06: Pediatric Heart Surgery Volume	Volume Measure
Indicator 07: Percutaneous Transluminal Coronary Angioplasty (PTCA) Volume	Volume Measure
Indicator 08: Cesarean Section Delivery Rate	Provider-Level Utilization Measure
Indicator 09: Laparoscopic Cholecystectomy Rate	Provider-Level Utilization Measure
Indicator 10: Acute Myocardial Infarction (AMI) Mortality Rate	In-Hospital Mortality Measure
Indicator 11: Congestive Heart Failure (CHF) Mortality Rate	In-Hospital Mortality Measure
Indicator 12: Gastrointestinal (GI) Hemorrhage Mortality Rate	In-Hospital Mortality Measure
Indicator 13: Hip Fracture Mortality Rate	In-Hospital Mortality Measure
Indicator 14: Pneumonia Mortality Rate	In-Hospital Mortality Measure
Indicator 15: Acute Stroke Mortality Rate	In-Hospital Mortality Measure
Indicator 16: Abdominal Aortic Aneurysm (AAA) Repair Mortality Rate	Post-Procedural Mortality Measure
Indicator 17: Coronary Artery Bypass Graft (CABG) Mortality Rate	Post-Procedural Mortality Measure
Indicator 18: Craniotomy Mortality Rate	Post-Procedural Mortality Measure
Indicator 19: Esophageal Resection Mortality Rate	Post-Procedural Mortality Measure
Indicator 20: Hip Replacement Mortality Rate	Post-Procedural Mortality Measure
Indicator 21: Pancreatic Resection Mortality Rate	Post-Procedural Mortality Measure

Table 21 Tabulated list of CQN PQI candidates selected for evaluation

Information supplied for CEEQNET experts as a basis for the rating of indicators
(To be provided for each of the 21 CEEQNET "Core indicator candidates")

Example of evidence relating to a selected CEEQNET PQI candidate

CEEQNET PQI candidate No. 1 Acute Myocardial Infarction (AMI) Mortality Rate (In-Hospital Mortality Measure) [17, 27, 28]

Indicator	Provider level mortality rate for AMI.
Relationship to Quality	Better processes of care may reduce mortality for AMI. As such lower rates represent better quality care.
Benchmark	State, regional, or peer group average.

Method:

Quality Measure	Number of deaths per 100 discharges with diagnosis code for AMI.
Outcome of Interest	Number of deaths with diagnosis code for AMI (see Appendix 6) in any field.
Population at Risk	All discharges with diagnosis codes for AMI in any field. (see Appendix 6) Age 18 years and older. Exclude transfers to other institution. Exclude MDC 14 (pregnancy, childbirth, and puerperium) and MDC 15 (newborns and other neonates).

NOTE: This factsheet is extensively commented in the **Annex** CEEQNET indicator_1_AMI_In-Hospital_Mortality_FACT_SHEET

Table 22 Basic fact sheet example for CQN PQI candidates (Acute Myocardial Infarction (AMI) Mortality Rate (In-Hospital Mortality Measure)

This description format is suggested for all CQN indicators. It is absolutely necessary, before implementing any hospital decision or activity to assure the unambiguity and highest possible level of validity of the indicator.

Indicator Exclusion Criteria

Performance Quality Indicator candidates *excluded* from CQN Indicator candidates set

Meticulous care was taken in the CEEQNET project to identify measures – indicator candidates that would not become another list of misleading information (facts). To provide insight about the process used for providing as sound as possible measures used for indicating the quality of the healthcare process, we present a table of indicators theoretically reachable from administrative healthcare data. To highlight the reasons leading to production of the limited list of CQN performance quality indicators selected for testing and inclusion, the following "exclusion" table is provided. It contains the overview of indicators considered feasible to construct from HC administrated („administrative") data, until the factual evaluation of each individual country collected HC administered dataset was thoroughly reviewed. This review is also the main underlying fact for the need to restructure the logical data model every time a new country accesses the CEEQNET Project. Often several reasons led to the exclusion of a PQI „candidate".

Main exclusion reasons summarized:

1. Unclear or on unavailable definition of the indicator (this relates to several NHS indicators [10])
2. The indicator requires for construction data available only after termination of hospitalization (e.g. as in the case of „Rates of permanent end colostomy among patients with colorectal cancer undergoing surgery" / NHS [10])
3. The indicator is defined using the terms „effective" or „acute-urgent". These terms are in the countries that collaborated on the CEEQNET project partly unavailable, partly poorly defined and partly badly coded. The site other effect, this was the

reason why no indicators based on unplanned readmission (e.g. „Emergency readmission rates within 28 days following elective admission for hysterectomy“ / NHS [10]) could have been considered for use in the CEEQNET project [4].

4. Difficulties or unclarities in remapping of procedures (e.g.. „Craniotomy Mortality Rate“ / AHRQ)
5. Cost based indicators (e.g. „Reference costs for acute myocardial infarction“ / NHS [10]), because, contrary to initial expectation, it proved impossible to obtain cost (financial) data nor any other data for activity based costing (with the exception of the Czech Republic.). The project demonstrated that accounting frameworks differ within European countries so much that it is practically impossible to remap financial data
6. The indicator relates to a region. This fact excludes all „Area-level utilization measures“ as well as indicators referred to as ACSC (Ambulatory Care Sensitive Conditions). There is no re-mappable coding relating to regions in the administrated healthcare data sets.
7. It is also problematic or impossible to remap between ICD-9 a ICD-10, which strongly limits the use of the AHRQ-Safety indicators [3].
8. The indicator is based on comorbidities or the indicator is based on auxiliary diagnosis (Chapter XIX ICD-10). This fact again excludes mainly the AHRQ-Safety indicators.

Considered PQI candidates excluded from evaluation	Source	Code	Comment
High/low/median length of stay rate (with the option of focusing on people with schizophrenia)	NHS	3035	
Rates of permanent end colostomy among patients with colorectal cancer undergoing surgery	NHS	2052	
Case fatality rate associated with acute diabetic episodes treated in hospital	NHS	4006	

Considered PQI candidates excluded from evaluation	Source	Code	Comment
Deaths in hospital within 30 days of surgery (elective admissions) (age & sex standardized)	NHS	25004	
Deaths in hospital within 30 days of surgery (non-elective admissions) (age & sex standardized)	NHS	25005	
Emergency readmission rates within 28 days following elective admission for total hip replacement (age & sex standardized)	NHS	25006	
Emergency readmission rates within 28 days following elective admission for hysterectomy (age & sex standardized)	NHS	25007	
Maternal readmissions	NHS	11004	
Psychiatric readmission rate - based on one of the following with the option of focusing on people with schizophrenia: all readmissions, emergency readmissions (Interface indicator)	NHS	3033	
Acute care management - Emergency admission rates for kidney/UTI (age & sex standardized)	NHS	25001	
Acute care management - Emergency admission rates for ENT (age & sex standardized)	NHS	25002	
Chronic care management - Emergency admission rates for asthma (age & sex standardized)	NHS	25003	
Elective surgery rates for CABG (age & sex standardized) (Quality indicator)	NHS	1041	
Elective surgery rates for PTCA (age & sex standardized) (Quality indicator)	NHS	1042	
Non-elective surgery rates for CABG (age & sex standardized) (Quality indicator)	NHS	1043	
Non-elective surgery rates for PTCA (age & sex standardized) (Quality indicator)	NHS	1044	
Percentage of revascularisations which are	NHS	1045	

Considered PQI candidates excluded from evaluation	Source	Code	Comment
PTCA			
Reference costs for acute myocardial infarction, chest pain, cardiac arrest, pacemaker implant for acute myocardial infarction, heart failure or shock	NHS	1039	
Cost of inpatient episode for infections such as scarlet fever, measles, rubella, gastroenteritis, mumps etc without serious complications.	NHS	10016	
Cost per normal delivery - figures for both hospital and community deliveries	NHS	11006	
Cost per inpatient day; cost per 'booked appointment' (this can be in any setting eg outpatient, clinic, patient's home) where the appointment is pre booked (so excludes crisis intervention)	NHS	3076	
Breast cancer - Ratio of lumpectomies to mastectomies	NHS	2051	
Chronic care management - Emergency admission rates for diabetes (age & sex standardized)	NHS	4008	
Indicator 09: Incidental Appendectomy Among the Elderly Rate	HCUP/AHRQ		
Indicator 10: Bi-lateral Cardiac Catheterization Rate	HCUP/AHRQ		
Indicator 11: Successful Vaginal Birth After Cesarean Section (VBAC) Rate	HCUP/AHRQ		
Indicator 13: Coronary Artery Bypass Graft (CABG) Rate	HCUP/AHRQ		Area-level utilization measures
Indicator 14: Hysterectomy Rate	HCUP/AHRQ		Area-level utilization measures
Indicator 15: Laminectomy and/or Spinal Fusion Rate	HCUP/AHRQ		Area-level utilization measures
Indicator 16: Percutaneous Transluminal Coronary Angioplasty (PTCA) Rate	HCUP/AHRQ		Area-level utilization measures

Considered PQI candidates excluded from evaluation	Source	Code	Comment
Indicator 17: ACSC: Dehydration Admission Rate	HCUP/AHRQ		ACSC
Indicator 18: ACSC: Bacterial Pneumonia Admission Rate	HCUP/AHRQ		ACSC
Indicator 19: ACSC: Urinary Infection Admission Rate	HCUP/AHRQ		ACSC
Indicator 20: ACSC: Perforated Appendix Admission Rate	HCUP/AHRQ		ACSC
Indicator 21: ACSC: Angina Without Procedure Admission Rate	HCUP/AHRQ		ACSC
Indicator 22: ACSC: Adult Asthma Admission Rate	HCUP/AHRQ		ACSC
Indicator 23: ACSC: Chronic Obstructive Pulmonary Disease (COPD) Admission Rate	HCUP/AHRQ		ACSC
Indicator 24: ACSC: Congestive Heart Failure (CHF) Admission Rate	HCUP/AHRQ		ACSC
Indicator 25: ACSC: Diabetes – Short Term Complications Admission Rate	HCUP/AHRQ		ACSC
Indicator 26: ACSC: Uncontrolled Diabetes Admission Rate	HCUP/AHRQ		ACSC
Indicator 27: ACSC: Diabetes – Long Term Complications Admission Rate	HCUP/AHRQ		ACSC
Indicator 28: ACSC: Hypertension Admission Rate	HCUP/AHRQ		ACSC
Indicator 29: ACSC: Lower Extremity Amputation Rate	HCUP/AHRQ		ACSC
Indicator 30: ACSC: Low Birth Weight Rate	HCUP/AHRQ		ACSC
Indicator 31: ACSC: Pediatric Asthma Admission Rate	HCUP/AHRQ		ACSC
Indicator 32: ACSC: Pediatric Gastroenteritis Admission Rate	HCUP/AHRQ		ACSC
Indicator 41: Craniotomy Mortality Rate	HCUP/AHRQ		
Complications of anesthesia	AHRQ-Safety		
Death in low mortality DRGs	AHRQ-Safety		

Considered PQI candidates excluded from evaluation	Source	Code	Comment
Decubitus ulcer	AHRQ-Safety		
Failure to rescue	AHRQ-Safety		
Foreign body left in during procedure	AHRQ-Safety		
Iatrogenic penumothorax	AHRQ-Safety		
Infection due to medical care	AHRQ-Safety		
Postoperative hip fracture	AHRQ-Safety		
Postoperative hemorrhage or hematoma	AHRQ-Safety		
Postoperative respiratory failure	AHRQ-Safety		
Postoperative PE or DVT	AHRQ-Safety		
Postoperative sepsis	AHRQ-Safety		
Technical difficulty with procedure	AHRQ-Safety		
Transfusion reaction	AHRQ-Safety		
Postoperative wound dehiscence	AHRQ-Safety		
Birth trauma	AHRQ-Safety		
Obstetric trauma – vaginal delivery with instrumentation	AHRQ-Safety		
Obstetric trauma – cesarean delivery	AHRQ-Safety		
Obstetric trauma – vaginal delivery without instrumentation	AHRQ-Safety		
Postoperative physiologic and metabolic derangements	AHRQ-Safety		

Table 23 List of considered PQIs excluded from evaluation in CQN Project

6.8. CQN Data source, Logical data model, Reports and Indicators

CEEQNET

Data source
Logical data model
Reports and indicators

Designed by: Petr Tůma
Revision: Aleš Bourek

Pardubice/Brno 30.03.2007

Quality, health care quality

The term health care quality includes quality and performance of health care. Following this logic the term is used in the expression quality indicator

Measure

Any quantitative data in database is a measure.

Quality indicator

Quality indicator (in CQN system) is a selected measure, based on quality indicator used in one or more foreign systems. Provided the measure (although derived from foreign quality indicators) is not validated and positively assessed in the given environment, it is better to use the term candidate for quality indicator. To be strict, all quality indicators in CQN system are just candidates for quality indicator.

Administrative data

Administrative data are routinely collected data for central purposes according to unified national methodologies [39, 41]

Indicator assessment

Conclusive properties for assessment of quality indicators are:

- Relevance and appropriateness
- Validity and reliability
- Feasibility

Relevance and appropriateness

Does the indicator cover areas of significance (severity and frequency) in terms of healthcare quality management within its specified domain (group of organizations and/or organization)? [20]

Validity and reliability

Is the indicator valid, reliable and internally consistent?

Feasibility

Are data available? Are costs and effort necessary for the collection and cleaning (purification) proportional to the global benefit?

The following Table shows the split of basic properties of quality indicators and their reference to related attributes:

Main attribute of indicator	Content of the attribute	Related items
Relevance and appropriateness	Significance Utility	Strategic importance Health importance Financial importance Interpretability Meaningfulness to decision makers Variance among systems Potential for improvement Controllability
Validity and reliability	Construct validity (evidence based) Internal consistency Exhaustiveness/exclusiveness Reliability	Scientific acceptability Precision Minimum bias Accuracy Case-mix risk adjusted Comparability of data sources
Feasibility	Availability of data Burden of data collection and data processing	

Table 24 Basic properties of PQIs and their reference to related attributes

Explanation of terms

Explanation of certain items and alternative definitions are in the Lexicon included in this document.

Maximum precision

Involving entire collection of those data, which correctly describe the reality.

Minimum bias

Means independence of the indicator on risk factors or existence of efficient Risk Adjustment Method.

Risk factors

Represent a patient attribute summary existing in time of admission to hospital determining expectation of unfavorable result (which is concurrently a quality indicator).

Risk Adjustment

Is a method reducing influence of risk factors (distributed irregularly among hospitals) on the indicator. Involves two types of methods: risk stratification and standardization.

Risk stratification

Represents narrowing of indicator definition or separated measurements in different bands of the risk scale.

Standardization

Aims to calculation of standardized indicator from nonstandardized (raw) by means of mathematical methods (direct standardization, indirect standardization, logistic regression). The calculation takes specific weight of particular risk factors and their combination.

Validity

Expresses how correctly the indicator measures what it is declared for. This is similar to accuracy but refers more to the relation between the measurement and its underlying concept.

Utility

Has the indicator been proven to be of value when used in acute health care (either for accountability, directing consumer decisions or quality improvement)?

Interpretability

Interpretability is defined as the degree to which one can assign qualitative meaning to an instrument's quantitative scores. Interpretability of a measure is facilitated by information that translates a quantitative score or change in scores to a qualitative category that has clinical or commonly-understood meaning.

External validity

External validity refers to the extent to which the results of a study are generalizeable or transferable.

Content validity

How closely the indicator relates to quality of care and to what extent are relevant aspects of care quality covered by the indicator.

Construct validity

What relation does the indicator have to other measures of quality?

Construct validity can be broken down into two sub-categories:

- Convergent validity
- Discriminate validity.

Convergent validity is the actual general agreement among ratings, gathered independently of one another, where measures should be theoretically related. Discriminate validity is the lack of a relationship among measures that theoretically should not be related.

Bias

Systematic differences in patient case-mix, including disease severity and comorbidity. In cases where such systematic differences exist, an adequate risk adjustment system should be available [20].

See:

- Selection bias
- Information bias

Accuracy

Refers to how well the measurement of an object or phenomenon reflects its actual state. For example, it is important to have an accurate measurement of your feet in order to select well-fitting shoes. (See also Bias, Precision and Validity.)

Measure

Measure is defined as quantitative data in database (primary or derived).

Dimension

Is a list of attributes (often in hierarchal order), enabling categorization of the indicator.

Mapping

Mapping in this document means linking elements of national dimensions towards aggregated level of elements created for the CQN database.

Sensitivity, specificity and predictive value

When significant associations between Test Result (e.g. Quality Indicator) and Phenomenon (Quality Defect) are found, it is useful to express the data in a relevant format (understandable, easily interpretable). In order to communicate the results in a consistent manner, the following definitions are used:

		Test Result (QI)	
		Negative	Positive
Phenomenon	Absent	A	b
	Present	C	d

Sensitivity = d / (c+d)

The probability that a test is positive given that the phenomenon is present. This is also known as the true positive rate.

Specificity = a / (a + b).

The probability that a test is negative given that the phenomenon is absent. This is also known as true negative rate.

Predictive value positive = d / (b + d)

The probability that a phenomenon is present given a positive test result

Predictive value negative = a / (a + c)

The probability that a phenomenon is absent given a negative test

False negative

The phenomenon for which test is negative but that is actually positive

False positive

The phenomenon for which test is positive but that is actually negative

6.8.1. National data sources and their brief features

Existence and real availability of MBDS items in systems of particular countries

Item	Symbol in the data model	AT	CZ	HU	PL	SK
Hospital identification	ID_HOS	YES	YES		YES	YES
Patient identification	ID_PAT	(YES)	YES		YES	YES
Gender	GEN	YES	YES		YES	YES
Age at admission	AGE	YES	YES		YES	YES
Date of admission and discharge	ADM_DATE DIS_DATE	YES	YES		YES	YES
Type of admission	ADM_ST	YES	YES		NO	YES
Admission planning	PLAN_ST	NO	YES		YES	YES
Type of discharge	DIS_ST	YES	YES		YES	YES
Main diagnosis	DG_PR	YES	YES		YES	YES
Associated diagnoses	DG_SE	YES	YES		YES	(NO)
Surgical procedures	PROC	YES	YES		YES	NO
Other important procedures	PROC	YES	YES		YES	(YES)
Procedure date	PROC_DATE	(YES)	YES		NO	
Case mix group	DRG	YES	YES		NO	NO
Admission date to ward	EPIS_ADM_DATE	YES	YES		YES	YES
Ward specialty	EPIS_SPEC	YES	YES		YES	YES

Table 25 Brief description of national data sources

Czech Republic (CR)

Base for Minimal Basic Dataset (MBDS) are reimbursement claims (documents used for reimbursement). These contain vast amount of details on where the patient was hospitalized, what procedures he underwent, and what medicines or material was he provided with. A disadvantage of data processing is that one episode (e.g. patient stay at ICU) may be referred to in more documents.

Acute care hospitalization case is not built into hospital data, however a method for its creating exists. Due to this method it is possible

- To readmit a discharged patient on the same or consecutive day is regarded as the same case
- Principle diagnosis of the case is defined as the principle diagnosis of the last document in the course of time
- Other diagnoses in documents (co-morbidities, secondary) are represented by means of the associated diagnoses of the case

Besides actuarial documents for reimbursement reports, national statistics exist and are collected as well. Both sources have common and separated data (e.g. the statistical report contains extra information on whether the admission was planned). Consistence of those two sources is not guaranteed.

Cases are voluntarily classified based on IR-DRG and they have allocated weight based on annually published national weightings (and formulas for calculating outlier weight) [8].

Outline: Data source CR

Element	Episode (Departmental stay)	Case (Hospital stay)
	Designed from one or more documents for reimbursement	Not designed in primary data A national method for case design exists
Type of care	YES	
Specialty	YES	
Patient ID	YES	YES – linking of various cases of the same patient enabled
Age	YES	Imported from episode
Gender	YES	Imported from episode
Main diagnosis	YES	Imported from last episode
Associated diagnoses	YES	Imported from all episodes
Admission date	YES	Imported from first episode
Discharge date	YES	Imported from last episode
Type of admission	YES	Imported from first episode
Admission planning	NO	Imported from statistical report
Type of discharge	YES	Imported from last episode
Surgical and other procedures	YES	Imported from all episodes
DRG	NO	YES - voluntarily
Case weight (DRG)	NO	YES - voluntarily

Table 26 Czech Republic data source overview

Poland (PL)

Base for MBDS are reimbursement claim documents where one document refers to one episode.

Acute care hospitalization case is not built into collected hospital data, and a method for its creating does not exist.

Outline: Data source Poland

Element	Episode (Departmental stay)	Case (Hospital stay)
	Refers to one document	Not designed in primary data
Type of care	YES	
Specialty	YES	
Patient ID	YES	YES – linking of various cases of the same patient enabled
Age	YES	Imported from episode
Gender	YES	Imported from episode
Main diagnosis	YES	Imported from last episode
Associated diagnoses	YES	Imported from all episodes
Admission date	YES	Imported from first episode
Discharge date	YES	Imported from last episode
Type of admission	NO	
Admission planning	YES	Imported from first episode
Type of discharge	YES	Imported from last episode
Surgical & other procedures	YES	Imported from all episodes
DRG	NO	NO
Case weight (DRG)	NO	NO

Table 27 Polish data source overview

Cases were designed similarly to case design from CR data.

Slovak Republic (SK)

Base for MBDS is the hospitalization report for state statistics, where one document refers to one ward stay-episode of care (without discriminating between standard and intensive care).

The hospitalization report does not contain information on underwent surgical procedures (this information is absent in data for reimbursement as well).

The hospitalization report does not contain information on secondary (associated) diagnoses (this information is absent in data for reimbursement as well).

Acute care hospitalization case is not built into hospital data, and a national method for its creation does not exist.

Outline: Data source Slovakia

Element	Episode (Departmental stay)	Case (Hospital stay)
	Refers to one document	Not designed in primary data
Type of care	NO	
Specialty	YES	
Patient ID	YES	YES – linking of various cases of the same patient enabled
Age	YES	Imported from episode
Gender	YES	Imported from episode
Main diagnosis	YES	Imported from last episode
Associated diagnoses	NO	Imported from all episodes
Admission date	YES	Imported from first episode
Discharge date	YES	Imported from last episode
Type of admission	YES	
Admission planning	YES	Imported from first episode
Type of discharge	YES	Imported from last episode
Surgical & other procedures	NO	NO
DRG	NO	NO
Case weight (DRG)	NO	NO

Table 28 Slovak Republic data source overview

Cases were designed similarly to case design from Czech Republic data.

Austria (AT)

Base for MBDS is a hospitalization report for state statistics, where one document describes a hospitalization case and a ward stay.

Contrary to Czech, Slovak and Polish reports the primary data contain the case with designed case and main attributes referring to the case. Data on main and secondary (co-morbidities, associated) diagnoses refer to the case (never to an episode). Data on surgical and other selected procedures are also referring to a case (although it is possible to derive a link to episode when the date of the procedure is present)

Outline: Data source Austria

Element	Episode (Departmental stay)	Case (Hospital stay)
Type of care	YES	
Specialty	YES	
Patient ID	YES	YES – linking of various cases of the same patient enabled, however only in frame of the same hospital
Age		YES
Gender		YES
Main diagnosis	NO	YES
Associated diagnoses	NO	YES
Admission date	YES	YES
Discharge date		YES
Type of admission		YES
Admission planning		NO
Type of discharge		YES
Surgical & other procedures		YES
DRG		YES
Case weight (DRG)		YES

Table 29 Austrian data source overview

Hungary (HU)

Due to administrational reasons in the course of the CEEQNET project (termination of work of the Hungarian partner before hospital data upload) Hungarian data is not available.

6.8.2. Logical data model of CEEQNET (CQN) database

The model represents description of acute care hospitalization case in the subsequently produced database. Data from particular national sources have been used to fill in the model to the largest possible extent.

Measure

Primary measures of a CQN database are

- Acute care case code
- Episodes code (stays in ward or department)
- Procedures code
- Days code (length of case, length of episode)
- Age

Mortality is a derived item (proportion of cases or episodes with "deceased" attribute)

Dimension

CQN database has following number of hierarchal dimensions:

- Country
- Hospital
- Gender
- Type of care

CQN database has following number of hierarchal dimensions:

- IDC-10
- Time
- Admission type*
- Admission planning*
- Specialty*
- Discharge type*
- Type of procedure*

* These dimensions have a basic level imported from national systems, and a higher level (granularity) created by mapping on CQN elements. More is explained in the „Mapping“ chapter.

Further dimensions with logical pertinence to the system exist, however from various reasons were not acquired, e.g.

- Type of hospital (e.g. according to possessing the „teaching status – University Hospital “) is a common dimension, however due to limited number of hospitals in the CQN database its deployment had no reason.

Mapping

Mapping principle is demonstrated via example – mapping of the dimension “Discharge Status”.

Annex: “Example – mapping dimension Discharge Status”

Refer to the included example of dimension mapping “Discharge Status“

This approach (mapping national elements towards „common“ level of dimension) has three important merits:

- Enables to categorize via inserted common level cases from various national data environment.
- At the same time in case of need it enables to „drill-down“ from the inserted CQN level down to the national level, and to check the information in primary data.
- Enables relatively simply to reorganize the analytical approach by changing links within the dimension (hence in a small and simple table). Extensive data in fact tables (sheets) remain unchanged, and Online Application Processing (OLAP) system ensures a correct new pattern.

Model description

Patient [PAT] has gender as attribute.

Element	Ratio	Code	Note
Gender	1 : 1	GEN	

One patient [PAT] has 1 or more acute care hospitalization cases.

One case of acute hospitalization [CASE] has these attributes and links:

Element	Ratio	Code	Note
Case identification		ID_CASE	Number allocated by the system
Hospital	1 : 1	ID_HOSP	
Patient	1 : 1-N	ID_PAT	Each patient in database has at least one case
Age	1 : 1	AGE	
Main diagnosis	1 : 1	ID_DG_PR	
Admission date	1 : 1	ADM_DATE	Identical with the admission date of first episode
Discharge date	1 : 1	DIS_DATE	
Type of admission	1 : 1	ADM_ST	
Admission planning	1 : 1	PLAN_ST	
Type of discharge	1 : 1	DIS_ST	
Associated diagnoses	1 : 0-N	ID_DG_SEC	
Surgical and other procedures	1 : 0-N	ID_PROC_NAT	
Costs	1 : 1	COST	voluntarily
DRG	1 : 1	DRG	voluntarily
DRG weight	1 : 1	WEIGHT	voluntarily

One case [CASE] has 1 or more episodes [EPIS] of acute hospitalization care.

One episode [EPIS] of hospitalization care has the following attributes and links:

Element	Ratio	Code	Note
Episode identification		ID_EPIS	Number allocated by the system
Case association	1 : 1-N	ID_CASE	One case has 1 or more episodes
Sequential episode number	1 : 1	SEQN_EPIS	Sequential episode number in frame of one case
Admission date	1 : 1	ADM_DATE_EPIS	
Type of care	1 : 1	ID_CARE_TYPE	
Principle diagnosis of the episode	1 : 1	ID_DG_PR_EPIS	
Specialty	1 : 1	ID_SPEC	
costs	1 : 1	COST_EPIS	voluntarily
DRG	1 : 1	DRG_EPIS	voluntarily
DRG weight	1 : 1	WEIGHT_EPIS	voluntarily

Table 30 CEEQNET Logical data model description

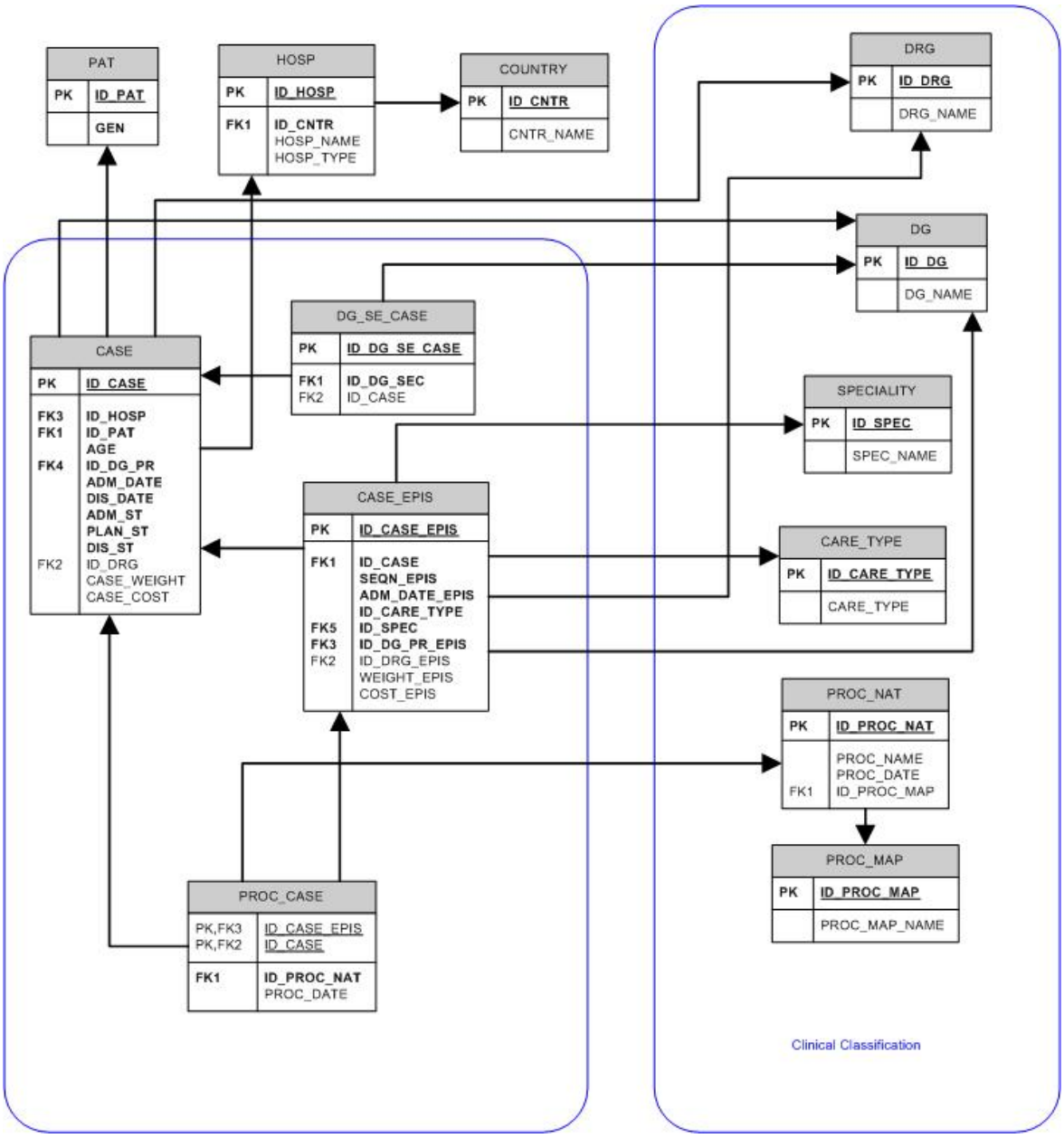

Figure 9 CEEQNET Logical data model representation

Why was this model chosen?

Model is a temporization of requirements on complexity (hence larger amount of data requires deeper particulars - facts) and versatility (hence embracement for all national data sources). Higher demands on data volume implies lower fulfillment of the model in all participating countries. On the other hand, if the versatility of the model was absolutely applied, data volume would be unacceptably reduced, as a specific data error in administrative data of a particular country could automatically reject one item from the model.

Acute care case and acute care episode

If the model was limited only to the hospitalization case, and not also taking episodes (parts of the case) into consideration, it would be simple. As the model includes episodes of acute care, it enables to investigate the case design. This is important as the case mix could be one of the reasons of diverse results (outcomes) of cases (e.g. Average length of stay - A_LOS) [25].

Pathway to the model versatility

Code lists and dimensions based on them are different in national systems. The only exception is the dimension „Gender“ and the code list of diagnoses ICD-10 (despite of that the Principle diagnosis in various systems may be selected following various existing and used rules).

Other national dimensions are mapped. The code list of operations is a partially mapped dimension (only those procedures are mapped, that constitute the indicator; others remain unmapped).

A dimension that is in whole impossible to re-map is the Diagnose Related Groups (DRG) since none of the countries use the same DRG system).

6.8.3. Selection of performance quality indicators for CQN testing

Researching

For reasons of identifying indicator candidates feasible for construction from the CQN database the following systems were reviewed:

- Australian Commission for Safety and Quality in Health Care (ACSQHC)
- Agency for Healthcare Research and Quality (AHRQ) [1]
- British National Health Service (NHS) [10]
- European Community Health Indicator Monitoring (ECHIM)
- Joint Commission on accreditation in Health Care (JCAHO)
- Organization for Economic Co-operation and Development (OECD)
- World Health Organization (WHO)

Based on availability of indicator description, methods of their assessment and methods of their application, the basic indicators were selected from the AHRQ system. Some of the selected indicators are present also in other systems (e.g. mortality of AMI and other), but because they are all listed in AHRQ, it of an advantage to refer to the same (methodically and terminologically consistent) source.

Reference - AHRQ

AHRQ Quality Indicators—Guide to Inpatient Quality Indicators – see:
http://www.qualityindicators.ahrq.gov/archives/iqi/iqi_guide_rev4.pdf
These indicators are used for hospital assessment and comparison in New York State (2006 New York State Hospital Report Card) – see:
http://www.myhealthfinder.com/newyork06/glancechoose.php

Used indicators

Indicators from the set "The Inpatient QI's" were used
This set contains 4 groups:

- 6 indicators of type Volume Indicators
- 7 indicators of type Mortality Indicators for Inpatient Procedures
- 6 indicators of type Mortality Indicators for Inpatient Conditions
- 2 indicators of type Utilization Indicators

List of indicators

Volume Indicators

- Esophageal resection volume
- Pancreatic resection volume
- Abdominal aortic aneurysm (AAA) repair volume
- Coronary artery bypass graft (CABG) volume
- Percutaneous transluminal coronary angioplasty (PTCA) volume
- Carotid endarterectomy (CEA) volume

Mortality Indicators for Inpatient Procedures [18]

- Esophageal resection mortality rate
- Pancreatic resection mortality rate
- AAA repair mortality rate
- CABG mortality rate
- PTCA mortality rate
- CEA mortality rate
- Hip replacement mortality rate

Mortality Indicators for Inpatient Conditions

- Acute myocardial infarction (AMI) mortality rate
- (AMI mortality rate, without transfer cases)
- Congestive heart failure (CHF) mortality rate
- Acute stroke mortality rate
- Gastrointestinal hemorrhage mortality rate
- Hip fracture mortality rate
- Pneumonia mortality rate

Utilization Indicators

- Cesarean delivery rate
- Laparoscopic cholecystecomy rate

6.8.4. Reports generated from the CQN databases

A data cube that is visualized (displayed) in the report is a result of a query to database.

Every user (currently collaborating institutions of the CEEQNET project) has an option to create his own queries to database, or modify the pre-designed reports.
The methodology of creating reports is described in the separate document „CQN Catalog of reports".

The CQN Central Database Repository is ready for imports of datasets from any interested healthcare organization wishing to benchmark their own data in the system.

Pre-designed reports

Pre-designed reports are described in detail in the separate document „CQN Catalog of reports". Reports form two main groups.

Part „D" - Database inventory

Reports in this part enable browsing through all uploaded data and „check" structural material for future construction of special (custom tailored to the requests and demands of any collaborating organization) indicators. Reports are at the same time constructed to enable the understanding of data links, data properties from particular national sources, and the methodology of using dimensions.

Part „QI" – Candidates for performance and quality indicators

Reports in this part contain a small portion of data, referring to measures constructed according to quality indicators enumerated in the section "Reference – AHRQ used indicators).

6.8.5. *Example of mapping of a dimension "Discharge Status"*

CQ – CEEQNET, CZ – Czech Republic, PL – Poland, AT – Austria, SK Slovak Republic,

HU – Hungary (Hungarian partner was participating in CEEQNET Project at the stage when re-mapping was performed

CQN items represent inserted "common" level of dimensions

CODE	LD_NAT	SD_NAT	LINK	COUNTRY	LD_ENG
DIS	Discharge	1-Discharge	ALL	CQN	1-Discharge in domicile
TRA	Transfer	2-Transfer	ALL	CQN	2-Transfer
DEA	Death	3-Death	ALL	CQN	3-Death
NOD	No Discharge	5-No Discharge	ALL	CQN	5-No Discharge
OTH	Other	4-Other	ALL	CQN	4-Other
1	Zakończenie procesu terapeutycznego diagnostycznego	Termination of diagnostic and medical treatment	DIS	PL	Termination of diagnostic and medical treatment
2	Skierowanie do dalszego leczenia w lecznictwie ambulatoryjnym	Referral to further treatment in ambulatory care	DIS	PL	Referral to further treatment in ambulatory care
3	Skierowanie do dalszego leczenia w zakładzie opieki stacjonarnej	Referral to further treatment in incare unit	TRA	PL	Referral to further treatment in inpatient care unit
4	Skierowanie do dalszego leczenia w zakładzie opieki długoterminowej	Referral to further treatment in the long term care unit	TRA	PL	Referral to further treatment in the long term care unit
5	Skierowanie do dalszego leczenia - inne przypadki	Referral to further treatment – other cases	OTH	PL	Referral to further treatment – other cases

6	Wypisanie na własne żądanie	Discharge on demand	DIS	PL	Discharge on demand
9	Zgon pacjenta	Death	DEA	PL	Patient death
1	prepustený domov	Discharge	DIS	SK	Discharge
2	prepustený do zariadenia sociálnej starostlivosti	Transfer to Social Care Setting	DIS	SK	Transfer to Social Care Setting
3	preložený na iné oddelenie toho istého zariadenia	Intra-hospital transfer (other department)	NOD	SK	Intra-hospital transfer (other department)
4	preložený do iného zdravotného zariadenia	Transfer to another hospital	TRA	SK	Transfer to another hospital
5	predčasné ukončenie hospitalizácie	Preterm discharge	DIS	SK	Preterm discharge
6	zomrel – pitvaný	Death- with autopsy	DEA	SK	Patient death - with autopsy
7	zomrel – nepitvaný	Death- without autopsy	DEA	SK	Patient death - without autopsy
0	Pokračuje ústavní péče na stejném lůžku	No transfer/discharge	NOD	CZ	No transfer/discharge
1	Propuštěn do ambulantní péče	Discharge	DIS	CZ	Discharge
2	Přeložen do ústavní péče - sociální péče	Transfer to Social Care Setting	DIS	CZ	Transfer to Social Care Setting
3	Přeložen do ústavní péče - jiná odbornost, stejné ZZ	Intra-hospital transfer (other department)	NOD	CZ	Intra-hospital transfer (other department)
4	Přeložen do ústavní péče - do LDN	Transfer to long term care	TRA	CZ	Transfer to long term care
5	Přeložen do ústavní péče - do jiného ZZ	Transfer to another hospital	TRA	CZ	Transfer to another hospital
6	Propuštěn do ambulantní péče předčasně	Preterm discharge	DIS	CZ	Preterm discharge

7	Zemřel, vystaven poukaz na pitvu	Death- with autopsy	DEA	CZ	Patient death - with autopsy
8	Zemřel, nevystaven poukaz na pitvu	Death- without autopsy	DEA	CZ	Patient death - without autopsy
X	Není ukončením hospitalizace	No transfer/discharge	NOD	CZ	No transfer/discharge
E	Entlassung aus dem Krankenhaus	Discharge	DIS	AT	Discharge
T	Transfer in ein anderes Krankenhaus	Transfer to another hospital	TRA	AT	Transfer to another hospital
S	Sterbefall	Death	DEA	AT	Patient death
A	Krankenhausinterne Verlegung vom Bereich der Rehabilitation und vom ausschließlichen Bereich der Pflege in den allgemeinen stationären Bereich (inkl. Intensivbereich)	Intra-hospital transfer	TRA	AT	Intra-hospital transfer
H	Abschluss eines Aufenthaltes im halbstationären Bereich oder krankenhausinterne Verlegung in den halbstationären Bereich	Intra-hospital transfer	TRA	AT	Intra-hospital transfer
R	Krankenhausinterne Verlegung in den Bereich der Rehabilitation	Intra-hospital transfer	TRA	AT	Intra-hospital transfer
P	Krankenhausinterne Verlegung in den ausschließlichen	Intra-hospital transfer	OTH	AT	Intra-hospital transfer

	Bereich der Pflege				
L	Kennzeichen der Datensätze, die zum Zeitpunkt der Asylierung dokumentarisch abge schlossen werden	Kennzeichen der Datensätze, die zum Zeitpunkt der Asylierung dokumentarisch abge schlossen werden	OTH	AT	Kennzeichen der Datensätze, die zum Zeitpunkt der Asylierung dokumentarisch abge schlossen werden
V	Kennzeichen für noch nicht abgeschlossene Aufenthalte von am Jahresende verblei benden Patienten/innen	No transfer/discharge	NOD	AT	No transfer/discharge
1	Belső kórházi áthelyezés	Transfer to another department within the hospital	TRA	HU	Transfer to another department within the hospital
2	más kórházba történő áthelyezés	Transfer to another hospital	TRA	HU	Transfer to another hospital
3	otthonába bocsátva	Discharge at home	DIS	HU	Discharge at home
4	Meghalt	Death	DEA	HU	Death
5	rész-számla	No transfer/discharge	NOD	HU	No transfer/discharge
6	otthonába adaptációs szabadságra bocsátva	Discharge at home for adaptation holiday	DIS	HU	Discharge at home for adaptation holiday
7	önkényesen távozott	Left without permission of hospital	DIS	HU	Left without permission of hospital
8	szociális otthonba távozott	Transfer to home care setting	TRA	HU	Transfer to home care setting
9	Egyéb	Other type of	DIS	HU	Other type of

		discharge			discharge
A	otthoni szakápolásra átadva	Discharge - special nursing care at home	DIS	HU	Discharge - special nursing care at home
B	otthoni szakápolásra javasolt	Sspecial nursing care at home suggested	DIS	HU	Sspecial nursing care at home suggested
C	folytató record következik	No transfer/discharge	NOD	HU	No transfer/discharge

Table 31 Dimension re-mapping example (Discharge Status)

6.8.6. CEEQNET Project, stages and steps

(leading to the development of indicators and documents)

Indicator development		**Documents**	
Formalized indicator identification	Formalized input description	Pasportization protocol of indicator	Document
	Input formalized description relating to Risk Adjustment		Document
Indicator evaluation	1. evaluation step– Evidence, facts, literary reviews		Document – review
	2. evaluation step – validation of the indicator		Putative validity Accuracy Minimal distorsion Objective validity Motivation towards quality improvement Current modes of use
			Applied risk adjustment system
	3. evaluation step – selection of „quality indicator sets (groups, clusters)		Document

Table 32 CEEQNET Project phases overview

6.8.7. Structured description of PQI – PQI pasportization

Registration Number	Xxx	
Indicator	Cogent indicator name	
Domain	Name of medical specialty in which the indicator will be used	
Segment of Care	Acute hospital (in-patient) or intensive or primary or home-care etc.	
Type	E.g. mortality, rehospitalization, potentially ”overused” procedure etc..	
Category	Quality of structure, process, output, outcome	
Short description	Description of the logics and sense of the indicator in several sentences.	
Definition – verbal	As exact as possible definition using common well defined terms.	
Definition – formula	Formula	
Formula – numerator (where applicable)	Exact description of numerator Included elements Excluded elements:	
Formula – denominator (where applicable)	Exact description of denominator Included elements Excluded elements:	
Present use		
Important references		
Link to existing standards		
Designation of use		E.g. internal, external control, benchmarking
Are other than administrative data deeded *?	Yes/No	
Description of ”other” data		

Are pre- and – post hospitalization data needed? Which?	Yes/No
Which…… …….	
Which……	
Responsible consultant for medical specialty	
Responsible consultant for statistics	
Responsible consultant for integration	

* Administrative data are routinely shared data according to a pre-defined and unified methodology trough the use of a standard interface (NOTE: the term ”administrative” does NOT mean that data does not contain any clinical data).

Table 33 CEEQNET PQI pasportization table

Structured format for formal description of a measure (indicator)

The following framework is proposed for use of the formal measure (indicator) description. It is a draft that will be altered, adjusted, explained and completed according expert reactions and comments.

The purpose of this activity is

- to find the consensus about the formal description and evaluation of the performance measurement
- to describe AMI mortality as a „model description“
- to test then the capacity of the CEEQNET database to meet requirements, issued for this consensual description

CEEQNET Intra-hospital mortality – Acute Myocardial Infarction – Structured description - DRAFT

Importance; Face validity	
- Country AMI morbidity a mortality	
- Country cardiovascular programs	
- Cross-Country cardiovascular programs	
Precision	
AMI coding	
- Country instruction for AMI coding	
- Country practice in AMI coding	
- Other consideration about AMI coding?	
Intra-hospital versus time-frame mortality	
- What is the best time time-frame definition?	e.g. 6 month
- Is the country difference between intra-hospital and <30 days known?	
Country diagnosis coding quality	
- What is carried out to improve (or maintain) the coding quality?	
- Is the coding quality audited?	
- Other consideration about the diagnosis coding?	
Country case principal diagnosis (PD) specification	
- What is the definition?	...if any
- If the correctness of the PD choice audited?	
Bias	
Selection bias	
- Referral and admission criteria bias	
- Discharge and transfer policy related bias	

Risk Adjustment	
- Any model tested?	
Construct validity	
- Does national AMI standard exist?	
- Some procedural standards AMI related in use?	
- Are there some country based pieces of evidence which could contribute to the AMI mortality construct validity?	
Prior use	
- Is the AIM mortality rate used for hospital comparison?	....in whatever form
- Was there an critical attempt to do the international comparison in AIM mortality?	
Feasibility	
Performance measurement feasibility	
Risk Adjustment feasibility	
Incentives	
Proper incentives	
Improper incentives (distorted motivation)	….are there reasons for gaming
Summary	
Recommended for use, under what conditions, with which limitations	

Table 34 Acute Myocardial Infarction – Structured description - DRAFT

Attachments

- Example_QI_mort_AMI_AHRQ
- Krumholz et al:Standardization AMI model based on administrative and clinical data [26, 27]
- QI compare in 5 countries

7. Country manager country specific outputs

Country managers input was not only related to the factual collaboration with participating hospitals, but all Country Managers were also confronted with the frameworks of their each respective country (legislative etc.). All Country Managers during the progress of their work needed to solve challenges relating to practical implementation of the CEEQNET project objectives into real life settings. This undergone "experience" is seen as a valuable product of the project (description of not only *what* was done, but *how* it was done), and the Country Managers were asked to comment especially on the following:

From the point of view of a „category" of barriers:

- Absolute barriers (which form an obstacle for reaching the specified goals of the project)
- Relative barriers (resulting in the shifting of the timeline or unexpected effort on the part of country managers)

From the point of view of the „type" of barriers:

- The legislative barriers
- Lack of interest or concern from the side of management of hospitals to provide a certain data type
- Technology barriers (obstructions relating to the process of exporting data)
- An unexpected complexity relating to data extraction from existing datasets
- Unexpected complications relating to communicating the needs (requirements) of the CEEQNET project with respect to each individual hospital

Following is a list of comments and observation collated from CEEQNET Country Managers:

Austria:

The Austrian Country manager submitted complete MBDS data sets of 3 large Austrian hospitals. It contains all individual inpatient stays (hospitalization episodes) each for the year 2004. That means that in regard to the objectives of the project all necessary data of 3 Austrian hospitals are delivered and available for the project use.

The description of the MBDS data is available and it is at the project manager's disposal. Therefore no lack of interpretation is to be expected.

There are no technological barriers as the interface is clearly defined. During meetings with the subcontractor (STAPRO) it was confirmed that the datasets are totally unproblematic from the technological point of view.

Legislative barriers are not relevant as the name of the individual patient was anonymized as required by the Austrian legislation with respect to the data security and personal data protection laws.

Report was prepared by Dr. Reli Mechtler Head of the Department of Health System Research, University of Linz, Country Manager CEEQNET project, Austria

Czech Republic:

The basic task in this stage of the project was aimed at contracting 4 hospitals in the Czech Republic, possessing and using a suitable system enabling the tracking and analysis of indicators compliant with the tasks of the CEEQNET project, having adequate skills in the problematic of performance measurement and showing an interest in an international benchmarking project. Although only hospitals in the Czech Republic already active in the end of specified tasks (having an installed hospital information system and working with healthcare indicators) it has been observed that the willingness to collaborate on international level is problematic. It is obvious, that the system of evaluation of indicators this still perceived more or less as a tool serving the management of each individual hospital facility, are at its best for the use of groups responsible for a hospital facility. We have seen that especially benchmarking on the international level and participation of third-party national coordinating institutions evokes thoughts about the possibility of hospital data sets ending in inappropriate hands. This was also the reason for the need of many explanatory meetings with the managements of possible collaborating healthcare institutions and slow progress with regard to the signing of contracts. Extensive collaboration with lawyers and preparation and subsequent modification of the text of contracts for collaborating institutions adhering to the legislation of the Czech Republic as

well as provision of a high level off security of all data and information to be provided to the national Institute of Public Health was necessary.

In view of the above, it is possible to summarize:

From the point of view of "category" of barriers:

Absolute barriers

So far no absolute barriers have been observed in the Czech Republic and the provision of requested data sets will, of course, be possible.

Relative barriers

All existing barriers are of the relative type. Considerable effort must be made in order to select and contract a collaborating institution (hospital or healthcare facility), resulting in a time lag of some steps as defined in the timeline of the project.

From the point of view of the „type" of barriers:

There are no legislative barriers in the legal framework of the Czech Republic. There is a certain level of discomfort of the collaborating hospital managements seen on the level of inadequate personal data protection and on the level of publishing hospital data relating to quality and productivity of the healthcare institution in an international context and comparison. Due to the fact, that some check healthcare institutions are undergoing the process of transformation into a private company, there was a lack of interest to collaborate on the CEEQNET project. Only after being acquainted with the aim and scope of the CEEQNET project, many of the approach to managements began to realize the significance and outreach of benchmarking and proper evaluation and use of indicators in healthcare for their own work and for the aims of groups responsible for founding a healthcare organization.

Conclusion:

Due to the fact that a considerable amount of hospitals in the Czech Republic monitors indicators of quality and uses adequate and relevant ICT technologies, it will not be a

problem in the final stage to fill the CEEQNET hospital database. At this stage of the project the observed time lag with regard to the proposed timeline is mainly produced due to a decreased level of managerial awareness of provided healthcare services.

Report was prepared by MUDr. Věra Chaloupková, Country Manager CEEQNET project, National Institute of Public Health, Czech Republic.

Poland

General outline

Currently there are 3 hospitals contracted and active in the program in Poland:

- The Barlicki University Hospital in Łódź
- District Hospital in Sucha Beskidzka
- Provincial Hospital in Elbląg

The John Paul II Specialist Hospital in Krakow that was approached at the very initial phase of the project finally decided to withdraw on the basis of organizational restructuring on May 23rd, 2005 and has been replaced with the District Hospital in Sucha Beskidzka, invited to join CEEQNET.

In order to follow the terms of the Grant Agreement, stating that 4 hospitals from a country participate in the Project, the 4th healthcare organization: Provincial Hospital in Elbląg signed a contract on Sept 02.2005.

Apart from a contract with CEEQNET partner, i.e. NCQA, each hospital has signed data confidentiality agreement with STAPRO ltd. (Project subcontractor).

A contact person and an IT representative have been established in each hospital; Country Manager and country IT person, Piotr Chruścielewski, started networking and communication with hospitals regarding the data requested.

Until now, one can observe different progress in data transfer; their volume and quality as the problems that appear on the way differ locally in the 4 hospitals.

Case Review

The Barlicki University Hospital in Łódź

The first hospital invited to join CEEQNET in Poland.

Progress regarding data transfer is the most advanced here. Statistical, financial and organization data requested have been sent to STAPRO.

Insignificant problems have been encountered, concerning the interpretation of organization structure, but that has been resolved in communication with the subcontractor.

District Hospital in Sucha Beskidzka

The hospital has sent organization, financial and statistical data. The problems encountered here might be defined as the 'common problems'; resolved within communication with Polish IT person.

Damian Medical Center

The only private hospital from Poland, and also the most problematic one. The problem is based in it's business-oriented structure: there are no medical specialization departments. Each statistical card and medical costs are globally assigned to the 'medical department'. Therefore it is not possible to connect costs to medial specialization etc. The situation has been consulted with STAPRO; finally a decision has been taken to retain the hospital in the Project and continue data analysis.

Please note that the data transfer in an acceptable manner is a result of numerous communications of Country Manager and hospital's contact person and management. (Data from this hospital is not used in the version of CEEQNET Reference Center as of spring 2007)

Provincial Hospital in Elbląg

The hospital has been the last one to be contracted with CEEQNET.

Data requests have been presented and some samples have already been sent.

The main problem relates to extracting cost data from a system – the necessary data can be found only in a system report (one for a cost center per month). The report form makes it difficult to transform it into the requested file structure. The local IT person is unable to

read it from a database (lack of adequate knowledge or lack of will to do so) so data will have to be transformed by some scripting. The files were supposed to be sent by a hospital at November 21st, 2005 but none has been received so far.

Common problems:

The common problems encountered at the local level in each of the hospitals relate to:
Organization structure – The organization structure is not unified: most of the hospitals have rather "flat" organization structure. Almost everywhere organization units are also cost units. Sometimes there is no well-prepared organization structure.

Cost category assignment –cost categories prepared for the project are not clear enough, and some assignments to hospitals cost categories are not definitely defined. It has been reported to the subcontractor.
It has been suggested to analyze and change the cost assignment at the end of the project.

Local IT person general skills – the general knowledge of hospital structure, organizations and financial notions is relatively weak.

Such situation requires the need to address both the IT and a Financial Department individuals.

The IT representatives find it also difficult to prepare each file in a requested structure, so that some additional work has to be done to adapt them to Project requirements.

Local IT person English skills – none of the hospitals have sent data translated into English. Every time data has to be translated by the Country Manager and Polish IT person. There were also some problems linked with understanding of Project materials and data when in English.

Other remarks:

Absolute barriers

There seem to be none. The biggest one is the Damian Medical Center problem, caused by totally different organization of this hospital. As a result only some part of data will be comparable to other hospitals.

Relative barriers

Data transfer: it is expected, that the requested hospital data covering 2004 will be transferred till December 31, 2005.

Legislative barriers

No legislative barriers have been observed, with respect to hospital contracting.
The contract for the IT country representative has not been developed and signed yet.

Low motivation of the participating hospitals

Hospitals seem to be relatively little interested in participation in the Project. This resulted in more clear and substantial defining of the short and long-term benefits that result from participation in CEEQNET that started to have a meaning only after filling in of the database with volume of data and production of a user manual – examples of use handbook that forms an integral part of this Report. The financial incentive of 2000 Euro for a hospital did not seem to be a sufficient motivation factor in initial phases of the work. The level of communication between STAPRO as data recipient, Country Manager, Country IT Person and hospitals needed to be cultivated. Feedback related to data analysis had to be assured and the local country management had to be more thoroughly instructed with regard to the real time availability of data/system access by the participating hospitals [23].

Technology barriers

Each hospital has a different IT system and a different structure. Each one has to be considered separately. Data received from hospitals require a lot of transformation. Even statistical files that should be in the same format slightly differ. Local IT professionals are not involved enough due to the lack of motivation and unstated potential benefits.

Unexpected complexity relating to data extraction

As described in the previous remark – hospitals are sending data in different formats; the Country IT Person is responsible for data verification and transformation into the proper form.

Communication problems

The reflections concerning communication problems overlap with remarks already stated on improving communication among STAPRO-country management - hospitals and initiating feedback on data provided. So far, lack of response from STAPRO has been limited to data acceptance and control. Data had to be verified by the country IT person and by STAPRO, before providing regular feedback to the IT national representative. Constructive feedback led to better assessment of project result in the local environments.
Inclusion of personnel data from hospitals had to be worked on because this data was not requested in the first phase. Consultation had to be made in this area (job categories etc) to allow uploading of this type of data

Report was prepared by Barbara Kutryba, CEEQNET Country Manager, NCQA, Poland

Slovak Republic:

There are 4 hospitals participating in the CEEQNET project in the SR:

- Faculty Hospital of Martin
- Hospital with Policlinics in Nové Zámky
- Hospital with Policlinics in Žilina
- Ministry of Defense Hospital, Bratislava

Slovak hospitals participating in the CEEQNET project were specified after comprehensive evaluation process comprised of both special discussions and evaluation of the statistical data that are annually submitted from the selected hospitals to the Institute of Health Information and Statistics, Bratislava.

Now it can be stated that each selected hospital i.e. its hospital information system (HIS) is in accordance with range requirements (evaluation criteria) stated in the evaluation process and we can confirm that our choice was appropriate

Only Ministry of Defense Hospital, Bratislava seemed to be a difficult hospital, i.e. hospital with specific and proprietary hospital information system. There were some problems with this hospitals accounting as this hospital does not need to provide economic data to the Information System of the MoH of the Slovak Republic (other hospitals are required to submit records with selected economic indicators.). This hospital (Ministry of Defense Hospital, Bratislava) is controlled by the department of the Ministry of Defense and therefore Ministry of Defense Hospital, Bratislava cannot be controlled by the department of the MoH SR.

Data from all hospitals was delivered in time. Data from the MoD Hospital, Bratislava was delivered in October 2005.
According to my opinion such time delay was due to small involvement of the IT experts from the hospital (MoD Hospital, Bratislava).

There were also some problems with the data collection due to the arrangement of the data collection(i.e. new data requirements during the process of the data collection – some data requirements were specified at the beginning of the data collection process and other data requirements were added after the first part of the data collection was submitted (e.g. data selection according to the costs centers, selection of the payments according to the months etc.).

There was also another problem: How to collect data on surgical procedures?
Now SR is at the beginning of the legislative process on adoption of the act on recording of the surgical procedures in hospitals and in outpatient wards too.

It is expected that by the end of the 1st Quarter of 2006 that the Catalogue of Health Procedures Codes could be adopted. It is expected that this Catalogue could be applicable in January 2007.

Report was prepared by PhDr. Daniela Brašeňová, Country Manager, CEEQNET project, Slovak Republic

8. CEEQNET project phase overview

From formal aspect:

- Production of complete names of dimension objects list in English language.

From factual aspect - programming

- Integrating new dimensions: OPERATIONAL EFFICIENCY, SECONDARY DIAGNOSIS, FIELD
- Creation of mapping for Operational acts (selected ones) and Fields

From factual aspect - imports

- Additional hospitals and periods data import was planned. This step relates especially to a time lag in Hungary, where the initial National partner organization and Country Manager had the project participation terminated as of May 2005 and a decision was taken by the Project Leader to replace the Hungarian partner by the Semmelweis University, Budapest, Hungary Dr. Éva Belicza, PhD. – as the new Hungarian Country Manager. Since the definitive financial report of the former Hungarian participant was not finalized, formal collaboration with the new partner was unofficial, though Dr. Belicza was already present during the 2nd. CEEQNET meeting in Krakow, Poland and her organization and she herself was in a position to provide the needed inputs for the CEEQNET project in order to include Hungarian hospitals in this study. The formal side of this change finally led to a situation where Hungarian data was unable to be successfully incorporated into the final analysis and report.

8.1. Modifications during the project (Based on feedback from participants)

The clinical data logical model was slightly modified. The Austrian data model was chosen as a basis of the common data model for its exactness, transparency and relative simplicity. At the same time, this model is the most suitable from the CEEQNET point of view, due to its highest ability to provide information. Despite of the need of a higher need of transformation of data from other countries, this model appeared the best for its exemplary logicality.

For each involved country, the data specification of a hospitalization (hospital episode) record for acute care was created. While in Poland, Slovakia and Austria the definition seemed to be unambiguous, in the Czech Republic the definition differed (between health insurance companies and statistical authorities). These differences possessed the risk of a potential source of significant decrease of precision of performance and quality measurement and need to be investigated further. Investigation were especially focused on separation between acute and "other" care, in connection with the ending/termination of an acute care case. "Other" care is understood as country specific (from taxonomy and nomenclature point of view) areas of health care (nursing, long term etc.).

In the selected data model, every hospitalization case has (in addition to the relation to a hospital and a country) its basic attributes: demographical (age, gender), clinical (diagnosis, urgency, admission, disclosure, length of stay).

Country specific dimension were mapped to a common CEEQNET dimension (not applied for ICD-10, countries and gender – these dimension are same in all involved countries). List of procedures was not re-mapped either. It is evident, that only selected areas should be mapped in future, especially the ones defining appropriate quality and efficiency measurement (e.g. all procedures representing total hip replacement). Further database

development (enabling of dormant functions) was focused on areas of secondary diagnosis and treatment relevant procedures.

Non-programmers work was directed towards: identification of significant measures obtained through the performed data collection in all participating hospitals and identification of potentially useable Quality Indicators ("Quality Indicator Candidates") taking into account also on models from other countries or international organizations and investigation of the level of precision and distortion within these measures in the countries participating in the CEEQNET project.

9. Datamining capabilities of the CEEQNET platform

Data mining in administrative healthcare data

Introduction

Healthcare services generate vast volumes of data that are usually very heterogeneous, but potentially rich in terms of useful information content from various observed aspects like public health, quality of healthcare, medical, economical, demographic etc. This information is usually hidden in the numbers of hospitalization case records [39, 41].

The potential group of users of analyses of HC administrated data are healthcare management than the medical specialists. The main aim of our work was to identify hidden dependencies in data and use these to produce models to make predictions based on source data and their relation. Because of width of possible observed data, we narrowed our research only to Mortality and Length of Stay indicators [20, 25, 41, 42, 43].

Data came from the CEEQNET central database repository.containing at the time of the analyses (spring 2007) information on over 350.000 records of hospitalization cases spanning 14 hospitals in Czech Republic, Slovakia, Austria and Poland. Data and was used for the presented models. Variety of used national reporting methods in healthcare systems caused on one side narrowing of observed features, on the other side allowed comparison among involved countries. It was shown that the only non-trivial (e.g. age categories, gender, discharge status, etc.) common dimension was ICD10 (International Classification of Diseases - endorsed by the Forty-third World Health Assembly in May 1990 and came into use in WHO Member States as of 1994). This dimension (hierarchical list) contains some 18.000 distinct items. We focused on roughly 250 diagnostic groups.

As a basic object to analyze we considered the hospitalization case, defined as **continuous single person stay in hospital in acute care bed departments**. Cases were generated

from various documents during ETL (Extract, Transform and Load) process. Improper or incomplete records were deleted during ETL. Number of deleted cases was below 1%. Quality of data is a crucial factor for this type of modeling Testing of accuracy their collection was beyond scope of this project. Accuracy of obtained models shows that these national differences did not severely impact final results.

Prediction models

Table bellow shows fields of input table.

Name	Number of distinct values
Diagnosis	250
Gender	2
Admission Type	4
Discharge Type	3
Plan Type	3
Length of Stay	19
Age Category	102

Table 35 Tabulated input data for data mining

For generating prediction decision trees we used C5 algorithm [7] implemented in software SPSS Clementine ver. 10.1.. Other algorithms and methods as CHAID [6], QUEST [30], Classification and Regression Trees [7] and Neural Networks [12] did not give such good results as C5.

Mortality Rate prediction

Mortality is a usual indicator to measure quality of healthcare service [20, 41, 43]. It is usually computed as fraction of deceased from all cases based on diagnosis group. Such a method does not provide a solid base for comparison of healthcare services among different hospitals. Problem is that each hospital works under different condition (mostly derived from different state of patients). That's why a good predictive model could be a better measure of quality as a difference between estimated and achieve results of treatment.

For purpose of death rate prediction we limited training set of data to those with Discharge Type equal to Discharge, Death or Transfer. We did not take into account cases “Other” or “Unknown”.

Because of the unbalanced dataset we took for training 2% of Discharged, 75% of Transferred and all Deaths. Generated model was tested on original data set with the following results:

Following table shows the coincidence matrix of results on testing data. In rows we have actual number of cases, in columns estimated. The accuracy of model on testing data was 72,95%. Accuracy of training dataset was 73,74% which demonstrates a good balance between these two sets.

	Death	Discharged	Transfer	**Total**
Death	4.850	403	849	**6.102**
Discharged	38.513	238.530	50.045	**327.088**
Transfer	1.440	1.283	6.146	**8.869**
Total	**44.803**	**240.212**	**57.040**	**342.055**

Table 36 Datamining coincidence matrix

Length of Stay Prediction

Length of stay is considered to be an indicator of resource usage efficiency [42, 25]. Longer than necessary stay can be regarded as “indicator” of potential resources wastage or miss-management. Shorter stay could point to possible under-treatment (with possible future complications hospital re-admissions). For purpose of estimation of the “proper” length of stay the DRG was created (Diagnosis-Related Group is a system to classify hospital cases into one of approximately 500 groups, also referred to as DRGs, expected to have similar hospital resource use, developed for Medicare as part of the prospective payment system). This system tries to estimate the correct length of stay. With respect to this interval health insurance companies (sickness funds) could possibly better compute the adequate reimbursement for a given DRG group. As in example of mortality this method

does not consider the medical status of incoming patients and differences between medical facilities.

For purpose of Length of Stay prediction we considered the same dataset as in the previous case limited to cases with length of stay less than 20 days. According to distribution to classes with the same length of stay we balanced the training set similarly as in previous case. Generated model was tested upon original data set with 36,11% of correct estimation on testing data set. Accuracy on training data set was 36,04% which is also corresponding.

The accuracy of created model was not good; therefore we calculated difference between estimated and actual values. The result shows the following. We achieved error of estimation of 2 or less days in 67,33% cases which may prove to be acceptable.

Absolute difference	Percentage	Cumulative
0	36.11%	36.11%
1	20.09%	56.20%
2	11.13%	67.33%
3	7.80%	75.13%
More than 3	24.87%	100%

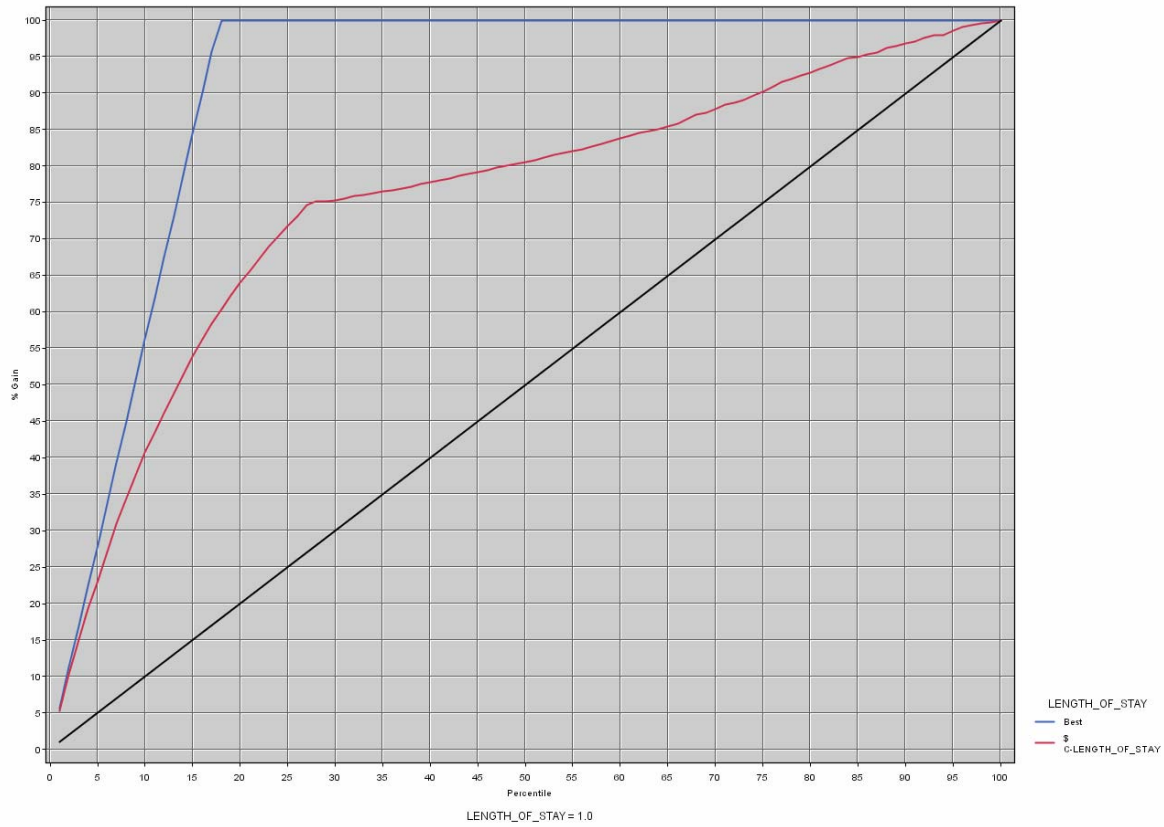

Figure 10 Information gains of model

Information gains of the model - (red line) based on percentiles of data samples. Blue line shows best possible model, black line random case. We can see that on 27% percentile we get 75% information gain.

Conclusions from the data mining study

Presented examples showed that decision trees Data Mining methods have a potential for practical utilization. The CEEQNET central databases use only routinely obtained administrative data, so further development should not demand additional data collection work in hospitals. These decision trees may become good prediction tool for management to help model some nonstandard situations like epidemics or demographic changes and pre- plan appropriate actions.

The main problem of creating more accurate models seems to be the great heterogenity of the diagnosis in tested hospitalization cases. This resulted in big decision trees with thousands of branches. Pruning methods do not seem to provide adequate improvement.

The assumed reason lays in the complexity any variety of real-life healthcare and data. Although we worked on about 350.000 cases, the number of different diagnosis (about 250) was too big. This was the reason that all combinations of considered attributes contained only small numbers (not always statistically relevant) of cases.

Report prepared by: Jaroslav Tachovský, jaroslav@tachovsky.eu (Project Subcontractor)

10. Identified areas to be addressed in further work

The following section contains areas of future interest identified during the work on the CEEQNET Project:

1. Re-mapping poorly defined datasets between various health care systems
2. Benchmarking different "health care cultures"
3. Harmonizing health care in wide geographical areas
4. Producing "mediated information" for high level policy making

Re-mapping poorly defined HC datasets between various health care systems

- Austrian HC datasets are on common EU level, well and systematically described.
- Czech HC datasets are very rich in content, data is collected in broad range of details, but with many duplicities, redundancies and other systematic weaknesses.
- Slovak HC datasets are missing some very important components (inpatient surgery procedure codes, co-morbidities coding, complications severity scores…).
- Polish HC datasets are appropriate in range of details, focused on product (combination of procedures which are in fixed format).
- Hungarian HC datasets have not been studied in all details yet.

Question:

WHAT IS THE LEVEL OF DANGER OF THE USE OF DATASETS THAT CAN NOT BE ABSOLUTELY „REMAPPED" FOR THE CONSTRUCTION OF PERFORMANCE INDICATORS?

Benchmarking different "health care cultures"

"Health care cultures" in the project do not differ much form the point of view of factual service provision historically till today.

Main variations exist in:

– Systems of reimbursement
– Methodologies of costs per case calculations (if existing in some countries)
– Approach to performance measurement on governmental level and the achieved level of development of such methodologies in every country

Question:

IS THERE A HIGH RISK THAT THERE WILL BE A CULTURALLY DEPENDENT INTERPRETATION OF KEY PERFORMANCE INDICATORS? [31, 47]

Harmonizing health care in wide geographical areas

- Is an issue in some areas of the World. We would like to think of the CEEQNET project as one of the possible tools to address it.
- Main aim of CEEQNET project was to find common data sets and a common set of key performance indicators as a tool for continuous quality and effectiveness improvement [2].
- Level of success in the evaluation of the "data environment" of health care in all participating countries will probably determine the scope of our contribution to harmonization of health care in these countries.
- Integration of the CEEQNET PQI candidates into other indicator lists (ECHI, etc.) or use of it's modeling capabilities for the production of "derived" indicators (as has been suggested in the section of this report relating to modeling).

Question:

HOW MUCH CAN PERFORMANCE MEASUREMENT CONTRIBUTE TO THE PROCESS OF HARMONIZATION? [46]

Producing "mediated information" for high level policy making

- Policy making is based on „mediated information" pre-processed by a third party.
- The aim of CEEQNET project is to produce INFORMATION from available and already used data for improvement of the achievable level of policy making.

Question:

WHAT MUST BE TAKEN INTO ACCOUNT IN ORDER TO PRODUCE OUTPUTS THAT WILL BE TAKEN INTO CONSIDERATION BY POLICY MAKERS? [32]

11. Dissemination activities

The CEEQNET project was presented at various international meetings and has drawn interest from the professional community (interest has been voiced from countries such as Greece, Germany, Italy and Turkey for the inclusion of hospital facilities into the framework of the project if possible in the future).

CEEQNET main concepts were presented as poster and a short presentation during 22. Conference of ISQua (International Society for Quality in Healthcare) "INNOVATING FOR QUALITY" held 25-28 October 2005, Vancouver, Canada (*CEEQNET - Performance Measurement and Monitoring of the Healthcare Quality and Efficiency in Central and Eastern Europe. Using what you already sit on - for sound decisions)* and is included In the book of abstracts - Short version is available on the ISQua website http://www.isqua.org.au

CEEQNET project interim results were presented to the participants of the 10th. International Symposium for Health Information Management Research iSHIMR, Thessaloniki, Greece, 22-24. September 2005 and is included in the book of abstracts.

CEEQNET project questionable areas were presented and discussed during the *"Improvement Clinic"* workshop of the10th European Forum on Quality Improvement in Health Care, 15. April 2005, London, UK

CEEQNET was presented at the Mezinárodní konference Slovenské lékarské komory - Indikátory kvality poskytovanej zdravotnej starostlivosti. (International Conference of the Slovak Medical Chamber – Indicators of Quality of Provided Health Care Services) as: *Unified Central and Eastern European surveillance/monitoring system for healthcare quality and efficiency indicators "CEEQNET"*, 13. May 2005, Bratislava, Slovak Republic. Activities of the CEEQNET project speeded the coding of secondary diagnoses and

creation of the Coded List of Procedures now being implemented in Slovak health care system.

CEEQNET collaboration platform and interim results were presented as a half-day workshop of the 11th European Forum on Quality Improvement in Health Care, 26-28th. April 2006 in Prague under the "Theme 7" Measurement for improvement, learning and accountability as *"Increasing efficiency of cost-effectiveness analyses through risk–adjusted benchmarking of performance measures"*. See also http://www.quality.bmjpg.com/

CEEQNET results and planned actions were presented at EFQM Community of Practice - Health Group meeting, Funchal, Madeira, 29.09.2006.

CEEQNET results and progress update was presented at CEESTAHC (Central and Eastern European Society for Technology Assessment in Health Care) International Symposium: Evidence - Based Health Care, Priorities in Health Care, Krakow, Poland. 3.10.2006.

CEEQNET project was presented and discussed at International Conference – Regional Health Care – Quality, Efficiency and Legality. Hradec Králové, Czech Rep. 17.10.2006.

12. Main project outputs

1. Reports resulting from the analysis usable for further dissemination of measurement and benchmarking methods cutting across the participating EU countries [31]

2. The standardized dataset enabling measurement and result comparison

3. Software-hardware-network platform utilizable as a tool for healthcare institutional management based on performance quality information

4. Selection of PQI based on administrated data [21, 39]

5. Proposal of a structured process for PQI selection and the evaluation of their usefulness in the management process

6. Formation of a multinational multi-institutional framework

7. Training of key staff responsible for data collection, analysis, presentation and for the appropriate use of indicators data. Training of professionals responsible within collaborating hospitals for quality and dissemination and interpretation of information needed for discussing with senior clinicians and managers the relevant issues relating to indicator use.

CEEQNET Central Data Repository – database (basic facts)					
Parameter	**All Cases**	**AT**	**CZ**	**PL**	**SK**
Number of Cases - Hospital Episodes	370208	136932	107844	39671	85761
Number of Cases – Departmental Episodes	409381	158153	119863	40841	90524
Number of Comorbidities and complications (Secondary Diagnosis)	478625	319832	122683	2195	33915
Number of Procedures	789140	155481	480637	153022	0

Table 37 CEEQNET Global Statistics (basic overview of the content of the CEEQNET Central Repository - database as of 30.03.2007)

13. Concluding remarks

The CEEQNET study produced a system for healthcare quality performance evaluation based on administrative healthcare data (data currently administered in HC institutions) [21] in four countries – Austria, Czech Republic, Poland and Slovak Republic.
Project added value comes from cataloging and description of currently used systems of performance measurement, methodologies and data sets, used. Quality administrative data were defined for this study as: 1) Available through explicitly defined data interfaces; 2) Electronically recoded and collected in conformity with a unified methodology, at least at national level (i.e. for national statistics, health insurance, fiscal purposes) [39].
Performance was considered to be composed of three elements: 1) Clinical production (Volume & Product Portfolio); 3) Clinical productivity (Human & Financial Inputs / Outputs); 3) Quality of care.

Challenges identified related to:
- Complexity of data sources and their existing intersection (for common MBDS needs)
The most important area of intersection of all collected data across involved countries came from common use of International Disease Classification (IDC10) list. It allowed the provision of comparison of relatively detailed and comparable clinical data in 4 participating countries. Limitations resulted from the existing use of different country or hospital specific dimension values. Such items required remapping to common "higher level" values to assure comparability. During this process detailed information was inherently lost.

- Inconsistency of data sources (for common MBDS needs)
Main limitation was the absence of a common list of procedures and in difficulties with remapping country code-lists. Complex mapping is not possible.

- Transformation of data for logical data model needs
The only country with transparent, logical and complex healthcare data model in the CEEQNET collaborating countries was identified as Austria. Data from all other

participating countries required broad transformation. This made automated extraction-transformation-loading (ETL) into a very difficult exercise.

Identified factors effecting benchmarking activities between participating countries:

- Different ways of organizing acute inpatient care
- Different descriptions of hospital and care types
- Absence of a common code list of procedures
- Low level of reliability of procedures and diagnoses coding in some countries

Despite all the limitations identified, the authors of this study would witness great satisfaction if any of the tolls or methods designed during this study to provide help in data description and transformation into information will provide useful in similar activities. Please feel free to contact any author should you need any form of assistance.

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15. Annexes

15.1. CEEQNET Catalog of pre-designed reports (To be used also as a primer and manual for the use of the online available database and reporting capabilities)

15.2. CEEQNET Newsletters (Quality indicator related links and information)