

Active methods of risk management, systems diagnostics and determinants of the Polish health care system

Michał Marczak¹

¹ Department of Management, Faculty of Organization and Management, Technical University of Lodz

Abstract. The article has formulated the concept of a health care system (HCS) with its components, structure, goals, functions and tasks. It also relates to a construction of mission and “good practice” in health care. Then it shows that the notion of evidence based medicine is for axiological reasons significantly opposed to a construction which uses the assumption of “good practice”. When constructing theoretical bases and appropriate modelling techniques widely interpreted logistics may prove useful, e.g. enabling the increase in the number of transplants performed in Poland. The following task was formulated: to lay out, where possible, a direction which rationalises evidence based health care without the need for resolution of moral dilemmas, concerning e.g.: queues, transplants, refusal of services. This can be realised through the use of system diagnostics along with health measurement. The implementation of risk management methods in HCS should also form an important complement to this direction. Active methods of risk management in health care were presented, such as: modification of VaR which enables the assessment of medical, economical and logical effectiveness (MEL effectiveness) and leads to rationalisation of choices on limiting the availability of medical services, a model of modification of risk factors which enables the creation of a post-operative care system on general surgery wards, a method of black spots in hospital care, ETA and FTA methods. The practice of using system diagnostics and health measurement on the basis of ICF platform was then referred to. It was stated, that without axiologically appropriate assessment technologies which are MEL effective may not be selected and as a result a credible basic health benefits basket, nor additional baskets may not be created. At the end the conditions and practice of HCS in Poland were referred to, showing the existing, uncontrollable conflicts. It was established that to conduct rational health care policy and effective MEL risk management in health care the following are necessary: a holistic approach, and e.g. basis of utilitarianism as a theoretical foundation, creation of system assessment tools – aggregates, scales, multidimensional qualitative and quantitative models, data analysis methods (cluster analysis, clustering, data analysis methods).

Introduction

In this paper, a health care system (HCS) will be understood to comprise:

- its components, that is: the set of all service recipients and service providers, “third party” institution – the payer, infrastructure, that is buildings, means of transport, equipment, hardware and existing technologies, knowledge;

- its structure, that is all relations, whether codified or not: organisational, logistical, social, legal, ethical;

Internal and cooperating institutions and various sub-systems (financial, management, scientific research, education, out-patient and in-patient health care, long term and palliative care and others) are operating around and within the framework of HCS. Also various functions and tasks are being realised, and some of the goals of the system are postulated.

Despite of this complexity one might say, that “every health care system assumes a certain structure and hierarchy of moral values” [1]. This statement may be modified into a following formula: on every stage of development we are able to recognize the basic foundations of relations which constitute relations which prioritise moral values in an existing health care system. That is, we can distinguish one of the elements of a series of models necessary to understand the principles and to provide rational management of health care, or to implement health policy (informational, educational). Such fundamental assumptions which form the basis of the model are not formulated by reform theorists or by politicians and decision-makers, because they only touch the surface of the issue – the real system is in a larger part overly inert and conservative (human factor), and in another part is very dynamic (technology, legislation, economics, antagonistic relations). HCS was not created according to a previously planned and meticulously created design. It is a complex anthropo- and partially socio-technical system, with layers of IT, economical, control and other systems which are not always clearly distinguished. Even if in some reform attempts the system “was designed” from the beginning, its implementation and the action of “human factor” have introduced unforeseen changes. New qualities, functions, goals, technologies and culture of the system have arise, and they are still changing dynamically. HCS has developed in an unstructured manner along with the history of humankind (civilisation, culture, philosophy and scientific and technical progress). Examination of this system for the purposes of management allows constant discovery of its (immanent) laws, goals, functions and tasks. One can also recognize the functioning of antagonistic subsystems or competitive relations, conflicts, and crises – which are certainly not oriented on joint achievement of planned goals of the system.

The notion of the mission of the organisation (system) should determine the basic direction of modelling, imposing a certain ordering hierarchy of compatibility of goals, functions and tasks with the given mission. However, in the real, very complex HCS the mission is not always clear, consciously aware, agreed-upon and unequivocal for persons which are functioning with-

in the system, even to the ones who manage it and carry out the most professional tasks.

In order to differentiate the states of very large organisations and socio-technical systems the notion of “good practice” [2] was created. This is a valuation notion which applies to the category of functional model, and not the structural system. However, it has the values of universal intelligibility and adaptation to the conditions and passage of time. It is also essential that the risk which characterises the state of the system is connected and perceived on all analysed levels, that is, on the level of goals, mission and “good practice” [3]. This applies especially to medicine based on the idea of “good practice”. The availability of services related to this idea takes into account a given society with: its culture, its service providers and service recipients, supply and demand, awareness and knowledge and acceptance of risk.

Just as we cannot know profoundly and conclusively the notion of truth nor the notion of justice, we also cannot create a closed model of a health care system which is sufficiently generalised for the requirements of management.

The notion of evidence based medicine [4], which is especially important to this symposium, is for axiological reasons significantly opposed to a construction which uses the assumption of “good practice” in the category of functional description.

A following example is provided for consideration: a touring bus accident has occurred, there are dozens of injured, including children and women. Victims are presenting haemorrhages and cardiac arrests. Aid is provided by one life-saver (a doctor), with a dilemma to whom and in what order help should be given, since without treatment some of the victims will die and some will be permanently impaired. Life-savers are trained in establishing the order in which aid is provided. Let’s imagine, that three persons, who might have lived have died. This was due to erroneous decisions, and an ethical dilemma remains – effective medical help was not given to persons in need. This opens the issue of moral and legal responsibility. There is also the issue of selecting an ethical theory, on the basis of which one might relate to the identified dilemma. Assuming an emotivist perspective and, e.g., a biomedical model of health (loss of health) may be supported by the QALY technique and assumed level of “good practice”, however this does not ensure the credibility of medicine and individual service provider. There was no holistic approach in the construction of the model. A description could be also implemented wholly on the basis of utilitarianism.

When looking for theoretical bases and appropriate modelling techniques, while assuming remaining on the grounds of evidence based medicine, widely interpreted logistics may prove useful. In this specific case providing as rapid as possible medical support from other life-savers (including personnel present at the place of the crash) and organisation of a system which would enable this. For rare catastrophic events it is easier, but in many other categories of HCS operation the scale of potential costs and organisational involvement is much larger. This applies especially to the issue of rationing of expensive and rare medical services [5]. In the Republic of Poland the issue of queues for the services in question is especially significant when compared to the rest of the EU, and is becoming socially noticeable. However, also here there are partial solutions which might reduce its scope. The increase in the quality of logistic management should significantly increase the number of transplants performed in Poland¹.

The following task will be formulated: to lay out, where possible, a direction which rationalises evidence based health care without the need for individual and constant resolution of dramatic moral dilemmas, concerning e.g.: queues, transplants, refusal of services. This can be realised in particular through the use of system diagnostics along with health measurement. This type of diagnostics enables, among other things, better selection of patients for drug programmes. In case of rheumatoid arthritis one in four patients may be qualified (is susceptible) for the programme of treatment with the most expensive biological drugs²; pharmaceutical companies have lobbied for the treatment of all patients, and have even tried to influence the selection of persons deciding on the programme.

The implementation of risk management methods in HCS should also form an important complement to this direction. This applies especially to active methods which are lacking, although there is also a lot to do in the domain of passive methods, such as insurance. This is shown by the subject matter of the symposium. Limited knowledge about the HCS, diffusion of the notion of the mission of the system and different understanding of the part of the ethics in medicine cause the ethical dilemmas to remain. However, they should be better understood and more helpful in management, including risk management in health care.

¹ Wojciech Rowiński – press release.

² Witold Thustochowicz – press release and individual communication.

Active methods of risk management in HCS

Sample methods of active risk management in health care will be presented.

Example 1. VaR method [6]

The use of an equivalent of the VaR method, which is acceptable on the level of community (in axio-medical quantification) even though not necessarily for individuals and pharmaceutical companies, with the use of matrix of transitions between therapies, that is methods that eliminate treatments that are too rare and at the same time too expensive on the level of selected quantile, may lead to a better selected preselection of patients for a drug programme. The VaR method enables the testing of medical, economical and logistical effectiveness (MEL effectiveness), and also taking into account the “human factor”, when the MEL effectiveness is treated widely enough, eg. taking into account the measurement of health level on the base of ICF.

0.099	0.044	0	0.033	0	0.011	0	0
0.44	0.264	0.033	0.011	0.011	0.055	0.055	0
0	0	0.022	0.022	0	0	0.011	0
0.033	0.011	0.011	0.011	0	0.011	0.011	0
0	0.011	0	0	0	0	0	0
0.011	0.011	0	0	0	0.066	0.011	0
0	0	0	0.011	0	0.011	0.044	0.011
0	0	0	0	0	0	0	0

Fig. 1. Matrix of transitions between therapies in RA (turning points):

$$P = [p_{ij}]_{i,j \in \overline{1,n}}$$

Rows and columns show the classification of the following kinds of therapy:

- 1 – MTX, MTX + Cyclosporine, MTX + SSA + Arechin
- 2 – as above + steroids (Encorton, Metypred, Solumedrol, Diprophos)
- 3 – Arava, Arava + MTX + steroids
- 4 – Arava, Arava + MTX
- 5 – Endoxan
- 6 – Remicade
- 7 – Enbrel, Humira
- 8 – Rituximab

Differences in the monthly costs of given therapies are significant, the amounts vary from approx. 30–40 zlotys in case of therapies 1 and 2, and in case of therapy 3 amount to 500–510 zlotys, up to 3000 zlotys in therapy 5 and 5000 zlotys in therapy 7. The matrix of individual costs of therapy may be written down as:

$$C = [c_i]_{i \in \overline{1, n}}$$

And the sum of costs of all therapies in the considered unit will be expressed by the following formula:

$$\sum_{j \in \overline{1, n}} k_j = \sum_{j \in \overline{1, n}} \sum_{i \in \overline{1, n}} p_{ij} c_i$$

The assessment of medical and logistical effectiveness is modelled analogously, although not always on the quantitative level.

A drug programme X in case of RA may be used as an example, when some of the patients are not susceptible to a very expensive and long-lasting therapy, although they have high hopes related to it. *Deciding whether to restrict access to the programme individually* (which is very corruption-generating) or systematically is unethical (one human life, million, or the rest of humanity – Peter Singer [5]). However, the choices may be rationalised on the basis of utilitarianism. The idea is to point out a direction of actions, pursuing to create therapies, medical technologies and diagnostic and therapeutic procedures which are best adapted to the needs of service recipients, in order to achieve a higher MEL effectiveness. And in border case it should avoid rationing of rare goods by their well chosen addressing and allocation.

Example 2. A model of modification of risk factors [7] which leads to the distinguishing of risk groups and creation of a post-operative care system on general surgery wards.

ROC modelling was used (receiver operating characteristic curve in the system of coordinates: sensitivity, specificity) for selected death risk factors and mode of accepting a patient to a general surgery ward. The examined population consisted of 32231 patients enrolled in general surgery wards in 3 clinical hospitals. In the analysed period of 2003–2007 788 persons have died. Control group was formed by patients with other diagnoses.

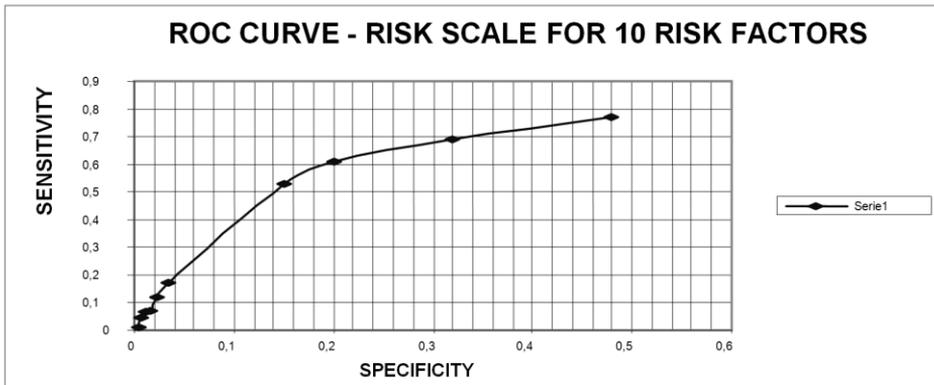


Fig. 2. Risk assessment on the basis of ROC model

Registry of death risk factors contains:

- Malignant tumour
- Non-malignant tumour, or one with an unknown or uncertain character
- Acute peritonitis
- Paralytic ileus
- Acute pancreatitis
- Other inflammatory conditions (eg. abscess, erythema, phlegmon, gangrene), burns and infections
- Gastrointestinal bleeding
- Acute bowel ischemias
- States with obstruction of perforation (puncturing, fistula) of an organ (gastrointestinal tract) or peritonitis
- States with liver failure or its cirrhosis

Also, the mode of accepting the patient to the general surgery ward was accepted as a risk factor.

Taking into account the medical and economical effectiveness there were 5897 patients in a risk group generated using one of the methods (three scales for various models of cutting off the optimum level), out of which 512 persons were rescued. Additional analysis applied to 111 basic diagnoses. On this basis a post-operative care system was created, which takes into account an early identification by an anaesthesiology doctor of sick people with an increased risk of death and post-operative complications.

Mortality on the general surgery ward in a hospital where this model is functioning is approximately three times lower in comparison to studied similar clinical hospitals, characterised by a similar structure of procedures, equipment and medical personnel employment (including professors), operating in the same area.

Example 3. “Black spots” method [8]

A “Black spot” in a health care institution is:

- especially dangerous place, which corresponds to a point event (ward, operational unit, central sterilisation point of the hospital, pharmacy etc.);
- specific medical procedure, during which a large amount of complications was noted;
- a place of significant concentration of adverse events, in which their number is much higher than the average.

The “black spots” method is a set of various methods (including analysis of event trees, fault trees) and partial analyses (expert analyses, epidemiological monitoring etc.). This includes risk identification, ordering of

Tab. 1. Number, types and causes of complications which occur during selected hospitalisations

Type of complication event	Number of complications	Eventual cause of event
repeated hospitalisations in order to correct previous surgeries, that is removing of nose bridge hump, straightening of the nasal septum	8	improper setting of nasal septum, improperly chiseled nose bridge hump, nose shortening required
infection, increase of temperature to 39 degrees, common cold	2	improper conditions on the ward (draughts, low temperature), lowered resistance of the patient or improper behaviour on part of the patient
ungluing of the plaster dressing	1	improper or overly loose dressing, lack of care on the part of the patient
localised changes near the intravenous line	1	improperly placed IV line, insufficient hygiene of the IV line area (disinfection)
bloody vomiting after the procedure	3	reaction of the organism to anesthesia

Ward: Plastic surgery

Number of tested patients: 80

Number of hospitalisations with complications: 14

Average time of stay without complications (days): 5.0

Average time of stay with complications (days): 6.3

Tab. 2. Risk assessment for adverse events during the plastic surgery of nose

Complications	Risk for the patient during the plastic surgery of nose (on a scale of 1 to 5)
	Average from three expert opinions
Repair/repeated hospitalisation	3.33
Infection and common cold	1.66
Lesions in the IV line insertion	1
Ungluing of the plaster dressing	1.33
Vomiting	2

Tab. 3. Data for the plastic surgery ward – for the plastic surgery of nose

Complications	Event frequency (%)	Time with complications (days)	Approx. extraordinary cost (of prolonged stay) (zł) per person-days
Repeated surgery/ repeated hospitalisation	10.00	7.65	849.51
Infection and common cold	2.50	5	0
Lesions in the IV line insertion	1.25	7	641.14
Ungluing of the plaster dressing	1.25	7	641.14
Vomiting	3.75	5	0

Approx. average cost of person-day: 320.57

Approx. normal cost (zł) (without complications): 1602.9

Approx. average extraordinary cost of complications: 538.56

threats and proposals of remedial actions, such as eg. monitoring or sealing up of procedures. It is cyclical and has a block algorithm structure, that is after removing the most dangerous “black spots” that are removable in another iteration on the subsequent level of hierarchy the risk analysis, selection of “black spots” etc. are performed again. The study was based on 430 disease histories with full medical documentation of patients treated in the hospital 2006–2007. Patients from dialysis stations, ophthalmology, neurosurgery and plastic surgery wards were hospitalised. The study was limited to the following surgical procedures: removal of cataract and glaucoma, removal of brain tumours, plastic correction of nose, and hemodialysis procedure.

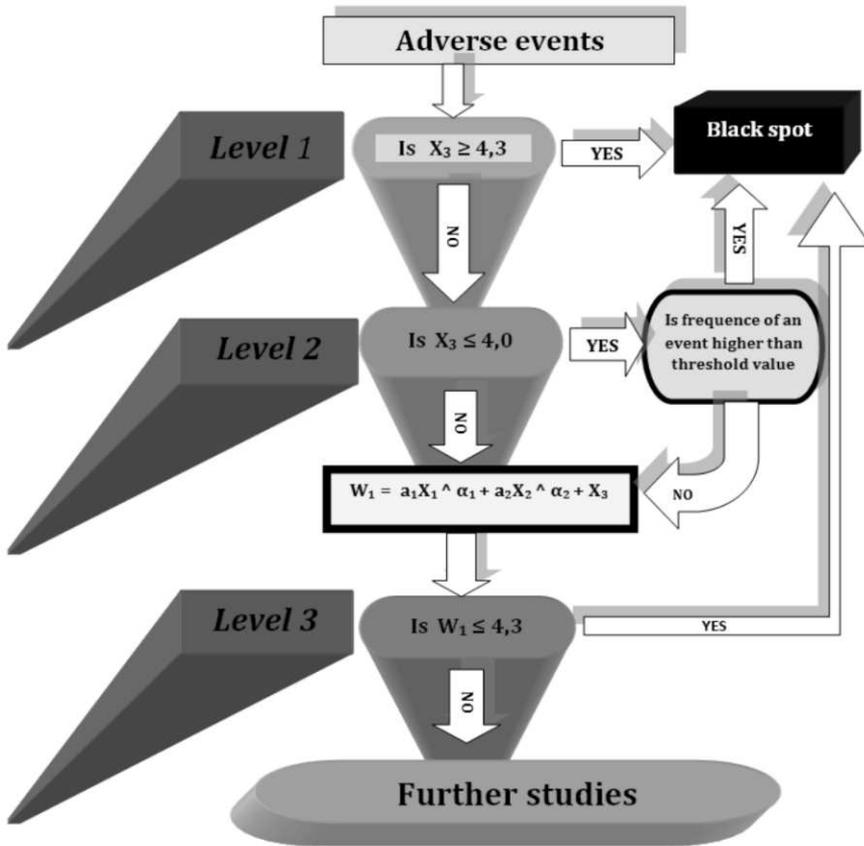


Fig. 3. Model of proceeding when determining black spots

As a result of minimising of the loss function the following values of the parameters of the model which describes the function of risk were obtained:

Tab. 4. Identified values of the parameters of the model

	for all surgeries (with the exception of hemodialysis procedure)	for the hemodialysis procedure
a_1	0.011	0.009
a_2	0.0004	0.0006
α_1	0.50675	0.42675
α_2	1.3155	1.4423

This enabled the creation of a hierarchy of “black spots”, taking into account three levels of classification and the ranking of adverse events, in which risk is higher when the rank number decreases.

Tab. 5. Comparison of “black spots” on various levels of hierarchy

Type of procedure/ surgery	Adverse event/complication	Black spot		
		Level I	Level II	Level III (W1)
Plastic surgery of nose	repeated surgery / repeated hospitalisation	NO	YES	YES 5.04
	infection and common cold	NO	NO	2.12
	lesions in the IV line insertion	NO	NO	1.52
	ungluing of the plaster dressing	NO	NO	1.85
	vomiting	NO	NO	2.46

Tab. 6. Ranking of adverse events

Adverse event	Rank	Adverse event	Rank
repeated surgery / repeated hospitalisation	1	haemorrhage to front chamber or vitreous body	1
vomiting	2	inflammation in the front chamber	2
infection and common cold	3	corneal oedema	3
lesions in the IV line insertion	4	flattening of the front chamber	4
ungluing of the plaster dressing	5	Folding of the Descemet’s membrane	5
dispersed blood in the vitreous body chamber	1	detachment of the choroid	6
inability to lower the intraocular pressure due to cells blocking the outflow of aqueous humour	2	epithelial oedema	7
tearing of iris adhesion – removal of exuding membrane	3	separation of suture of the basis of the conjunctival flap	8
detachment of lenticular capsule	4	post-operative hypotonia	9
wound leakage	5	death (as a result of ischemic stroke and pulmonary artery embolism, repeated surgery after bleeding into post-operative site, or unrelated to the procedure)	1
corneal oedema	6	epidural haematoma	2
Folding of the Descemet’s membrane	7	air near the surgery site and in the chamber system	3

Tab. 7. Ranking of adverse events, contd.

Adverse event	Rank	Adverse event	Rank
post-surgery period complicated by intensification of left-sided hemianopsia	4	reddening in the buttock fissure or of the buttock	14
paraplegia of upper or lower limb	5	significant reduction in RR	1
hospital infections (eg. cerebro-spinal meningitis)	6	chest pain	2
localised changes near the intravenous line	7	vascular rupture during HD	2
vomiting	8	suction from the C1 artery during HD	3
partial damage to the right nerve III	9	clot during HD	4
hydrocephalus – patient required a ventricular-peritoneal valve	10	spine pain during HD	5
postsurgery period complicated by the paralysis of the left oculomotor nerve	11	seeping from the IV insertion	5
hypokaliaemia	12	muscle spasms	5
trauma, eg. sliding from the bed, fall	13	skin itch	6

The study was extended by an analysis of hospital infections for all the hospital wards in the years 2004–2007. 384 cases of infection were identified. It is worth mentioning that a spectrum of techniques were used, not only the analysis of medical documentation (patient medical histories), but also expert interviews and data on the antibiotic therapies from the hospital pharmacy. Detailed techniques for the suppression of “black spots” were recommended, including those connected with the hospital infections.³

Example 4. ETA event trees and FTA fault trees

An example of the tree analysis technique in the risk assessment is provided. Frequently both methods (ETA and FTA) are used at the same time during project risk analysis.

³ Implementation of the black spots method is implemented in the “Latawiec” hospital in Świdnica, see: Topografia czarnych punktów szpitalnictwa, Natalia Adamska-Golińska, Menedżer Zdrowia, March 2011.

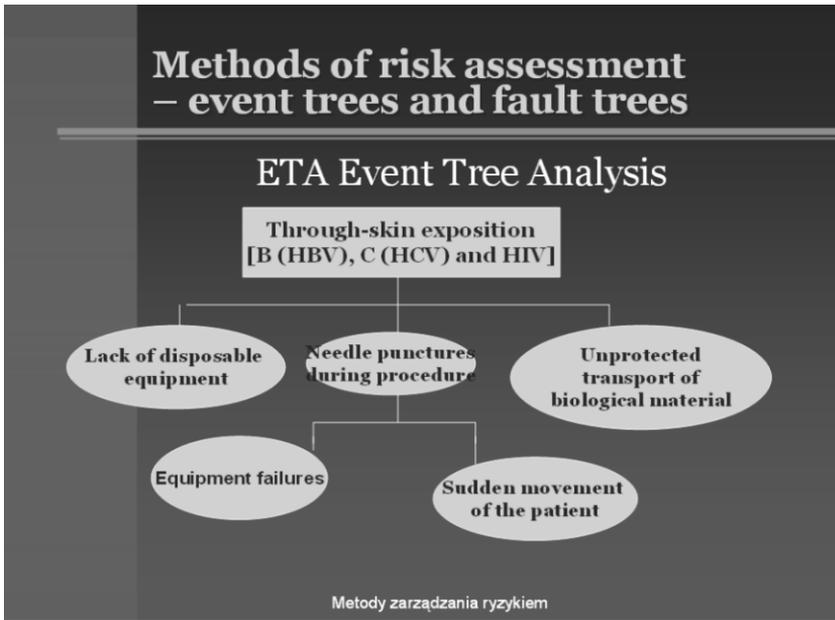


Fig. 4. Modelling of ETA and FTA trees in risk analysis

Example 5. Other risk management techniques, for example the risk drivers method [10] were not yet sufficiently well adapted to the needs of HCS in Poland.

Systems diagnostics

Holistic approach to the HCS modelling, realised on the basis of evidence based medicine, is closely connected with the use of systems diagnostics [11].

Systems diagnostics is a key process, which serves: distinctness, certainty of method, trust, obligation and uniqueness. It enables cooperative action and achieving in quality the optimum results in a diagnostics and therapeutic process. Clinical thinking (or holistic-type approach) covers not only mutual connection of systemic phenomena, but also their influence on the structure as a whole, regardless of [12]:

- *minuteness of detail of the character of studied phenomenon or modifying influence,*
- *organisational level,*
- *connection with the somatic, psychic, social or environmental sphere.*

System diagnostics in collective and cooperative formulation, adapted to the requirements of an IT system in health care and to updated classifications (including the ICF platform) result in:

- unification and objectivisation of diagnostics, certification and decision-making for turning points in the selection of medical procedures and therapies, including: diagnostic, nursing, rehabilitation, care (assessment aggregates, multi-criteria assessments, typological assignment to selected concentrations),
- quality change in the HCS culture, including the customer service formula in this system (therapeutic units, customer relations and internal relations of the system, providing information),
- new techniques for the measurement and assessment of the state of the system and realisation of its goals.

System diagnostics also requires the use of special measurement and information gathering techniques for various description levels [11], which is illustrated by the diagram below.

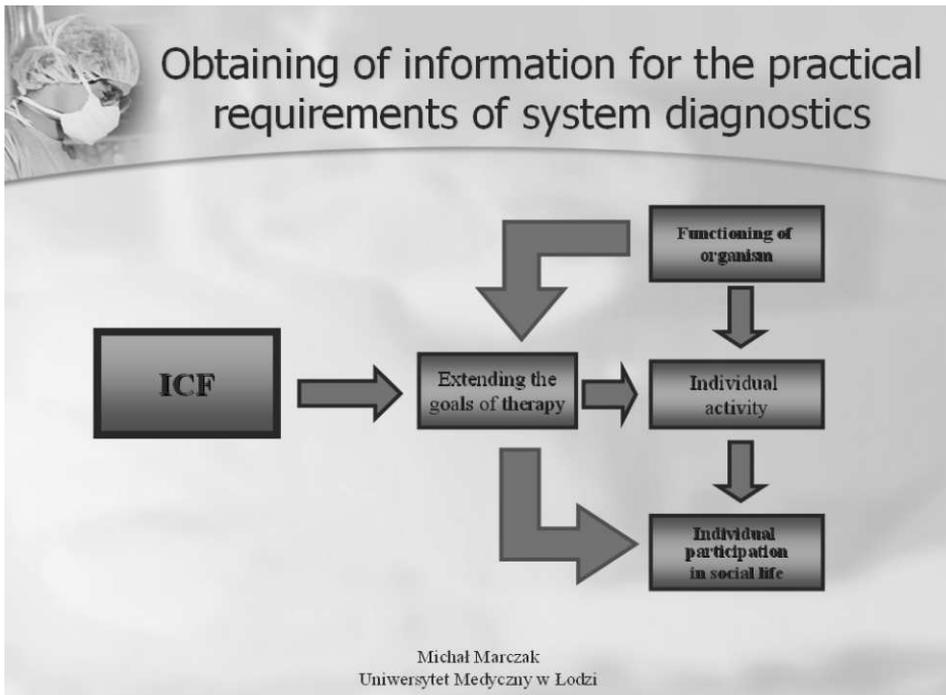


Fig. 5. Gathering information for the purpose of diagnostics of the system and its environment

Measurement of functioning, disability and health (ICF)

Risk management in HCS should be accompanied by appropriate methodology of health measurement (or, more general: of functioning, disability and health, eg. on the basis of the ICF platform). Without assessments that are axiologically appropriate, more effective MEL of medical technologies may not be selected and more *a posteriori* rational decisions may not be reached. As a consequence, it is not possible to create a credible basic health benefit basket, nor additional baskets, nor negative or derivative baskets!

The following ICF characteristic should be emphasized [13]:

- *it describes all aspects of human condition related to health and health-related fields,*
- *is intended for all people, not only for persons with disabilities,*
- *this classification may be used to describe health and health care with all conditions concerning health.*

Below an example realisation of ICF based measurement of functioning and health is presented [14]:

	No impairment	Light impairment	Moderate impairment	Significant impairment	Total impairment	Undetermined	Not applicable	Co-illnesses
b152 Emotional functions	X	1	2	3	4	8	9	C
Specific mental functions related to emotional and affective components of mental processes								
b180 Experience as a function of time	0	X	2	3	4	8	9	C
Specific mental functions related to awareness of identity of ones place in the reality of a given environment and time								
b1801 Body image	0	1	2	3	X	8	9	C
Specific mental functions related to repression and awareness of ones own body								
b2800 General pains	0	1	2	3	4	8	X	C
Experiences of unpleasant feeling indicating potential or real damage of some body structure								
b28010 Head and neck pains	0	1	2	3	4	8	X	C
Experiences of unpleasant feeling indicating potential or real Damage of a body structure, felt in the head or neck								

design: Tomasz Sulajewski
CYBERATELIER.EU

Fig. 6. Assessment of emotional functions, multi-dimensional body image and pain on the basis of selected ICF projection

Diagnostic studies and implementation works from the scope of ICF are performed by CSIOZ under the patronage of WHO. However, after five years, despite some interesting results they seemingly institutionally have returned to the point of origin, that is to education of the initial Polish personnel.

Additional insurance

Free market principles in health protection – well operating in an affluent civil society can not be directly transferred to a poor and less developed society [4]. This also applies considerably to other types of health insurance then obligatory, since it may show the deep social divide and violate the principle of egalitarianism. The market for private insurance fosters egoistic and demanding attitudes, thus reinforcing negative characteristics related to medicine as an ethical enterprise [15]. More so that in Poland there is a constant domination of pensioner and retired households over other socioeconomic groups when comparing the level of household expenses for the purchase of medical services and goods [16]. System assessment shows that passive methods of risk management, such as insurance, increase the general costs of health care more when medical technologies and services of highly specialised personnel are introduced rapidly. The results of polling of the Polish societal preferences do not show economically significant interest in additional health insurance. This tendency could change, if:

- the society would become more affluent and the socioeconomic consequences of a crisis were minimised;
- a system of obligatory insurance would allow for partial write-offs of insurance for additional services
- a natural change of the social culture in the direction of the development of civic society, an evolution of awareness, change in the level of acceptance of risk would occur; an effective information politics by the Ministry of Health would appear, and the methods of communication by the ministry with the society would change along with appropriate technologies.

Among all the questions and moral decisions [4] concerning additional insurance, especially the following remain topical:

- *What is more important – individual freedom of choice of medical treatments, or solidarity with those, who were harmed by fate?*
- *By whom and how are the rules of justice determined?*

Determinants and management of the HCS in Poland

In order to achieve contrast let's bring an example of sinking of the *Lancastria* lying off in the Quiberon bay – *when hearing the cry “space for a child” soldiers drew aside, standing with their backs to corridor walls, and they have acted thus every time they saw a woman and child, thus they lost precious seconds, which made the difference between life and death*, most of them have died (over 2800 people have died in total). From the point of view of the amount of rescued human lives (half) or even the total amount of their future lives this was an irrational behaviour, soldiers were moving faster and more efficiently than women with children. Also from the point of view of future defence potential of the country. However, the culture of solidarity prevailed, deeply ingrained and state-building need to help the weaker ones.

Moving to another time and another country in Europe: drivers passing near Nowe Miasto next to a site of a bus crash have not stopped, and when asked for help they drove away (all of them). Emergency services were called only by the injured driver of the second vehicle. 18 victims, all together in a very small place required quick extraction and at least an attempt to treat airway obstructions or to reanimate. All have died. Both selected examples are extreme, however they may not be constructed to be a standard and anti-standard.

Polish society is currently characterised by a high level of risk acceptance in health care, and also a low level of activity in voluntary service (social aid, nursing services, counteracting exclusion).

Specifics of HCS in Poland are characterised by conflicts and functioning of antagonistic subsystems with the participation of various professional groups. Tendencies in changes in the structure of employment and scope of realised services in medical professions (education, but also remuneration) is not only not compatible, but frequently opposed to the ones currently observed in more affluent EU countries or in the US⁴. In particular, over 70% of hospital directors do not have education in management. This is a process which results from the conservatism of the medical profession.

The Ministry of Health, in order to meet the needs of CSIOZ based management plans to work out the Information System by summing data achieved for individual patients. However, information on demand for health

⁴ Examples here may be: staffing of management positions in hospitals, taking over of providing of some procedures by other medical professions than doctors, that is nurses, EMTs, assistants.

services in a socio-demographic context can not be obtained based on data prepared for an individual patient (history of illness, services, referrals, procedures, prescribed drugs). It is also impossible to conduct rational health care policy and effective MEL risk management in health care. What is needed for such actions is a holistic approach, and eg. basis of utilitarianism as a theoretical foundation, creation of system assessment tools – aggregates, scales, multidimensional qualitative and quantitative models, data analysis methods (cluster analysis, clustering, data analysis methods).

An example of creation of system tools is the construction presented below, modelling the ICF “projection” for the needs of rheumatology.

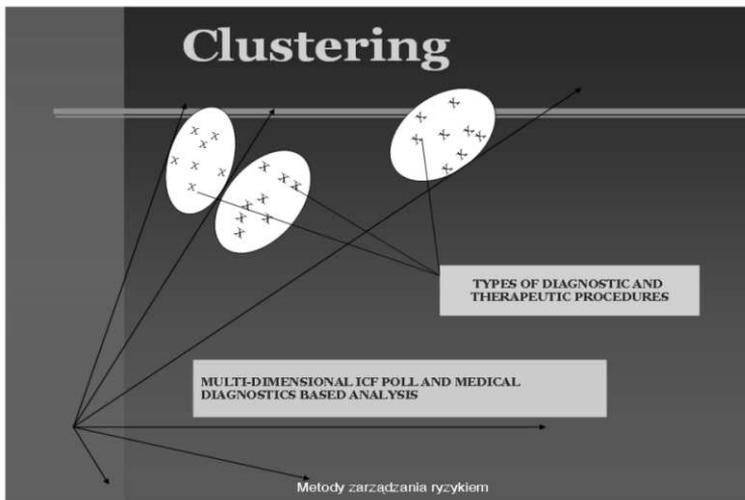


Fig. 7. Cluster modelling when using ICF in rheumatology

The counterexamples attached further illustrate the problems with simple addition or averaging as the basis of methods of data acquisition for the requirements of HCS management.

1. The model of appearance of a Czech soldier (by Franz Joseph I of Austria) can be transferred to a model of health of a Czech soldier,
2. Diversity of therapy for the same disease classification requires the systemic analysis of: reasons for the diversity, dynamics, dependence on socio-demographic qualities. What is needed is a reliable analysis of heterogeneity and assessment of the level of uncertainty of the results,
3. The sum of optimum activities for individuals, eg. the corruption of medical professionals [4] does not have to correspond to the best solutions for the community (health safety),

4. The selection of the most effective drug on the basis of two sample populations⁵; both for women and men the drug A is better, but it is *generally worse* than the drug!

DRUG A				DRUG B		
	Treated	Improved	Effectiveness	Treated	Improved	Effectiveness
Men	210	50	23.81%	100	20	20.00%
Women	20	15	75.00%	60	40	66.67%
Total	230	65	28.26%	160	60	37.50%

Fig. 8. The influence of population heterogeneity leading to erroneous inference

Epidemiological indicators: expected longevity, newborn mortality, infant mortality, incidence etc. due to their static nature may not be used as a basis for risk management in health care. However, with the information on the value of health insurance premiums and the amount of budget they practically form the basic platform for the communication of Ministry of Health with the society. Other information important for the aware civic society are limited, and thus probably are not politically correct.

The health resort is well oriented in the amount and level of services which it can offer depending on the amount of insurance premiums as a part of the NFZ and health care budget. However, the health care decision makers for many years do not have an information policy⁶ and do not maintain a dialogue with the society. They are intuitively, or on the basis of a convictions of the medical profession, strengthened in the opinion that:

- informing the society on the potential of health care services in Poland (a few hundred percent deficit in global perspective, low average quality, high risk level) carries the threat of loss of confidence in the medical profession and further social and political consequences. Usual transfer of responsibility to the historical conditions in the form of low earnings of the doctors became obsolete in the last years;

⁵ Created on the basis of: Michał Szurek, *Opowieści matematyczne*, Warszawa 1987.

⁶ With the exception of a test attempted by prof. Zbigniew Religa.

- the political and economical effectiveness of the medical and pharmaceutical companies lobbying is known and tested. The consequence is a small effectiveness of system reforms in the period of last dozen or so years;
- adverse events in health care, medical errors or hospital infections are practically not recorded in Poland. The databases which exist in accordance with the requirements of the law or certifications systems are rudimentary or unreliable. The Agency for Assessment of Medical Technologies nor the Quality Monitoring Centre have any influence on this;
- we are awaiting a necessary and very hard to accept by the society permanent increase of the NFZ insurance premiums and health care budget. Especially that in the changing demographical situation the introduction of a nursing insurance system cannot be put away much longer.

The decision makers do not have specific data, but they accept this state of affairs. Changes related with the increase of the awareness of citizens, and as a consequence the evolution of civic society could force difficult and costly reforms, it might also cause the reconstruction of the political arena and the forms of communication between HCS decision-makers, service providers, insurers and service recipients.

For holistic HCS risk analysis, risk treated as a condition of system, comprehensive measurements and assessments of: quality and costs of services, availability (type of rationing, waiting time), occurrence of adverse events are important. In practice most of these analyses are not conducted in Poland.

“Health care units” limit themselves, with the Ministry of Health remaining passive, to reporting on the level of accounting, and possibly to external customer satisfaction polls. The results of these last analyses are “surprisingly” good, which contrasts with the assessment obtained from indirect studies, that the Polish society accepts almost four times higher level of risk in health care than more affluent societies of countries which are members of the EU longer [3]. This shows the level of awareness of service recipients, their knowledge on: HCS and their rights, medical technologies, epidemiological threats, and on the inability to compare risks between individual health care units.

Against this background the initiative to create a system and database organised by the WHC foundation – CEESTAHC stands out.

In the category which decides on the limiting of availability, that is: *disproportion between the contents of benefits basket and the amount of financial resources from the basic insurance premium which is allocated to health care in Poland*, it is worth emphasizing that ensuring on a minimum,

rational level which does not significantly limit the numbers of population of patients the financing of treatment programmes for only two selected frequent illnesses (RA and MS) would require additional financing on a level of approx 7–10 billion zlotys per year. Significant losses in the level of health and functioning of patients are occurring (exclusion), whereas the efficiency of treatment is rather high and *highly cost-effective*.

The systemic problem with allocation of resources in health care is not only deficient function (lack of activity), but also excessive function (shown in documentation formal increase of the number of patients suffering from diabetes and circulatory system diseases by general practitioners, caused by attractive corrective indices of the capitation fees). This causes a significant lowering of medical effectiveness and increase of the costs of treatment.

An open question remains, is a better servicing of queues, logistics and organisation system, functional implementation of evidence based medicine with system diagnostics, health measurement and risk management will be enough for a satisfactory increase of health care if the HCS in Poland will still remain strongly internally antagonised?

R E F E R E N C E S

- [1] Szawarski Z., Etyczne założenia reformy systemu zdrowia i opieki społecznej, Warszawa, 2008.
- [2] Dziennik Ustaw z 2005 r. nr 57 poz. 500 i inne akty prawne.
- [3] Marczak M., Risk Management in Health Care System – Methodology and Chosen Examples, Edited by: Marczak M., Lodz, 2008.
- [4] Szawarski Z., Mądrość i sztuka leczenia, Gdańsk, 2008.
- [5] Singer P., Why We Must Ration Health Care, July 19, 2009.
- [6] Marczak M., Thustochowicz W., Raczkwicz-Papierska A., Joint application of ICF and ICD with reference to long-term health problems: opportunities of evaluation of a course of a disease and a risk of a relapse. Theoretical models and practical conclusions, Konferencja Ministerstwa Zdrowia CSIOZ Warszawa, 2007.
- [7] Piechota M., Wpływ modelu opieki okołoperacyjnej na śmiertelność chorych leczonych na oddziałach chirurgii ogólnej, Rozprawa habilitacyjna, AMS, Łódź 2009 (11).
- [8] Sierocka A., Marczak M., The Method of “Black Spots” in Risk Management of Adverse Events, submitted to: Zdrowie Publiczne.
- [9] Sierocka A., Zarządzanie ryzykiem zdarzeń niepożądanych na przykładzie jednego ze szpitali klinicznych w Łodzi, doctoral thesis, Łódź, October 2010.
- [10] Schmidt R., Schmieder Ch., Modelling dynamic portfolio risk using risk drivers of elliptical processes, Banking and Financial Studies, 7, 2007.
- [11] Marczak M., Diagnostyka systemowa; Referat plenarny, Konferencja Ministerstwa Zdrowia CSIOZ, Warsaw, 2010.

- [12] Doroszewski J., *Struktura i funkcja nauk medycznych*, Zagadnienia Naukoznawstwa, 2005.
- [13] Boonen A., Rasker J. J., Stucki G., The international classification for functioning, disability and health, A challenge and a need for rheumatology, *Clinical Rheumatology*, 26 (11), 2007.
- [14] Marczak M., Pomiar poziomu zdrowia i niepełnosprawności jako założenie opracowywania systemów informacyjnych opieki zdrowotnej wykorzystujących ICF, Konferencja Ministerstwa Zdrowia CSIOZ, Warsaw, 2007.
- [15] Szewczyk K., *Medycyna i finanse. Czy ekonomiczne racjonowanie świadczeń zdrowotnych jest sprawiedliwe?* *Diametros*, 5, 2005.
- [16] Suchecka J., *Nierównomierności w finansowaniu i dostępności świadczeń medycznych*, www.stat.gov.pl.