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Declaration on eHealth - 1st Revision[1,2]

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The Croatian Academy of Medical Sciences (CAMS) has published this "Declaration on eHealth" to warn all stakeholders (patients, health professionals, institutions, government agencies, suppliers) to use the huge potential of information and communication technologies (ICT) and solutions to improve health care in Croatia. The Declaration draws attention to areas of infrastructure such as: education, regulation and standardization, medical and health informatics (MHI) as a profession, the obligation of institutions, government bodies and suppliers.

In addition to answering the question "what?", the Declaration addresses the most important question "how?". Instead of the existing "atomization" and disconnection of projects and solutions, the Declaration proposes the realization of a common concept of computerization in health and for health by establishing a central body at the state level (agency, office, institute, etc.) in which expertise, decision-making and financing of health informatics projects at the national level will be concentrated. The central body should function on the principles of professionalism, independence and transparency. The purpose of the proposal offered by the Declaration is to improve the management of health system computerization, which would avoid containment within institutions, enable obtaining and purposeful use of available financial resources and experts, and achieve the necessary cooperation, which would bring the results in ICT support to the health system.

Key words: eHealth; medical informatics; declaration

[1] The last section of the Declaration has been revised in line with the changes regarding ProRec Center Croatia
[2] Croatian version is available at: http://www.amzh.hr/nakladnistvo/deklaracije/

Preamble

Modern ICT enter all spheres of human life and existence. Accordingly, medicine and health must be included. This technology facilitates access to information, enabling dissemination of knowledge and supporting responsible decision-making.

Examples of misuse and even abuse of the technology point to the need for the introduction of rules in its use. To avoid mistakes and misuse of ICT in medicine and health care, it is necessary to assess the possibilities of such technologies, set up a framework, adopt standards for information infrastructure, quality and safety and define an appropriate education.

Medicine and healthcare are very sensitive areas in terms of human life and work, and any inappropriate use or misuse of medical information can lead to undesirable outcomes.

The fact is that Croatia is working on the computerization of the healthcare system. Computerization of primary health care mainly refers to the storage of patient data in digital format and data exchange with the Croatian Health Insurance Institute (CHII).

Components that will enable primary care physicians to continuously learn through information infrastructure and information system, routinely consult (telemedicine) with colleagues and specialists, to review and complete national databases, to communicate directly with the patient through ICT, do not even exist in the plans yet, so a big, organized job is ahead. Hospitals, as well as polyclinics, have their own ideas and are constantly working on developing their own information systems that would meet their information needs.

Public health institutes (but also other participants) are developing subsystems based on data coming from health institutions. Much of this data is stored in the medical records of their patients. However, sending this data to other institutions requires additional work of health care staff (work reports, data from medical records), which often results in delays and sometimes incomplete data. Therefore, health statistics reports are late. Furthermore, health records are generally fragmented (some patient data is in primary care, some in hospitals, and much of the medical data is kept by patients at home). All this complicates access to patient data, which creates problems in direct medical work of health care providers.

The process of computerization of the health system itself is not going smoothly. As a rule, health professionals (as users of the health information system) are not involved (enough) in its development, and they are not satisfied with the results (with software products they receive). It is often unclear how they could influence the improvement of the system, to whom to suggest and how, or, how to replace painlessly a software product that does not satisfy them.

Therefore, the Committee for eHealth of the Croatian Academy of Medical Sciences proposes the Declaration defining the framework for the application of modern technologies, educational frameworks for health professionals and general informatics professionals, as well as frameworks that will raise the quality of eHealth, and thus the quality of the health system.

Framework

1. eHealth

eHealth is a common name for the development, implementation and evaluation of ICT in the health system for the needs of health professionals (routine / professional work; continuing education or lifelong learning; evaluation of professional work; research) and for the needs of all citizens (care for their own health; information on the health system; reliability of health information on the Internet).

> *There are different terms talking about the application of ICT in health and medicine (biomedical, medical and health informatics, health portals, medical advice on the Internet, information for patients, computerization of health care, internetization of health system, telemedicine, telehealth etc.). It is useful to create an umbrella term, like eHealth, that includes all the above.*

2. Health information is an issue of public interest

Health information collected in health institutions daily serve to make decisions related to efficiency and management of the healthcare system. Good and valid healthcare system is an issue of public interest for both the state and the society.

> *The amount of information in the healthcare system needs the modern ICT. The decision-making needs facts, i.e. available, accurate, up-to-date, timely, secure and unchangeable information. In the same time, the public interest requires the principle of data protection (in terms of general human rights and international and national legal acts on health data protection in the health system), as well as ethical principles in the handling of medical and health data.*
>
> *Public money may only finance clearly designed health computerization projects with the ultimate meaning, and concrete practical goals (aimed at the direct, immediate benefit of citizens that they can perceive, feel and use). Improving the system (or any process) without practical benefit to citizens, must not be a sufficient reason to use the public money. Such projects need redesign.*
>
> *The private health institutions should also a part of their data (of public interest) make available and involve them in production of public information of interest for the state and the society in general.*

3. Ensuring and improving the quality of health care

Investing in eHealth will ensure and enhance the quality of healthcare.

> *The ICT in the healthcare system is a means to further improvement the quality of health care based on solidarity, accessibility, comprehensiveness, efficiency and equity. A sustainable and high quality health care we cannot achieve without investing in ICT in health care. Investments must be appropriate (with an amount based on the experience of developed countries) and in line with the results that these investments should yield.*

4. Defining the medical and health informatics as an activity in healthcare system

The law should define the activities of medical and health informatics (MHI) in healthcare facilities as well as standard of MHI professional team (MHIP team).

Different types of experts are necessary for the planning, development and management of ICT in health care facilities. The structure and size of the team depends on the level of health care (primary, secondary, etc.) and the degree of computerization at that level. Following the example of other medical professions, it is necessary to develop a legal framework that would define the activities of MHIP.

The ICT development plans in the health system must also contain clearly defined needs for ICT staff. It is necessary to identify the good practice of balanced development and management of certain functionalities of the system by their ICT employees and involvement of external experts. Addressing the status of ICT professionals, i.e. MHIP in the healthcare system contributes to positive staff selection.

5. Establishment of an umbrella institution for medical and health Informatics

Strategies, construction and supervision of health information system should be entrusted to a body, as an umbrella institution (institute, agency, office) which operates on a national level.

Nothing (highlighted in this Declaration) can happen only spontaneously, i.e. through the cooperation of existing entities in health care or outside it. A body in charge of building and supervising the national health information system needs to be established. Such an institution must be an umbrella, i.e. that no one can do anything with public money independently of this body. Such a body must be independent. It must have a significant budget for the needs of central development of health informatics (in accordance with the standards in developed countries).

6. Involvement of medical professionals in professional teams of medical informatics

Inclusion of medical professionals of different profiles into MHIP teams will improve and facilitate the development and management of ICT in the healthcare system.

Understanding the needs of the healthcare system, medical technology and the possibilities of ICT is essential for the successful development and management of the information systems in medicine and healthcare. Establishing a system of sub-specialization of MHIPs and the definition of professional status will encourage the entry of medical professionals in this field.

7. Legal regulation of computerization of healthcare system

The harmonized legislation should fully support the entire area of eHealth.

Some of the existing regulations/laws related to healthcare are not completely consistent. Therefore, they should be adjusted or upgraded. Legislation should regulate the content of medical documentation, including electronic health records, policy and information security as well as the position of the central institution described in Section 5.

8. Change management

The introduction of ICT in the healthcare system requires changes in the way of working of both individuals and organization. Therefore, change management is essential.

At the top of the pyramid of any computerization project there must be an appropriate change management project (work organization, education). Tasks for all other projects / activities also arise from the change management project.

Education

9. eHealth issues in the education of health professionals

The educational curriculum of every health profession must include topics on eHealth.

> *For the effective use of modern ICT in medicine or the health profession (doctor, nurse, medical technician, etc.) it is necessary to know the principles, possibilities and limitations of ICT and acquire skills for its use. Avoiding formal, factual, and superficial teaching, and insisting on understanding and putting technology in the context of everyday activities in the health system, is necessary. It is important to encourage health professionals to active assess the strengths and weaknesses of the application of specific technologies and procedures.*

10. Health / medical topics in the educational curriculum of ICT professionals

It is necessary to establish a new educational profile, i.e. profession of medical / health IT professional (MHI specialist). It means to introduce health/medical topics in the educational curriculum of ICT professionals who want to work professionally in eHealth area.

> *The fact is that the collaboration of health professionals and ICT specialists will be more effective if both parties have knowledge in common. This implies that healthcare professional should achieve certain skills and knowledge in the field of MHI, and ICT specialist specific knowledge and skills related to medical and health issues.*

11. Education for change management

Users of ICT based system (existing or in future) must be involved in the design of that system from the mere beginning. More than that, involvement of users in testing, continuous monitoring and evaluation of the system must be condition sine qua non. Users' education must have the highest priority in the process. All stakeholders must be informed timely and appropriately about everything that is important for the system (purpose of the system, system development, results of testing, monitoring, evaluation, etc.).

> *The postulates of change management imply that the users of the future system should be involved in the computerization project from the very beginning (and, continuously, in all phases of project development). It must not happen, that system users get to know the system just after its completion. Therefore, strategists, planners, computer scientists, and health professionals need to understand the basics of change management, so that they can participate, plan, and implement the project successfully. In addition, change management must be regulated organizationally - to establish the way of communication between users and system manufacturers.*

Communication

12. Communication between health care institutions, and health care institutions with health care users

Citizens must be able to communicate (in a way that is tailored and useful to them) with any part of the health system. Healthcare professionals and healthcare institutions are also obliged to communicate with each other.

All participants in the health system (healthcare users, healthcare providers) should be enabled to use methods of e-communication. The Ministry of Health, clinical hospitals, the Croatian Health Insurance Institute (CHII) and other health insurances, the Croatian Institute of Public Health (CIPH) and other institutes should be leaders by example. Therefore, the healthcare institutions should have their own up to date web. There should be information useful to the health care users (e.g. about diagnostic unit or practice, working hours, about health professionals, contact, etc.). Information on health could be useful for healthcare users too (e.g. health education, how to achieve health information or maintain it - the reliability of such information should be confirmed by HONcode certification). Healthcare institutions should proactively apply technologies that enable data exchange between institutions as well as two-way communication (institutions with healthcare users) which could increase the quality, speed / ease of service providing, and reduce costs and errors.

Quality of eHealth

13. Integration of health information

Health Information System (HIS) must integrate all the data/information circulating in the health system and, with a high degree of security and protection, ensure availability of data to authorized entities.

Every healthcare user should have their own unique electronic health record (EHR) with data coming from various health care facilities (family medicine office, other medical specialty, hospital, laboratory, diagnostic unit and elsewhere). The EHR does not necessarily have to be physically on the same place. However, any part of the EHR must be linked to others whenever is necessary, meaning, when is required by an authorized person (health professional with patient at the point of care), and with the patient's consent. Every health care user must be able to find out who used his/her data, when and what data, as well as what rights (law) or authorizations allowing to do that.

14. Health statistics as an issue of public interest

Data on health status of citizens and health services provided in health care institutions are the basis for making periodic statistical reports (used by the CIPH, network of county institutes of public health, and other institutes and agencies). The purpose of health statistics is to diagnose health status of the population, surveillance on the health system, and basis for public health interventions in the population as well as in the organization / reorganization of the health system itself.

Extracting of data from the patients' EHR (information on treatment, prevention, medical procedures, etc.) enables the health statistics reports to be current and immediate (without delay). Using the data in any part of the health system and cooperation of the institutions and agencies in health sector will help to improve the quality of work. Indicators of the quality of work are instruments measuring such activities. Retrieval and use of data should be anonymously (identity of health care user should not been known). Part of health statistical information should be available to users outside the health system too.

15. Health registries

Any health registry should be a result of extracting data that already exists in the EHR. Information on deaths obtained from the Registry of Deaths should also enter in the EHR. In this way, they become usable for the purposes of the health registry too.

> *Extraction of data from the patient's EHR, will enable updated and completed health registry.*

16. Standards and standardization

Standardization is a prerequisite for the proper functioning of any system. This refers to standardization in the education system (at all levels of education), in science and research (appropriate definition of scientific areas, fields and branches) and in everyday practice (eg in daily medical/health practice, in development and use of health information systems, etc.).

> *"Standard is a document adopted by consensus, approved by the competent authority, which for common and repeated use, provides rules, guidelines or characteristics for activities or their results, and ensures the best level of organization in the given circumstances" (Act on Standardization). Also, standards are medical guidelines (e.g. Guidelines for the treatment of hypertension, etc. issued by international professional bodies) as well as recommendations of other international bodies and organizations (e.g. Recommendations on Education in Biomedical and Health Informatics, or the Code of Ethics for Medical Informatics given by the International Medical Informatics Association (IMIA)). Regarding standardization of health information system, it is necessary to follow the European (CEN, CENELEC, etc.) and international standards (ISO, HL7, etc.) and standards adopted by Croatia (Croatian Standards Institute, CSI).*

17. Certification of software and other products

Any product (before its use) must pass the certification process: verification of functionality, security of data and information system itself, as well as interoperability. For this purpose, it is necessary to set the primary criteria that a product must meet, establish a body that will implement the certification process, define the period for which the certificate will be valid as well as the conditions for a potential recertification of products.

> *When it comes to the HIS, EHR, etc., the body that conducts certification must include a variety of professions: (1) users / health professionals, (2) Medical Informatics and ICT professionals, (3) lawyers, and (4) a variety of professions and individuals potentially interested for considered problems.*

18. Obligations of producers and vendors about software product for healthcare system

All software applications intended for the same user group (eg family medicine) must be compliant. This means that each new software product must ensure direct interoperability with other software products in a given area (eg family medicine) developed according to the given criteria. In other words, it must be possible to export data in a standard format that any software product intended for the same field of application can accept.

> *Establishing the criteria that a software product must meet, respecting standards and certification criteria will increase responsibility of producers and vendors, as well as freedom of end users (health professionals) in choosing or replacing software products.*

19. Obligation to comply with European initiatives in eHealth

Development of EHR systems must be compatible with European initiatives in eHealth.

> *The European Institute for Health Records (EuroRec) in 2009 launched a project to harmonize the quality of the EHR system in the European Union. On the Croatian side, the Croatian Society for Medical Informatics (CSMI) participated in the project. The establishment of the ProRec Center in the Republic of Croatia in 2013 enables a direct connection with European activities in the field of e-health and involvement in European and Euro-Atlantic projects of the European Commission coordinated by EuroRec.*

Abbreviations

CEN	European Committee for Standardization - European Organization for Standardization (http://www.cen.eu/cen/NTS/What/Pages/default.aspx)
CSMI	Croatian Society for Medical Informatics (http://www.hdmi.hr)
EuroRec	European Institute for Health Records - an independent nonprofit organization in Europe to promote the use of high quality EHR (http://www.eurorec.org)
EHR	Electronic Health Record
HIS	Health information system
HL7	Health Level Seven International - an international organization of production and exchange of communication standards in healthcare, also a group of such norms (http://www.hl7.org)
HONcode	Code of Conduct devoted to medical and health Web sites - a certificate on the reliability of health information on the Internet (http://www.hon.ch)
CAMS	Croatian Academy of Medical Sciences (http://www.amzh.hr)
CIPH	Croatian Institute of Public Health (http://www.hzjz.hr)
CSI	Croatian Standards Institute (http://www.hzn.hr)
CHII	Croatian Health Insurance Institute (http://www.hzzo-net.hr/)
ICT	Information and Communication Technology
IMIA	International Medical Informatics Association (https://imia-medinfo.org/wp/welcome-to-imia-the-international-medical-informatics-association/)
ISO	International Organization for Standardization (http://www.iso.org/iso/home.html)
MHI	Medical and Health Informatics
MHIP	MHI profession
ProRec	https://www.hzzo.hr/en/osnovana-hrvatska-udruga-za-elektronicki-zdravstveni-zapis-prorec-hr/

Guidelines for the Advancement of Electronic Health Records

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The Guidelines have been proposed for the development of electronic health records (EHR) that must meet the needs of all relevant stakeholders. The system of electronic health records should contribute to the improvement of health services to healthcare users, support the daily work of health professionals and enable continuous improvement of quality at all levels of the health care system. The following concepts are defined: electronic health record, electronic medical record (EMR) and electronic personal health record (EpHR); Any health care user should have one EHR, one EpHR, and multiple EMRs. The parts of the EHR, i.e., the EMR and EpHR, should not be physically kept in the same place, but must be interconnected in case of need (via the health care user unique identification and authentication rules). All EMRs contain data collected by health professionals in health facilities (primary health care, polyclinics, hospitals, public health institutes, etc.). This data can be entered directly or transmitted from medical devices. The EpHR contains data collected and maintained by the health care user. They can be recorded directly or transmitted from a medical device. Data in the EHR may be made available to authorized persons only. Data protection in the EHR should be ensured in three ways: technically, regulatory and through codes of ethics, in line with international initiatives (certification, EU regulations, standards, etc.). The EHR and its components should be used for both primary and secondary purposes. The primary use of the data relates to the individual (diagnosis, therapy, vaccination, etc.). The secondary use relates to population groups (reporting on the health status of the population, the quality of health care, the effects of preventive activities, funding, and research, etc.). The EHR data (structured or not) should be defined by health care professional associations. The ICT experts need to offer optimal technological solutions. The EHR development strategy, as well as supervision (medical, legal, technical, and ethical aspects, as well as standardization) should be entrusted to the institution at the national level, i.e., the Central eHealth Authority. EHR (EMR and EpHR) should be developed in stages, step by step, depending on current knowledge, technology, and material resources.

Key words: electronic health record; electronic medical record; electronic personal health record; primary/secondary use of data

Preamble

Based on Croatian Encyclopedic Dictionary, the *guideline* denotes an established *course of action*. So, guidelines for improvement of electronic health records (EHR) should be understood as the course of action in the life cycle of the EHR system that should:

- Meet the needs of all stakeholders in the health care system
- Support health-professional work
- Enable continuous quality improvement

at all levels and in all parts of health care and thus contribute to preserving and improving the health of all the health care users.

Guidelines are not obligatory.

The EHR concept is not new and in various developed and less developed countries, work is underway to develop guidelines for building and improving EHRs. However, a satisfactory solution has not yet been achieved.

Although medicine is an established discipline, science and profession, each country has certain peculiarities in the organization of the health system which must be considered when applying the information technologies in medical and health-professional work.

Information technologies have already penetrated very well into the health system in Croatia, but still (despite the Declaration on eHealth from 2011 which was incorporated in several official documents on health and health system) there is no single comprehensive solution for EHR. Therefore, the Committee for eHealth of the Croatian Academy of Medical Sciences (CAMS) has started to develop guidelines to determine the optimum way forward.

Abbreviations

CAMS	Croatian Academy of Medical Sciences
CEN	European Committee for Standardization
CEZIH	Centralni zdravstveni informacijski sustav Republike Hrvatske (Central Health Information System of the Republic of Croatia)
EHR	Electronic Health Record
EMR	Electronic Medical Record
EpHR	Electronic personal Health Record
HDMI	Hrvatsko društvo za medicinsku informatiku (Croatian Society of Medical Informatics)
HL7	Health Level 7
HLZ	Hrvatski liječnički zbor (Croatian Medical Association)
HLK	Hrvatske liječnička komora (Croatian Medical Chamber)
HUMS	Hrvatska udruga medicinskih sestara (Croatian Nurses Association)
HZN	Hrvatski zavod za norme (Croatian Standards Institute)
HZN/TO215	Tehnički odbor za normizaciju u medicinskoj informatici pri HZN-u (Technical Committee 215 in HZN)
HZZO	Hrvatski zavod za zdravstveno osiguranje (Croatian Health Insurance Fund)
ICT	Information and Communication Technology
IHCU	Identification of Health Care User (identifikator korisnika zdravstvene zaštite)
ISO	International Organization of Standards (Međunarodna organizacija za norme)
MBO	Matični broj osigurane osobe (Identity Number of Insured Person)
NIAS	National Identification and Authentication System (Nacionalni identifikacijski i autentifikacijski sustav)
PDI	Personal digital identifier (osobni digitalni identifikator)
OIB	Personal Identification (osobni identifikacijski broj)
PIN	Personal Identification Number (tajni osobni broj, lozinka)
PHC	Primary Health Care
PcHC	Polyclinic Health Care
STeZ	Središnje tijelo za eZdravlje (Supervisory Authority for eHealth)
HIS	Health Information System

Introduction

In line with the meaning and logic of integrated health care, the principle of health care providing with the aim of improving patient care and coordination of health care (1), and taking into account the Declaration on e-health (2), it is necessary to integrate the health information:

"Health Information System (HIS) should integrate all the health data available within the system and, by ensuring a high level of security and protection, make the data available to authorized entities ".

Considering the above, the Declaration requires that any health care user has his own unique electronic health record (EHR) filled with data from various parts of health care - primary health care (PHC), polyclinic (PcHC), hospital, laboratory, specific diagnostic or therapeutic unit and elsewhere.

The EHR does not necessarily have to be (physically) stored in one place, but it must be possible to link all its parts on request of authorized person (physician or other health care professional while providing health care to the patient) and with patient consent. Every health care user (i.e. patient) must be able to have complete and simple insight into the information on who used his health information, what information and when, as well as what was the basis for this authorization.

Any approach to solving a problem requires an overview of the area, defining goals and purpose, considering different opinions about the problem and its solutions, and finding or suggesting possible solutions. The development of the EHR is still an incompletely solved problem in the world. Recently, guidelines related to EHR issues have been completed in various countries around the world. Good examples of this are developed countries like the UK and the United States, but some other countries (like India) have followed the same way (3-6).

All the work on the guidelines is generally of more recent date, and guidelines are still under development. Some guidelines are limited in scope - they refer exclusively to one part of the health care system, e.g. the electronic record of patients in a general practice (5).

Each of the guidelines is an attempt to direct the development of EHR in the country towards integrated health care, in line with the organization of the health care system of the specific country.

Although the professional literature and documents of international standardization bodies, mostly use the name electronic health record (EHR), other names appear too - names like "electronic medical record" (EMR), "electronic patient record" (EPR), "personal health record" (PHR), and similar.

Given the fact that Croatia still does not have a complete solution for EHR, and that different names (terms) are used in current documents and communication [e.g. eKarton in the Ordinance on the Method of Keeping of Personal Health Record in the Electronic Form (7)], and that at the same time there are several fragments of a potential solution for EHR, the eHealth Committee of the Croatian Academy of Medical Sciences (CAMS) considers it necessary to clearly define terms and develop Guidelines for improving EHR (hereinafter: the Guidelines) that will help improve the existing incomplete solution.

Purpose and Objectives

The purpose of applying these Guidelines is to develop a new EHR which will be meaningful and useful for both, primary (treatment and prevention at the individual level) and secondary use (improving quality in health, planning and implementing interventions at the population level, improving the health system, education, scientific research, etc.).

The purpose of this paper is to develop such Guidelines.

The objectives of these Guidelines are as follows:

- To define the concepts and terminology to be used in the Guidelines
- To define the relationships between concepts
- To define the functionality of the EHR and its parts at different levels of the health care system
- To consider the necessary infrastructure for the implementation of the EHR
- To establish supervision over the development and functioning of the EHR.

Who will benefit from the Guidelines? And what benefit?

The Guidelines are intended for all stakeholders in the computerization of the health system, i.e. system developers (vendors) as well as users.

Thus, the Guidelines are intended for:

- Those who will develop the EHR
- Those who will use the EHR data for:
    - Their primary needs and activities (oriented to individuals),
    - Secondary needs (oriented to population in care, quality of health care, effects of preventive activities, financing and scientific research)
- The population as a whole.

The benefits of the Guidelines are manifested in giving directions for the development of EHR, in purposeful and meaningful use of EHR data for different purposes, and in better health care for individuals and the population as a whole.

Development of Guidelines

Development of the Guidelines includes the elaboration of individual goals. Concepts which will be used in the Guidelines like electronic health record (EHR), electronic medical record (EMR) and electronic personal health record (EpHR) will be specified, as well as their inter-relationships. Functionality needs will be identified at all the levels of health care - primary health care settings, polyclinics, hospitals, public health, etc.

The Guidelines will discuss the infrastructure elements important for implementation and functioning of electronic records. Primarily, this refers to the protection/security of data stored in EHR, EMR and EpHR, and consequently to the safety of health care users themselves.

Interoperability is an indisputable requirement in complex systems (like the health care system) that require communication of data and cooperation between various settings and health professionals. Therefore, standardization is an unavoidable component in the construction of EHR, EMR and EpHR.

Furthermore, in addition to the code of ethics for health care professionals regarding patient data, information and communication technology (ICT) professionals should also be considered and a code of ethics proposed for them.

Development and functioning of EHR, EMR and EpHR must be legally fully regulated. It is also necessary to consider how to monitor, both the development and the functioning of the EHR.

Electronic health record and related concepts

Due to the variety of names for sets of patient health data used in both literature and everyday health care practice we consider it necessary to introduce basic definitions. The definitions are as follows:

An electronic health record - EHR - is a set of *data and information on the health* of a health care user; data being stored and transmitted electronically, protected and secured, and available to authorized users.

An electronic medical record - EMR - is a set of *medical data* of a health care user, being stored and transmitted electronically, protected and secured, and collected and recorded by health care providers.

An electronic personal health record - EpHR - is a set of data on the health of a health care user; created, electronically recorded, and disposed *by the health care users themselves*.

The authorized users can be health care professionals and the health care user.

Providing the health care to a health care user, the health care professional becomes the authorized user of health care user's data.

Relationship between the defined concepts can be shown by diagram (Fig. 1) which shows who is responsible (input and use) for the data in the EHR, EMR and EpHR.

Therefore,

- Any health care user has only one EHR. The EHR should be created by integrating relevant data from various EMR and EpHR
- The EMR should be created at health care settings (GP surgery, laboratory, hospital wards, diagnostic unit, public health counseling, emergency care, community nursing activity, etc.). In this way, there are several EMRs in which the health professional enters data relevant to his / her scope of activity and according to the regulations on keeping medical records.
- The EpHR should consist of the data relevant to the health status of a health care user and should be entered by the user himself.

All these records can have its own mobile format.

The content and format of the data should be based on the regulation on medical documentation. Detailed elaboration of content and format should be determined by professional societies, i.e. associations (e.g. HLZ, HLK, HUMS, HDMI, etc.).

Linking of data recorded in various EMRs and EpHRs into one EHR (i.e., data from different sources: PHC, hospital, patronage, etc.) is achieved through the identification of health care users (IHCU) and the application of international standards.

The health care user identifier must be an attribute that is unique to each user. However, each user may have multiple identifiers, i.e., multiple digital identities enabling authentication by using any authentication feature (biometrics), person’s knowledge (PIN) or items that the person owns (card, token, chip, etc.).

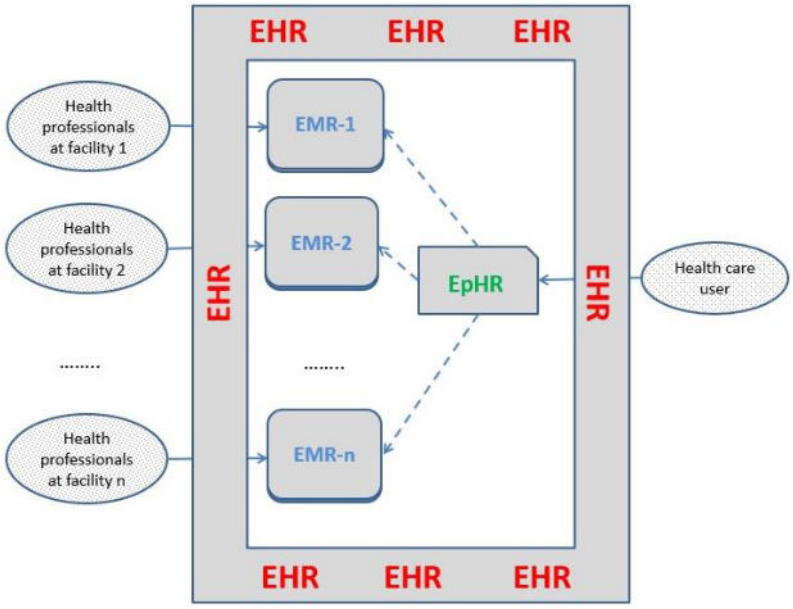

Figure 1. Relationship between EHR, EMR and EpHR

Special attention should be paid to the possibility of unambiguous authentication of health care users in a situation when they need to be provided with health care, and they themselves are not able to provide data that would identify and authenticate them. Therefore, at least one personal digital identifier (PDI) should be an invariant biometric characteristic that undoubtedly ensures the authenticity of health care users. In addition to the simplest one (fingerprint, which is increasingly used in laptops and smartphones), recent literature cites the venous structure of finger (the finger vein) (8) or the venous structure of the palm as one such property (the palm vein). Such technology can check the authenticity of an individual (palm vein recognition technology) with very small errors by contactless scanning of a finger or palm (according to Kumar et al. from 0.996% to 3.112%) (9,10).

In line with the current solutions in Croatia, the identity number of the insured person (Croat. MBO) of the Croatian Health Insurance Fund (Croat. HZZO) serves as the identifier of the health care users. Based on this identifier, the data of health care users in the health system are linked in a single record, in the EHR. At the national level in Croatia, there is a Personal Identification Number (Croat. OIB) which has the same purpose - to connect data belonging to the same person (in different systems).

The fact is that the application of a unique person identifier, especially in various systems, potentially violates the person's privacy. In the world today, there are different solutions that have the same goal and purpose - to connect data about one person, for example, from different health care settings. Finland, for example, has a citizen identification number that is used in all systems, including health care, regardless of where the data is collected and where they are located (11,12). In contrast, in Germany, there is no unique identification number of a person, nor is such a solution being considered (13). Data linkage in Germany is based on special record linkage algorithms, and each system has its own way of identifying a person.

The current European legislation, the General Data Protection Regulation, i.e., GDPR (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016, concerns the protection of individuals with regard to the processing of personal data and on the free movement of such data (14). Given that the GDPR refers to the protection of the individual and his data in the health care system, including the EHR, an appropriate technological solution

should be chosen to connect data on health care users in accordance with the GDPR as part of Croatian legislation.

Why one EHR, more EMRs and one EpHR?

Integrated health care implies lifelong monitoring of health care users ("from birth to death"). Data on his/her health and illness recorded at one health care setting, in one EMR, may be needed by health professionals in another setting. Therefore, the connectivity of different EMRs created in different settings is required. Likewise, in some cases of providing health care, it is important for the health professional to gain insight into the data recorded by the health care user himself (e.g., at home or in some special situations) in his personal health record (EpHR). The EHR should link all this data, regardless of where they originated and who recorded them. Private health facilities should also not be exempted.

From all the above, the principle "one person - one EHR" arises.

The development of the EHR system should be carried out gradually (in stages), and the development itself will necessarily depend on:

- Education of participants (health professionals, ICT professionals, health care users)
- Legal basis (regulations)
- Professional support (societies of health professionals)
- Financial opportunities
- Political will (health authorities, etc.) (Fig. 2).

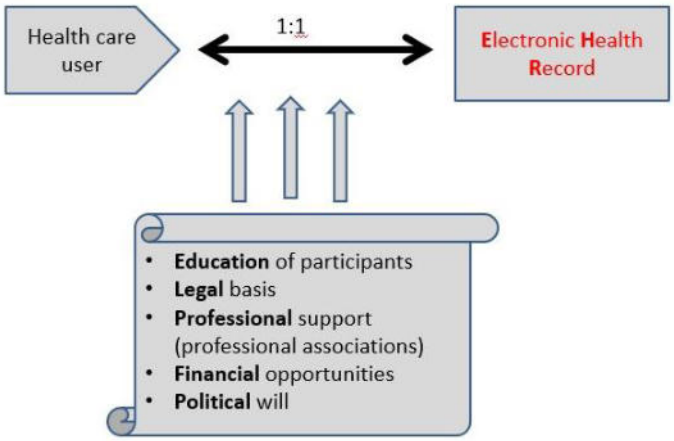

Figure 2. Aim and modulators of the EHR development dynamic

The EpHR refers to the individual. The EpHR is not mandatory for every health care user. It is recommended to health care users for whom monitoring of data derived from outside a health care facility can improve health outcomes.

The EHR functionality and how to achieve it

Both the EHR and EMR are intended for primary and secondary use (Fig. 3).

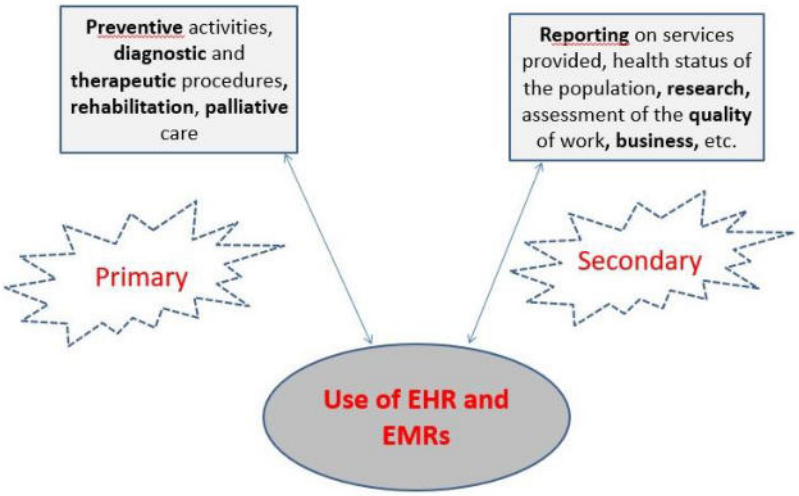

Figure 3. Primary and secondary use of the EHR data

The primary use of EHR and EMR is to aid decision-making in the process of providing health care to the individual (preventive activities, diagnostic and therapeutic procedures, rehabilitation, palliative care).

Data sharing is an integral part of the primary use of EHR. A prerequisite for data sharing between health care professionals is the interoperability of their IT applications. For example, one of the data sharing outcomes can be the active alert to the general practitioner (GP) on the findings of specialists, laboratories, or other diagnostic units and display of this finding in the GP's IT application.

The secondary use of EHR and EMR includes reporting on services provided, health status of the population in care, etc., research (scientific and professional work, the discovery of new knowledge based on data collected in daily work with the patient), assessment of the quality of work, business, etc.

The difference between primary and secondary use of data can be illustrated by the example of panels, recently a part of the EHR in the GP surgery. One of such panels is the Total Cardiovascular Risk Panel developed under the proposed National Cardiovascular Disease Prevention Program: systolic blood pressure, total cholesterol, and HDL-cholesterol will be measured for any man over 40 and a woman over 50 who comes to a GP surgery for any reason (opportunistic screening). Based on these data as well as data on gender, age, and smoking, a 10-year cardiovascular risk will be calculated automatically (SCORE table). The risk for a cardiovascular incident and the LDL-cholesterol value will determine whether hypolipemic treatment is required or not. This is an example of the primary use of the data.

Also, the same panel contains data on early cardiovascular mortality as well as on established cardiovascular disease in the family. The panel is also intended to assess the health status of the population in the care of any GP, specifically in relation to cardiovascular risk factors, which

can be one of indicators of the quality of medical work. This is one example of the secondary use of data.

According to the existing Guidelines for GPs, each GP should cover 20% of their population per year. In this way, after 5 years, the entire population of Croatia will be covered, and relevant data on cardiovascular health of the nation, i.e., total Croatian population, will be obtained. So, it will be possible to carry out scientific research of cardiovascular risk, which is another example of the secondary use of data.

The content and format of data in EHR should be based on the needs of both primary and secondary use. Therefore, it is necessary for professional societies, professional bodies, and representatives of patient associations to develop appropriate criteria by which both primary and secondary use of EHR can be achieved.

Criteria for the functionality or the point of the using EHR can also be developed in stages, depending on the readiness of the health care profession.

The Annex provides examples of information derived from data in the EHR for individual segments of health. It should be kept in mind that both primary and secondary use require the inclusion of data on socio-demographic and psycho-behavioral determinants of health. American colleagues, for example, envisioned for their environment the following set of precisely defined data from the socio-demographic and psycho-behavioral domains to be included in EHR: race/ethnicity (2 questions), education (2 questions), exposure to financial difficulties, stress (1 question), depression (2 questions), physical activity (2 questions), tobacco use and exposure (2 questions), alcohol consumption (3 questions), social cohesion or isolation (4 questions), exposure to violence by an intimate partner (4 questions) and measures of economic development of the neighborhood in which the patient lives (2 measures). The list and forms of the mentioned data were obtained by researching the connection between health and potential socio-demographic and psycho-behavioral determinants (15).

Infrastructure for the implementation of EHR

Infrastructure implies ensuring the general principles of introduction of ICT in certain areas, which are:

- Data security,
- Application of international standards,
- Legal regulations and certifications, and
- Ethics.

Thus, the implementation of an electronic health record system requires the fulfillment of these general conditions. In other words, health care users, i.e. their health data, must be protected from unauthorized use, and any use of this data must be legally and ethically regulated. Continuity of health care requires interoperability of all subsystems, which means that international standards must be applied (Fig 4)..

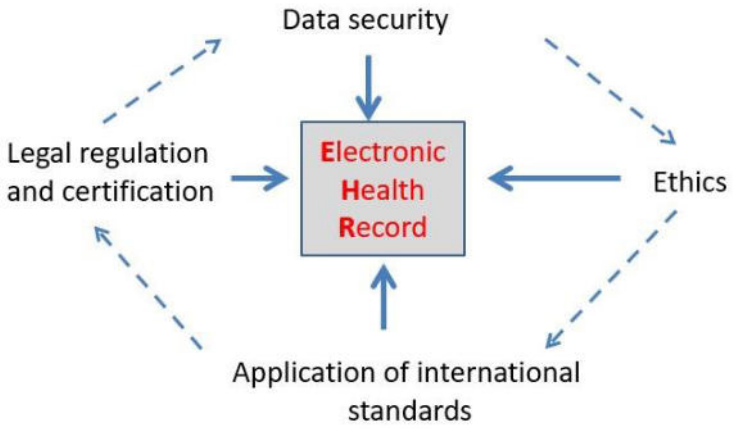

Figure 4. General principles of the EHR implementation

The EHR data security

The safety of health care users also depends on data security in their EHR. Data security implies protection against destruction (accidental or intentional) and against unauthorized use which can result in harm to the health care user by reducing his quality of life.

Data security includes a technical or technological component, as well as legal regulations and codes of ethics.

There are three dimensions of data protection contained in the EHR (EMR):

- Availability - data should be available only to authorized persons
- Confidentiality - authorized persons may disclose information only to authorized persons
- Integrity - only authorized persons can enter or change the entered data.

Traceability of use of the data (who accessed the data, entered the data, and made changes in them), as well as the undeniability and authenticity of the person who did so, must always be able to be established.

When they become an integral part of the EHR, the EpHR data should also be protected according to the same stated principles. In all other situations, the health care user takes care of data security in his/her EpHR.

Once the data become part of the EHR, technologically they must become "eternal." This means that both the original data and the data after the changes must be kept. In this way, it is always possible to reconstruct the data lifecycle regardless of the reason for their change.

Access to data from the EHR, EMR, and EpHR is allowed only to authorized persons. The persons authorized to access the data in EHR and EMR of a certain individual are persons who participate in providing health care to that individual, exclusively at the time when they do so.

Access authorization is proven by credentials.

For now, the health professionals use credentials issued by the HZZO to access the Central Health Information System of the Republic of Croatia (CEZIH). Credentials to access the data in a hospital or other facility not being an integral part of the CEZIH are issued by the manager of the institution's information system. An individual, a health care user, can access a part of

their health data in CEZIH (so-called eKarton) via credentials of the Central State Portal and the National Identification and Authentication System (NIAS). In the future, in accordance with regulations (including the Patient Rights Protection Act), the health care user should be given access to his EHR.

An authorized person for access to data from the EpHR is the health care user, or the health professional to whom the health care user allows access to his/her data.

Any access to the EHR must be evidenced: who joined the EHR, when and on what basis. If the health care user has allowed access to their EHR, this must be recorded in the EHR access log. Data on any access must be available to the health care user.

Standardization

In limiting the diversity of products, processes, and services, ensuring their compatibility and interoperability as well as in finding the most appropriate solutions, standardization, particularly international standards, have an important role. Together with international standardization bodies (ISO, CEN, HL7, etc.) and related technical committees (e.g., Technical Committee for Standardization in Health Informatics at the Croatian Standards Institute, HZN/TO215) the standardization of EHR / EMR / EpHR requires the participation of professional bodies/associations in the field of medicine, health care and professional bodies/associations in the field of ICT.

Special emphasis should be put on the role of associations of health professionals (medical profession, nursing, etc.) which should define the content and format of data in the EHR / EMR / EpHR. Both primary and secondary use of data should be kept in mind when defining the content and format of data. This means that the cooperation of various health professions is necessary (e.g., when it comes to a diabetic patient, the cooperation of diabetologists, GPs and public health doctors is necessary - treatment, registration, reports, monitoring the quality of work, scientific research, etc.). Useful suggestions can also be expected from other professions such as medical informaticists and other ICT professionals.

It is necessary to consider the application of universal medical language, nomenclatures, and classifications in the development of EHR and EMR. Data protection should also be ensured by applying international standards on the protection of medical and health data related to health care users.

Legal regulations and certifications

Any activity in the field of e-health, including the development and improvement of EHR, should be regulated appropriately. The bases of e-health legislation should be contained in the Act on Health Care. The basic issues that such a law should contain are: (1) clear e-health terminology (EHR, EMR, EpHR), (2) who is in charge and responsible for a particular activity in the development and improvement of EHR and purposeful primary and secondary use of data from EHR (institutes, professional societies), (3) who has an overview and supervision (including the certification process of the EHR system) over the implementation of the EHR.

All EHR management subsystems involved in the Croatian health care system must be certified. The certification of the EHR management system should be performed at the national level and include both technical and functional, as well as semantic, process and business readiness of the system for inclusion in the Croatian health system. The list and detailed content of technical, functional, semantic, process and business (primarily professional) requirements that must be

met by the EHR management system in the certification process should be adopted at the national level and regulated by a bylaw.

Ethics

Ethics include ethical codes of conduct for medical/health professions related to personal and other information about the health care user (e.g., the Code of Medical Ethics and Deontology), but also the Code of Ethics for Health Informatics Professionals developed by the International Medical Informatics Association (IMIA) (16).

Code of ethics should primarily regulate the confidentiality of data on health care users.

The supervisory authority over the development of EHR

The system of supervision over the development or improvement of the EHR should be entrusted to the Supervisory Authority for eHealth (STeZ) as defined in the Declaration on eHealth.

Namely, in accordance with the Declaration:

> *"The strategy, construction and supervision of the health information system must be entrusted to an institution - the umbrella institution (institute, agency, office, etc.) operating at the national level."*

The explanation states:

> *"Everything outlined in this Declaration cannot happen only spontaneously and with the cooperation of the current entities in health care and beyond. It is necessary to establish an institution in charge of building and supervising the national health information system. Such an institution must be an umbrella, i.e. (1) that no one can do anything with public money outside that institution, (2) that it must be independent, and (3) that it must have a significant budget for the needs of central health informatics development (according to relative criteria in developed countries)".*

This approach was confirmed in the Strategic eHealth Development Plan, in February 2015 (17). As the EHR is a fundamental component of the HIS, this supervisory authority should organize the construction and supervise the development or improvement of the EHR.

Useful information related to the application of ICT in healthcare, especially for the construction and use of EHR, can be found in many documents from various countries. We highlight one of the more recent reports contained in a document from England (18).

Conclusion

The implementation of the Guidelines for improving the electronic health record will achieve the meaning and usefulness of the electronic health record in its primary and secondary use.

According to the Guidelines:

- Only one EHR, one EpHR and several EMRs belong to any health care user; parts of the EHR do not need to be physically located in the same place, but they must be linkable via the identification attribute of the healthcare user under certain authentication rules.

- Each EMR contains data collected at health facilities (PHC, polyclinics, hospitals, public health settings, etc.); data are collected by health professionals, by direct entry or transfer from devices producing that data.
- The EpHR data are collected and used by health care user; data are entered directly or transmitted from devices that produce that data.
- The EHR data must be available only to authorized persons; the concept of authorized person should be defined by-laws; the EHR data should be protected on three sides: technically, by regulations and codes of ethics, and in line with international initiatives (certification, EU regulations, standards, etc.)
- The EHR (and its parts) must meet both the primary and secondary use; the primary use is referring to the individual (diagnosis, therapy, vaccination, health care, etc.); the secondary use is referring to groups, i.e., the population in care, improving the quality of work in health care, the effects of preventive activities, as well as financing and scientific research.
- Both the content and format of EHR data should be defined by professional associations of health professionals, and ICT professionals who should find the appropriate technological solution.
- The strategy and development of EHR, as well as supervision from all aspects, should be entrusted to an umbrella institution operating at the national level; according to the Strategic Plan for eHealth Development, it can be the Central Body for eHealth.

The improvement of EHR should take place in stages, in accordance with existing knowledge, technological innovations, and financial possibilities.

The Guidelines for improving the electronic health record are not compulsory. They should be understood as the framework for the development of an EHR system able to meet the needs of all health care stakeholders, support health professional work, and enable continuous improvement of quality at all levels of health care, by contributing to preserving and improving the health of all health care users.

Contribution of the authors

All authors participated in the design of the paper. JK made the concept of the paper, the first text with the titles of the chapters, made schemes for individual chapters and coordinated the work on the manuscript. All authors participated in discussions, writing, and refinement of the paper. BBM, IH, BT, GR, KL, SV made initial texts on the secondary use of data from the electronic health record. PP worked on a text on information security. JK, PP, KL, KF, IH worked on searching the literature on the topic. All authors read the full text and agreed with the final version of the paper.

Annex

The secondary use of EHR data

The secondary use of EHR data of health care users primarily means deriving indicators that reflect:

- quality of work
- an argument for intervention like
    - improving the quality of work
    - work organization
    - additional education of health professionals
- evaluation of the intervention (e.g., patient outcomes based on the intervention carried out by the health care professionals)
- any research leading to new knowledge relevant to medicine and health care system, health professionals and health care users.

The secondary use of EHR data includes the possibility for early warning and response, for example, in case of an onset of acute infectious diseases with epidemic potential.

General practitioner (GP) and EHR

The GPs must be able to evaluate the quality of their own work based on data from the EHR. They must also be able to conduct research in a systematic, independent and documented way. From the data in the EHR, the doctor must be able to find out at any time (for the general population and for the patients registered with their practice):

- The prevalence of certain risk factors for chronic and other diseases and the modes of care
- The prevalence of chronic and other diseases and the modes of care.

1. Risk factors for chronic diseases

Insight into the prevalence of certain risk factors for chronic diseases, the mode of their care, as well as the connection of risk factors with the already established chronic non-communicable diseases:

a. population involvement in risky behavior (smoking, physical activity, diet, use of alcohol and opiates),
b. constitutional risk factors of the population (demographic indicators, anthropometric measurements),
c. other risk factors: hypertension, diabetes, hyperlipoproteinemia,
d. the social environment of the population.

The proportion of patients on whom diagnostic treatment was applied according to accepted guidelines (obliges the profession to define guidelines for the treatment of several major diseases),

The proportion of patients who received preventive measures for chronic diseases (stool for occult bleeding, mammography, breast ultrasound, vaccination against HPV virus, influenza, pneumonia),

Insight into the kind of treatment (pharmacological - number / polypharmacy / and type of drugs, and non-pharmacological treatments), in accordance with the recommendations of the accepted guidelines:

a. the dynamics of change in risk factors in relation to the treatment and the proportion of people with treatment results
b. allergies to certain drugs - anamnestic, clinically or laboratory proven (the origin of the data is important, because data on allergies are often based on the testimony of the patient or doctor, without a proven background, which may ultimately harm the patient),
c. side effects and interactions of individual drugs,
d. insight into use of non-prescription drugs (OTC drugs),
e. insight into other complementary or alternative treatments

2. Identified chronic diseases

Prevalence of identified chronic diseases according to the International Classification of Diseases (ICD), the method of treatment and the connections between lifestyle, risk factors and chronic diseases,

Proportion of patients on whom diagnostic treatment was applied according to accepted guidelines (obliges the profession to define guidelines for processing some major diseases),

Insight into the choice of treatment - pharmacological and non-pharmacological (number and type of drugs /poly-pharmacy, poly-pragmatism /), in accordance with accepted guidelines:

a. dynamics of change of chronic disease by treatment,
b. allergies – anamnestic, clinical or laboratory proven (the origin of data is important because data on allergies are often based on the testimony of the patient or doctor, without a proven background, which may ultimately harm the patient),
c. side effects and interactions of individual drugs,
d. use of OTC drugs,
e. complementary and alternative treatments.

3. Acute conditions

a. insight into acute conditions and diseases according to ICD,
b. correlation with demographic indicators and vaccination,
c. the association of acute condition and chronic disease management.

4. Frequency of antibiotic use

a. relationship between the antibiotic administered and the diagnosis,
b. the type of antibiotic and length of treatment,
c. correlation with demographic indicators,
d. allergic reactions to antibiotics and their side effects,
e. interaction of antibiotics with other drugs.

Today, some elements of the above are addressed through panels - parts of the electronic medical record (EMR) of each patient in primary care.

Specialist-consultative health care (ScHC) and EHR

ScHC includes diagnosis, treatment and rehabilitation of patients. Our goal is to formulate the secondary information arising from EHR that is needed by specialists and other health professionals:

1. Frequency of diagnoses in ScHC (code entered according to ICD) by age, sex, type of occupation, socio-economic status (work organization, procurement of equipment, etc.),
2. Frequency and types of tests with certain diagnoses (cost rationalization in order to avoid unnecessary tests),
3. Relationship between normal and pathological findings resulting from diagnostic procedures in ScHC,
4. Prevalence of risk factors for the development of chronic diseases in patients in SCHC according to demographic characteristics, type of occupation and socioeconomic status,
5. Evaluation of interventions aimed to risk reduction,
6. Types and number (relative/absolute) of prescribed drugs according to diagnoses (whether doctors follow the guidelines, effectiveness of individual drugs),
7. Types and number of diagnostic, therapeutic and rehabilitation procedures - according to demographic characteristics,
8. Relationship between SCHC doctors and GPs in patient care,
9. Correlation of types and frequency of side effects with recommended treatments,
10. Cancellation of outpatient procedures - according to the reason of the cancellation and the type of procedure.

Hospital health care and EHR

Secondary information obtained from the hospital's EHR has the following objectives:

- achieve patient safety
- help doctors and nurses to improve the quality of care
- monitor changes in the health system (*Agency for Healthcare Research and Quality. Advancing Excellence in Health Care*. Available at: http://www.ahrq.gov/index.html).

The following are examples of information derived from EHR data that can contribute to achieving these goals.

All medical activities with inpatients

1. Restraining according to duration, reasons and onset:
   a. the total number of patients restrained
   b. the total number of patients restrained more than once,
   c. the total duration of restraint in hours.

2. Falls:
    a. the total number of documented falls,
    b. falls according to cause - the patient's condition; reaction to treatment, procedure, anesthesia; risky environment; other reasons,
    c. the number of falls that caused the injury,
    d. patients who have fallen twice or more.
3. Bedsore:
    a. the total number of patients with newly developed bedsores,
    b. number of patients admitted with bedsores: total number; stage; the unit of previous residence (other department, house, other institution),
    c. prevalence by the number of localizations,
    d. according to stage (I-IV),
    e. according to localization (sacrum; sciatic bone; trochanter; calcaneus; malleolus; scapula; occiput; other),
    f. incidence of multiple bedsores.
4. Multidrug-resistant organisms:
    a. the overall incidence of MRSA,
    b. incidence of MRSA on surgical wounds,
    c. the overall incidence of Clostridium difficile,
    d. the overall incidence of VRE (Vancomycin-resistant enterococcus).
5. Successful cardiopulmonary resuscitation:
    a. survival 48 hours after resuscitation,
    b. by location (ward, emergency tract, intensive care unit, other).
6. Personnel exposure incidents:
    a. by location (in the ward, in a hospital clinic, in the emergency department),
    b. by type of staff (nurses, doctors, other staff).

Surgical activities

1. Infection of surgical wounds - according to the procedures,
2. Antibiotic prophylaxis - according to time,
3. Peri-operative mortality - according to the procedures,
4. Unplanned re-hospitalization - according to time,
5. Unplanned hospitalization after an outpatient procedure - according to the procedures,
6. Unplanned return to the intensive care unit - according to the procedures and time,
7. Unplanned return to the operating room - according to the procedures,
8. Deep venous thrombosis and pulmonary thromboembolism after surgery - according to the procedures,
9. Pre-operative thrombo-prophylaxis - according to the procedures.

Intensive care or nursing units

1. Use of central venous catheter, ventilator, permanent urinary catheter,
2. Infections related to the use of the central venous catheter; ventilator; permanent urinary catheter,
3. Nosocomial infections (MRSA, etc.):
    a. bacteremia in the central venous catheter,
    b. ventilator-associated pneumonia,
    c. symptomatic urinary tract infection with a permanent catheter.

Units using sedation and analgesia (intensive care units, endoscopy, emergency department, angiography room, radiology).

Complications after sedation and analgesia:

1. according to the unit,
2. according to the type of complication - oxygen de-saturation, aspiration, airway obstruction, sudden drop in systolic blood pressure, etc.

Emergency Medical Service (EMS)

1. Length of treatment according to duration and outcome - hospitalization, admission to the intensive care unit, other,
2. Degree of urgency,
3. Unplanned return to EMS:
    a. according to time, outcome and diagnosis,
    b. the number of patients with two or more returns to EMS within 30 days,
4. Leaving the EMS before the end of treatment - the percentage of patients,
5. Change of approach to the patient due to radiological findings - the percentage of patients whose access to treatment was changed due to radiological findings, method of treatment, degree of urgency, etc.

Psychiatry

1. Self-harm - per 1000 discharges, per 1000 days of hospital stay,
2. Suicide attempt - per 1000 discharges; per 1000 days of hospital stay,
3. Suicide - per 1000 discharges, per 1000 days of hospital stay,
4. Physical assault - per 1000 discharges, per 1000 days of hospital stay,
5. Escape - per 1000 discharges, per 1000 days of hospital stay,
6. Transfer to an acute psychiatric care unit,
7. Re-hospitalization according to the time of occurrence,
8. Measures of physical restraint (tying, clamping):
    a. number of procedures - per 1000 discharges, per 1000 days of hospital stay, per 100 patients,
    b. the number of patients in whom the measure was used two or more times in one stay.

9. Isolations:
    a. number of isolations - per 1000 discharges, per 1000 days of hospital stay,
    b. duration,
    c. number of patients with two or more isolations during the same hospitalization.

Nursing and EHR

The nursing documentation contains information that provides quality control of planned and implemented health care and is an integral part of the patient's medical documentation, i.e., EHR. Patronage healthcare is an example area of nursing in which electronic documentation helps to provide high quality care. Clear, concise, and thorough record-keeping of the patronage health is crucial because nurses are health professionals who sometimes the patient only encounters in their home, so encouraging documentation at the place of care ensures that the data important for treatment are not missed or forgotten.

Whether the documentation relates to an individual, a group, or community, it gives a clear picture of:

- the needs and goals of the individual, group, or community
- undertakings based on assessment need
- results and outcomes of implemented interventions
- knowledge and skills of health care providers, possible shortcomings of health care, and opportunities to improve the quality of health care.

The obligatory part of the nursing documentation contains:

- nursing history
- nursing diagnoses and patient characteristics
- monitoring the patient's condition during hospitalization and continuous monitoring of procedures
- medical-technical and diagnostic procedures
- continuous monitoring of the patient's condition
- health care plan
- list of nursing procedures performed
- discharge letter of health care.

From these data much secondary information can be obtained:

1. Proportion of nursing records containing all required parts, i.e., those that lack some of the parts (e.g., anamnesis, diagnosis, nursing procedures, etc.) - in order to ensure the continuity of care,
2. Proportion of patients by categorization – for better organization of nurses' work, i.e., ensuring enough nurses for quality patient care, and justifying the need for nursing staff,
3. Number of procedures or interventions by type and in relation to the plan,
4. Success of implemented interventions,
5. The outcome of care by the caregiver,
6. Recorded incidents.

It is possible to find out from the constant monitoring of the patient's condition what procedures are administered to the patient and by whom. We can track the duration of a particular procedure and which procedures are commonly most administered to the patient.

Public health needs and EHR

The functions of operational public health are:

- Health monitoring to identify and address community health needs,
- Diagnosing and examining community health problems and health risks,
- Evaluation of effectiveness, availability, and quality of health care for both personal and health organizations and sub-populations of interest for public health,
- Early identification of population health threats and rapid response (EWRS).

The public health administrator and employee should automatically receive this information from EHR:

1. Prevalence and incidence of diseases and conditions according to age, gender, socio-economic status, year of occurrence, geographical location,
2. Vaccination by age, gender, socio-economic status, year of occurrence, geographical location,
3. Disability by age, gender, socio-economic status, year of occurrence, geographical location,
4. Response to national (or regional) preventive programs by age, gender, socio-economic
5. status, year of occurrence, geographical location,
6. Relationship between incidence and response by age, gender, socio-economic status, year of occurrence, geographical location,
7. Frequency of side effects of treatment and vaccination according to age, gender, socio-economic status, year of occurrence, geographical location,
8. Mortality by age, sex, socio-economic, status, year of occurrence, geographical location,
9. place of death,
10. Register needs - entry and exit from the register - re-reason for registration.

Health Insurance and EHR

The insured person needs to obtain the following information from the electronic health record:

1. Health services provided according to:
   a. Institutions and medical discipline
   b. Health care workers in institutions and disciplines,
   c. Recipient's insurance status,
   d. Codes of procedures and disciplines,
   e. Codes in the ICD and disciplines,
   f. Documentation provided by health service,
2. Consumption of ampoules of drugs by discipline,
3. Sick leave.

The description of the necessary information from the EHR depends on the content of the Contract for the provision of health care made between the insured and the health care provider.

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Važnost informacijske pismenosti za upravljanje zdravstvenim sustavom Republike **Hrvatske**

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U ovom radu objašnjava se važnost informacijske pismenosti za upravljanje informacijskim zdravstvenim sustavom. Radi se o tome da je informacijska pismenost menadžmenta, a to znači prepoznavanje potrebnih informacija, poznavanje efikasnog načina dolaženja do njih, strukturiranje informacija u novo znanje te diseminacija informacija onima kojima su potrebne, preduvjet bez kojeg nema ovladavanja menadžmenta s informacijskom tehnologijom. Drugim riječima, bez informacijskog opismenjavanja menadžmenta, on nije u mogućnosti pravilno valorizirati ulogu informatičke tehnologije u poslovanju, ne može ju kvalitetno uporabiti kako bi ona zaista bila podrška u odlučivanju.

U ovom radu predložen je pristup ovladavanja informacijskom tehnologijom od strane menadžmenta preko primjene okvira COBIT. Isto tako predstavljeno je istraživanje u kojem se kroz ispunjavanje kontrolnih ciljeva unutar svakog COBIT procesa može odrediti stupanj zrelosti ovladavanja menadžmenta s informacijskom tehnologijom, a time i stupanj njihove informacijske pismenosti.

Ključne riječi: informacijska pismenost menadžmenta; ovladavanje informacijskom tehnologijom; COBIT; CMM

Uvod

Tijekom posljednjih dvadesetak godina računala i dostupnost informacija postaju sastavni dio zdravstvenog sustava u Hrvatskoj. Informacijska pismenost u zdravstvu je specijalnost koja integrira zdravstveno područje, znanje o računalima te područje informacijskih sustava prilikom prepoznavanja, prikupljanja, obrade i korištenja podataka i informacija u zdravstvenoj praksi, administraciji, menadžmentu, edukaciji, istraživanju i širenju znanja.

Cilj je ovim radom ukazati na ulogu i značaj informacijske pismenosti za upravljanje zdravstvenim sustavom. Ona je neophodna menadžmentu radi donošenja djelotvornih i učinkovitih odluka. Te odluke mogu biti takve ukoliko menadžment ovlada informacijskom tehnologijom, tj. stvori uvjete da informacijska i komunikacijska tehnologija bude podrška u odlučivanju.

Ovladavanje informacijskom tehnologijom

Kako bi informacijsko-komunikacijska tehnologija (1) bila podrška u poslovanju, menadžment bi trebao odgovoriti na sljedeća pitanja:

- Je li nam informacijska tehnologija/informacijski sustavi (IT/IS) važni u poslovanju? Zašto i u kojoj mjeri nam treba IT/IS?
- Koja je poslovna vrijednost IT/IS? Koji su rizici korištenja IT/IS?

- Kakva je kvaliteta usluge koju IT/ IS nudi?
- Kako učinkovito i optimalno koristiti IT/IS u organizaciji?
- Što ćemo (možemo li) bez IT/IS? Kako (koliko) uložiti u IT/IS?
- Koliki je povrat ulaganja u IT/IS?
- Je li trenutna informacijska infrastruktura usklađena s potrebama i ciljevima poslovanja?
- Znamo li odrediti prioritetne IT/IS projekte i možemo li procijeniti njihov doprinos poslovanju?
- Može li naša informacijska infrastruktura odgovoriti i budućim potrebama poslovanja?
- Koja IT/IS misija, ciljevi, strategije i arhitektura su nužni da bi IT/IS bio podrška budućem poslovanju?
- Koristimo li IT/IS na način da prikupimo relevantne informacije, znamo li ih uopće prepoznati, staviti ih u međusobni odnos i dijeliti ih s drugima?

Drugim riječima, menadžment treba upravljati informacijskom tehnologijom na razini ustanove, tj. treba ovladati informacijskom tehnologijom. Cilj ovog rada je pokazati kako se to može provesti.

Ovladavanje informacijskom tehnologijom je skup tehnika i metoda kojima najviši menadžment u potpunosti razumije i kontrolira primjenu informatike u poslovanju, ali i preuzima odgovornost za provedbu informatičkih procesa i svih aktivnosti. Kako bi menadžeri mogli ovladati informacijskom tehnologijom trebali bi biti informacijski pismeni. Ovladavanje informacijskom tehnologijom definirana je kao jedna od vještina unutar SFIA okvira (*Skills Framework for the Information Age*) (2). SFIA je okvir u kojem su definirana potrebna znanja vještine i kompetencije za profesionalce koji rade u informacijskim i komunikacijskim tehnologijama, softverskom inženjerstvu i digitalnoj transformaciji. Taj pristup bi se mogao prilagoditi za ovladavanje informacijskom tehnologijom u zdravstvu, ali u ovom radu nastoji se afirmirati drugačiji pristup. Cilj je pokazati da se informacijska pismenost bitna za upravljanje zdravstvenim sustavom može dostići preko ovladavanja informacijskom tehnologijom, a ovladavanje informacijskom tehnologijom moguće je postići preko COBIT-a. Ovladavanje informacijskom tehnologijom obuhvaća:

- povezivanje poslovne strategije i strategije informatike (*Strategic Alignment*),
- informatiku kao funkciju koja stvara novu vrijednost (*Value Delivery*),
- optimalno ulaganje i dobro upravljanje kritičnim informatičkih resursima – ljudima, mrežom, podacima, aplikacijama, projektima, infrastrukturom (*Resource Management*),
- razumijevanje i upravljanje rizicima u organizaciji, ‘corporate appetite for risk’; treba stvoriti sustav stalnog praćenja razina rizika, odrediti protumjere za izbjegavanje ili smanjivanje rizika (*Risk Management*),
- praćenje performansi poslovanja i mjerenje uspješnosti - provedbe strategije, projekata, praćenje performansi poslovnih procesa i/ili usluga, itd. (*Performance Measurement*).

Kako ovladati informacijskom tehnologijom

Postoje različiti okviri ili “dobre prakse” (3) ovladavanja informacijskom tehnologijom od strane menadžmenta u zdravstvu. U ovom radu prikazat će se jedan od okvira uz pomoć kojeg

se može provesti ovladavanje informacijskom tehnologijom - COBIT (akronim od *Control Objective for Information and related Technolgy*) i to verzija 4.1. Dakle metoda ovladavanja informacijskom tehnologijom koja je ovdje prikazana je COBIT 4.1 .

COBIT je okvir upravljanja informacijskom tehnologijom koji ima za cilj:

- da informacijska tehnologija bude strateški partner u poslovanju,
- da informacijska tehnologija omogući postupnu integraciju poslovanja, nove poslovne mogućnosti, brze prilagodbe promjenama, reakcije na nove izazove u poslovanju,
- informacijska tehnologija mora dati poslovodstvu informacije koje će mu omogućiti djelotvornije i učinkovitije poslovanje.

COBIT je*n*astao 1992. godine pod okriljem dvije organizacije: *Information Systems Auditand Control Association* (ISACA) i *IT Goverment Institute* (IGI). COBIT omogućuje menadžerima, nadzornicima, korisnicima informacijske tehnologije da imaju skup mjera, indikatora, procesa i primjera (najbolja praksa) koji im pomažu da maksimalno iskoriste prednosti informacijske tehnologije te razviju prikladno upravljanje i kontrolu nad poslovnim procesima u svojim organizacijama.

COBIT nudi šansu da informatika ne bude samo donositelj informacijskih usluga već strateški partner u poslovanju. Njezina ključna uloga je da omogući kontrolu svih procesa vezanih uz informacijsku tehnologiju, da ih usmjerava prema stalnoj provjeri i sigurnosti izvedbe. Cilj COBIT-a je upravljanje poslovnim uslugama i trebao bi riješiti tzv. suficit informacijske tehnologije, tj.nedovoljno iskorištenu informatiku, a s druge strane treba osigurati da informatika može podržati zahtjeve poslovnog sustava (treba onemogućiti deficit informacijske tehnologije).

Osnovne značajke COBIT-a

COBIT podržava ovladavanje informacijskom tehnologijom (IT) tj. upravljanje poslovnim procesima (eng. IT governance) tako što donosi okvir unutar kojeg prezentira domene, procese, aktivnosti na upotrebljiv i logičan način. Okvir se sastoji od četiri osnovne domene i 34 procesa unutar domena. Domene su:

1. *Planiranje i organiziranje.* Ova domena odnosi se na strategiju i taktiku, tu se definira najbolji način na koji IT može doprinositi ostvarenju poslovnih ciljeva.
2. *Akvizicije i implementiranje.* Ovdje je predmet interesa realizacija strategije. Definiraju se IT rješenja, razvijaju se i obogaćuju, implementiraju se i integriraju u poslovni proces.
3. *Isporučivanje i podrška.* Ova domena odnosi se na isporuku zahtijevanih usluga, što uključuje samu isporuku, upravljanje sigurnošću i kontinuitetom, podršku za uslugu prema korisniku, upravljanje podacima i operativne usluge.
4. *Nadzor i ocjenjivanje.* S vremenom svaki IT proces treba se kontrolirati da li radi prema korisničkim zahtjevima. U okviru ove domene upravlja se izvedbom, nadgleda se interna kontrola i reguliraju se procesi.

Kroz ove četiri domene i 34 procesa u okviru tih domena COBIT ostvaruje svoju svrhu, a to je da bude podrška ostvarenju poslovnih usluga. No, osim što je usmjeren na procese, COBIT je fokusiran na posao, usmjeren na kontrolu i pokretan je mjerenjima. Fokusiranje COBIT-a na posao znači da on nije alat samo za donositelje IT usluga, korisnike i kontrolore već on predstavlja jasan vodič menadžerima i vlasnicima poslovnih procesa. To je tako jer su kvalitetne informacije ključne za odlučivanje, a upravljanje i kontrola informacija srž su COBIT-a. COBIT osigurava da informacije budu učinkovite, djelotvorne, povjerljive ukoliko je to

potrebno, dostupne, zakonite, sigurne i provjerene. COBIT je usmjeren na kontrolu i to kroz kontrolne ciljeve kojima se osigurava kvalitetno odvijanje svakog od 34 procesa. Osim ciljeva koji se odnose samo na određeni proces, postoje i globalni ciljevi koji se istovremeno odnose na sve procese u svim domenama. COBIT je pokretan mjerenjima. To znači da se unutar COBIT-a primjenjuju mjerenja uspješnosti ostvarenja ciljeva i procesa. Konkretno primjenjuje se CMM (*Capability Maturity Model*) model određivanja razine zrelosti određenog IT procesa kako bi se odredilo stanje u kojem se proces trenutno nalazi kao i potreba za unapređenjem. Postoji početna razina (kada proces još ne postoji) i pet daljnjih faza zrelosti.

Osnovni COBIT (3) princip je sljedeći: na osnovi poslovnih zahtjeva pokreću se investicije u IT resurse. IT resursi se koriste u IT procesima. IT procesi isporučuju informacije o poslovanju. Te informacije o poslovanju odgovaraju na zahtjeve korisnika. Kroz ovaj princip podržava osnovna područja upravljanja poslovanjem: strateško poravnavanje (veza između poslovnog i IT plana; definiranje, održavanje i vrednovanje IT vrijednosti, usklađivanje IT i poslovnih operacija), isporuka vrijednosti (osiguranje da IT isporučuje informacije vrijedne za poslovanje, a u skladu sa strategijom), upravljanje resursima (optimalno investiranje u resurse), upravljanje rizicima (zahtjeva se svjesnost postojanja rizika od strane menadžmenta, razumijevanje potrebe da rizika mora biti jer bez njega nema napretka, dogovor oko značajnih rizika, definiranje odgovornosti za rizike u organizaciji), mjerenje izvedbe (prati implementaciju strategija, izvođenje projekata, upotrebu resursa, izvođenje procesa i isporuku IT usluga; za praćenje se koristi (*Balanced Scorecard – BSC metoda*).

Koncept cilja u COBIT-u je od ključne važnosti. Tu postoji hijerarhija ciljeva. Na najvišoj razini je poslovni cilj. On se ostvaruje kroz IT ciljeve. Svaki IT cilj realizira se kroz ostvarenje ciljeva procesa. Svaki cilj procesa se sastoji od niza ciljeva aktivnosti. Indikator ostvarenja svakog cilja u COBIT-u se zove mjerilo rezultata (u ranijim verzijama je to bio tzv. ključni indikator cilja). Mjerilo rezultata pokazuje da li je neki cilj ostvaren ili nije. Ono se uvijek koristi nakon događaja. Uz cilj i njegovo ostvarenje vezani su i indikatori izvedbe (ranije ključni indikatori procesa). Indikatori izvedbe pokazuju da li ima šanse da se neki cilj ostvari. On pokazuje zapravo sposobnost nekog procesa da ostvari cilj pa se ponekad zove i pokretač izvedbe (npr. u BSC).

Zbog hijerarhije ciljeva, ista stvar koja je na višoj razini bila mjerilo rezultata, na nižoj razini postaje indikator (pokretač) izvedbe.

U COBIT-u svaki IT proces ima određenu strukturu prikaza. Postoje četiri dijela prikaza:

Prvi dio:

Prikazani su informacijski kriteriji (kakve informacije moraju biti),

Koji poslovni zahtjev, IT proces zadovoljava,

Kroz ostvarenje kojih ciljeva IT proces zadovoljava poslovni zahtjev,

Koje aktivnosti IT proces poduzima za ostvarenje cilja,

Kako se mjeri ostvarenje cilja,

Koje poslovno područje unutar upravljanja poslovanjem IT proces primarno obrađuje, a koje sekundarno podržava,

Koje IT resurse proces koristi za ostvarenje cilja.

Drugi dio:

Sadrži kontrolne ciljeve za ostvarenje svrhe IT procesa.

Treći dio:

Sadrži ulaze u i izlaze iz procesa (to su aktivnosti iz različitih domena), tzv. RACI matricu koja pokazuje od kojih se aktivnosti sastoji IT proces te tko je odgovoran za pojedinu aktivnost, na koga se računa, tko se konzultira, a tko informira; (*Responibile, Accountable, Consulted, Informed*); u kontekstu informacijske pismenosti menadžmenta ova metoda ukazuje na potreban intenzitet informacijske pismenosti – onaj tko je odgovoran za određenu aktivnost treba biti u većoj mjeri informacijski pismen, od onoga tko je tek informiran o određenoj aktivnosti

U RACI matrici se vide i funkcije koje su potrebne za ispunjenje svrhe IT procesa (uprava, šef informatike, izvršni direktor, poslovođa, djelatnik, voditelj projekta…)

Primjer RACI matrice (3):

RACI Chart — **Functions**

Activities	CEO	CFO	Business Executive	CIO	Business Senior Mangement	Head Operations	Chief Architect	Head Development	Head IT Administration	PMO	Compliance, Audit, Risk and Security
Determine risk management alignment (e.g., assess risk).	A	R/A	C	C	R/A	I					I
Understand relevant strategic business objectives.		C	C	R/A	C	C					I
Understand relevant business process objectives.				C	C	R/A					I
Identify internal IT objectives, and establish risk context.					R/A		C	C	C		I
Identify events associated with objectives (some events are business-oriented [business is A]; some are IT-oriented [IT is A, business is C]).	I			A/C	A	R	R	R	R		C
Assess risk associated with events.				A/C	A	R	R	R	R		C
Evaluate and select risk responses.	I	I	A	A/C	A	R	R	R	R		C
Prioritise and plan control activities.	C	C	A	A	R	R	C	C	C		C
Approve and ensure funding for risk action plans.		A	A		R	I	I	I	I		I
Maintain and monitor a risk action plan.	A	C	I	R	R	C	C	C	C	C	R

A **RACI** chart identifies who is **R**esponsible, **A**ccountable, **C**onsulted and/or **I**nformed.

Četvrti dio:

Model zrelosti IT procesa prema CMM (3) modelu.

1. *Proces ne postoji.* Nema informacijske pismenosti menadžmenta. Organizacija ne vodi računa o posljedicama informacijske nepismenosti na poslovanje (posljedica je ranjivost i neizvjesnost projekata). Informacijska nepismenost nije identificirana kao rizik tj. nešto bitno za ostvarenje i isporuku IT servisa.
2. *Proces je u početnoj fazi (ad hoc).* Potreba za informacijskom pismenošću se promatraju od slučaja do slučaja. Postoji neformalna procjena stupnja informacijske pismenosti ovisno o projektu i voditelju projekta. Procjena ponekad postoji, ali nije formalni zadatak menadžera. Specifični rizici informacijske nepismenosti kao što su sigurnost, dostupnost, integritet ponekad se ispituju. Informacijska pismenost se rijetko spominju na sastanku uprave. Postoji svijest da su rizici vezani uz nedovoljnu informacijsku pismenost menadžmenta opasni i da bi ih se trebalo ozbiljno razmotriti.
3. *Proces je u ponavljajućoj ali intuitivnoj fazi.* Postoji razvijen pristup procjene informacijske pismenosti na razini projekta i njime se bave projektni menadžeri.

Upravljanje rizikom nedovoljne informacijske pismenosti menadžmenta primjenjuje se samo u velikim projektima i reaktivno tj. kao odgovor na problem. Postoje postupci informacijskog opismenjavanja kroz proces cjeloživotnog učenja.

4. *Proces je definiran.* Organizacija definira upravljanje procesom informacijskog opismenjavanja, definira se način procjene i kada se on obavlja. Upravljanje s informacijskim opismenjavanjem slijedi određeni postupak koji je dokumentiran. Postoji trening i dostupan je osoblju. Proces smanjenja rizika od informacijske nepismenosti je definiran Odgovornost za informacijsko opismenjavanje menadžmenta ugrađena je u opis posla.
5. *Proces je upravljiv i mjerljiv.* Procjena informacijskog opismenjavanja je standardna procedura. Izuzeci od procedure upravljanja informacijskog opismenjavanja prijavljuju se pomoćniku uprave zaduženom za kvalitetu. Upravljanje procesom informacijskog opismenjavanja je odgovornost uprave. Menadžment razmatra strategije smanjenja rizika.
6. *Proces je optimiziran.* Proces informacijskog opismenjavanja je strukturiran, proširen je u svim segmentima organizacije, procesi su dobro definirani i upravljani. Primjenjuju se dobre prakse kroz cijelu organizaciju. Obuhvat, analiza i izvješćivanja o informacijskom opismenjavanju je visoko automatizirana. Postoje vodiči za informacijsko opismenjavanje. Menadžment kontinuirano procjenjuju strategije informacijskog opismenjavanja.

Informacijska pismenost i upravljanje zdravstvenim sustavom

Informacijska pismenost (4-8), u užem smislu, je sposobnost prepoznavanja potrebe za određenim informacijama, pronalaženje informacije, njihovo strukturiranje (stavljanje u međusobni odnos) radi stvaranja novog znanja te prosljeđivanje informacija onima kojima su potrebne. Alat uz pomoć kojeg menadžment u zdravstvu ostvaruje svoju informacijsku pismenost jest integrirani informacijski sustav koji podržava poslovne procese unutar medicinskih ustanova (npr. bolnice) te poslovne procese između različitih informacijskih sustava.

Informacijska pismenost u širem smislu, o kojoj govori Anemaree Lloyd (9) razmatra informacijski krajolik (krajobraz) koji se sastoji od društvenog (socijalnog) prostora, fizičkog prostora i prostora koji se bavi razinom znanja (presjekom istina i vjerovanja).

1. Prostor koji se bavi razinom znanja temelji se na informacijama koje su istinite, dokazive i objektivne. To su pravila, zakonitosti koje vrijede u svakodnevnom životu. Informacije su ovdje zapisane.
2. Socijalni prostor ispunjen je neopipljivim informacijama koje nisu zapisane. To su društvene norme, konvencije, prakse koje se izvode u određenim sredinama.
3. Fizički prostor ispunjen je informacijama koje dajemo okolini vlastitim tijelom (izgled, geste npr.).

Sva tri opisana prostora međusobno su isprepletena i moraju se promatrati kao cjelina ukoliko želimo neku osobu proglasiti informacijski pismenom.

Iz ove perspektive gledano pitanje je kako znati da li je menadžer u zdravstvu informacijski pismen? Nije dovoljno samo formalno obrazovanje. Ono pokriva samo prostor koji se bavi razinom znanja (tzv. epistemiologiju). Menadžer treba:

- imati formalno obrazovanje o menadžmentu (prostor koji se bavi razinom znanja – ovo može dobiti kroz formalno obrazovanje),
- imati „neopipljivo“ znanje o navikama djelatnika, njegovim reakcijama na kritiku/ pohvalu, načinu razmišljanja uposlenika, o organizacijskoj kulturi (socijalni prostor – to je znanje koje menadžer stječe kroz vrijeme, tj. iskustvom),
- znati prepoznati fizičke reakcije djelatnika; na osnovu reakcija znati prepoznati da li je sve u redu ili ne (fizički prostor - dijelom do znanja može doći formalnim obrazovanjem, ali neophodna je i praksa).

Prema Lloydu, informacijski pismen menadžer mora znati doći do informacija, mora znati procijeniti njihovu vrijednost, treba znati pravilno zaključivati na osnovu dobivenih informacija te podijeliti dobivene informacije (informacijska pismenost u užem smislu) – ali sve to mora ostvariti uzimajući u obzir ne samo formalno znanje već i socijalni i fizički prostor djelatnika.

Informacijska pismenost u užem i širem smislu temelj je ovladavanja menadžmenta s informacijskom tehnologijom, a to je opet neophodno da bi se stvorili uvjeti da informacijsko - komunikacijska tehnologija bude podrška u odlučivanju. Menadžmentu u zdravstvu trebao bi biti cilj učinkovito i djelotvorno upravljanje uz pomoć informacijsko komunikacijske tehnologije, a za to je neophodno da bude informacijski pismen.

Upravljanje zdravstvenim sustavom (10,11) vrlo je izazovno i zahtijeva mnogo menadžerskih vještina od kojih su najvažniji: upravljanje ljudskim resursima, sposobnost kvalitetne komunikacije, upravljanje informacijama, motiviranje, upravljanje financijama i strateško planiranje. Za sve te vještine neophodna je informacijska pismenost menadžmenta.

Postavljaju se pitanja:

- kakva je situacija danas u svezi informacijske pismenosti menadžmenta?
- da li menadžeri u zdravstvu posjeduju znanja, vještine i kompetencije povezane s informacijskom pismenošću?

To se svakako treba istražiti.

Neophodna istraživanja

Područje koje izučava važnost informacijske pismenosti menadžmenta u upravljanju zdravstvenim sustavom je nedovoljno istraženo. Potrebno je utvrditi spremnost menadžmenta u zdravstvu da se informacijski opismeni i ovlada informacijskom tehnologijom. Navedeno je neophodno kako bi se definiralo postojeće stanje te kako bi se na osnovu toga predložila poboljšanja. Postojeće stanje opisat će se tzv. modelom CMM tj. modelom zrelosti za utvrđivanje stupnja informacijske pismenosti menadžmenta i njihovog ovladavanja informacijskom tehnologijom.

Cilj istraživanja je utvrditi stupanj zrelosti zdravstvenog menadžmenta da se informacijski opismeni i ovlada informacijskom tehnologijom.

Metoda istraživanja je anketa koja bi se provodila putem upitnika. Anketirale bi se dve grupe menadžmenta: članovi uprave zdravstvenih ustanova s jedne strane te voditelji informatike s druge strane (CIO). Anketa bi se zasnivala na 4 domene COBIT-a. Prve dvije domene (Planiranje i organiziranje; Akvizicije i implementiranje) bi se odnosile na članove uprave bolnice, a druge dvije (Isporučivanje i podrška; Nadzor i ocjenjivanje) na voditelje informatike. Kroz anketu utvrdio bi se broj ciljeva koji su ispunjeni u svakom od 34 poslovna procesa.

Primjer pilot istraživanja provedenog u bolnici “X” je sljedeći:

PODRUČJE	Procesi	Ispunjenost kontrolnih ciljeva	Razina zrelosti
Planiranje i organiziranje	Strateško planiranje	2/ 6	2
	Definiranje informacijske arhitekture	1/ 4	2
	Određivanje tehnoloških smjernica	2/ 5	2
	Definiranje IT procesa, organizacije i odnosa	5/ 15	2
	Upravljanje IT investicijama i troškovima	2/ 5	2
	Komuniciranje prema menadžmentu	2/ 5	2
	Upravljanje ljudskim resursima	3/ 8	2
	Upravljanje kvalitetom	2/ 6	2
	Upravljanje i procjena rizika	1/ 6	1
	Upravljanje projektima	2/ 4	3
Nabavka i implementacija	Određivanje mogućih rješenja	2/ 4	3
	Nabava i održavanje aplikacijskih programa	4/ 10	2
	Nabava i održavanje tehnološke arhitekture	2/ 4	3
	Korištenje i funkcionalnost rada (obrade)	3/ 4	4
	Nabava IT resursa	3/ 4	4
	Upravljanje promjenama	3/ 5	3
	Instalacija i odobravanje rješenja i promjena	5/ 9	3
Isporuka i podrška	Definiranje i upravljanje razinama usluga	2/ 6	2
	Upravljanje vanjskim uslugama	1/ 4	2
	Upravljanje performansama i kapacitetom	2/ 5	2
	Osiguranje kontinuiteta usluga	2/ 10	1
	Sigurnost sustava	2/ 3	4
	Određivanje i dodjela troškova	2/ 4	3
	Izobrazba i trening korisnika	6/ 11	3
	Podrška korisnicima	2/ 5	2
	Upravljanje konfiguracijom	1/ 3	2
	Upravljanje problemima i incidentima	1/ 4	2
	Upravljanje podacima	3/ 6	3
	Upravljanje pomoćnom opremom	2/ 5	2
	Upravljanje operacijama (obradom)	2/ 5	2
Nadzor i ocjenjivanje	Nadzor i procjena IT performansi	1/ 6	1
	Nadzor i procjena internih kontrola	1/ 7	1
	Sukladnost s zakonskim i drugim normama	2/ 5	2
	Korporativno upravljanjem IT-om	2/ 7	2

Kriterij za određivanje razine zrelosti: broj ispunjenih kontrolnih ciljeva u odnosu na ukupni broj kontrolnih ciljeva unutar određenog COBIT procesa. Skala za određivanje zrelosti:

Postotak ispunjenosti ciljeva	Razina zrelosti
0 %	Ne postoji / 0
1 -20 %	Inicijalna/ 1
21 – 40 %	Ponavljajuća/ 2
41 – 60 %	Definirana/ 3
51 – 80 %	Upravljana/ 4
81 – 100 %	Optimizirana/ 5

Ovdje se radi o CMM metodi. Gleda se postotak ispunjenosti kontrolnih ciljeva u svakom poslovnom procesu te se dolazi do sljedećeg zaključka:

Ovladavanje informacijskom tehnologijom bolnici X je na 2. razini. Ono je ponavljajuće, ali intuitivno. To znači da postoje određeni definirani i dokumentirani procesi koji se koriste u svakodnevnom radu, ali oni nisu određeni na nivou cijele organizacije (ne odvijaju se na isti način svugdje, u svim dijelovima organizacije). Postoje upravljanje zahtjevima, projektima. Vodi se računa o nabavi svega što je neophodno za isporuku IT usluge. Nastoji se raditi u skladu s politikama poslovanja.

Gore opisano istraživanje je bitno kako bi se identificiralo postojeće stanje. Razina zrelosti 2 je nezadovoljavajuća i treba poduzeti radnje kako bi bolnica bila bolja. Plan razvoja informacijske tehnologije treba biti bolje povezan s poslovnim ciljevima. Iz hipotetskog istraživanja se vidi da je domena „Nabavka i implementacija“ relativno dobra, ali ostale domene imaju prostor za napredak. Kada bi se detaljno proučavali rezultati uvidjelo bi se da je ispunjenost ciljeva u svim poslovnim procesima nezadovoljavajuća. „Nekvalitetna procjena i upravljanje IT rizicima“ npr. je vrlo loš vođen proces jer je ispunjen samo jedan cilj od mogućih 6 dok je npr. „Nepostojanje obuke krajnjih korisnika“ dosta dobro jer je ispunjeno tri od ukupno četiri kontrolna ciljeva.

Zaključak

Informacijska pismenost u užem i u širem smislu neophodna je za upravljanje zdravstvenim sustavom iz razloga jer omogućuje menadžmentu ovladavanje informacijskom tehnologijom tj. omogućuje im da stvore uvjete kojima omogućuju da informacijsko - komunikacijska tehnologija bude podrška u donošenju odluka tj. djelotvornom i učinkovitom upravljanju zdravstvenim sustavom. To je posebno važno danas kada svaka ušteda s jedne strane i povećanje prihoda s druge strane su izuzetno bitni. U oba spomenuta izazova, informacijska pismenost može pomoći jer omogućuje pravovremeno prepoznavanje, dolaženje do, obradu i diseminaciju informacije kako bi odluke u određenom trenutku bile optimalne.

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Iskustvo medicinske sestre s bolničkim zdravstvenim informacijskim sustavom

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Bolnički informacijski sustav je program kojim se podiže kvaliteta rada u bolničkoj ustanovi, kvaliteta skrbi i brži oporavak, sprečavaju se komplikacije te se povećava zadovoljstvo i sigurnost bolesnika. Pojava pandemije korona virusne bolesti je usporila uvođenje sestrinske dokumentacije, koja je sada na provjeri u Komori medicinskih sestara. Radna skupina educiranih i kompetentnih medicinskih sestara izradila je sestrinsku dokumentaciju. Bez obzira na trenutnu situaciju, zdravstveni informacijski sustav pruža mnoštvo mogućnosti koje već sada koristimo u svakodnevnom radu.

Ključne riječi: bolnički informacijski sustav; sestrinstvo; sestrinska dokumentacija

Uvod

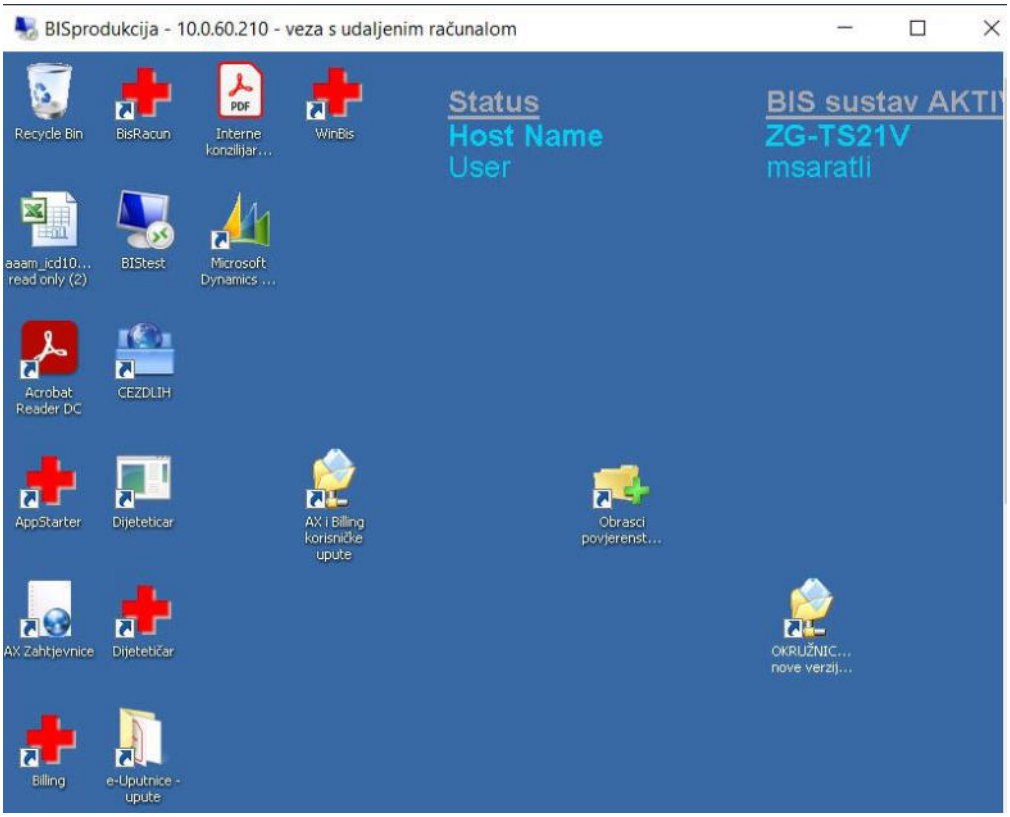
Radim u bolničkom sustavu, na Odjelu za pedijatrijsku intenzivnu medicinu, Klinike za pedijatriju, KBC-a Zagreb. Trenutno sam na radnom mjestu Glavne sestre odjela. Dugi niz godina sam radila kao voditelj smjene i jako dobro se sjećam samih početaka uvođenja bolničkog informatičkog sustava (BIS-a). Imali smo kratko, informativno predavanje gdje se od nas tražilo da izradimo sastavnice kako bismo mogli unositi potrošni materijal i provedene postupke (STAC). Odjel dječje intenzivne medicine koristi puno različitih lijekova i potrošnog materijala. Provodimo brojne i raznolike intervencije i postupke. Odmah smo počeli raditi „sastavnice“ a nismo bili svjesni koliko je to zahtjevan posao. Sastavnice su nam predstavili kao skup potrošnog materijala i lijekova koji se koristi pri nekoj određenoj intervenciji i zahvatu koji se obavlja na odjelu a provode ga zdravstveni djelatnici. Pri samo jednoj intervenciji, koristi se jako puno potrošnog materijala i lijekova. Sve je trebalo povezati u sastavnicu i na taj način se prilikom unošenja postupaka odmah evidentira i sve utrošeno, upisujući i količinu. Tješila nas je spoznaja da ćemo ubuduće imati lakši unos svih tih podataka koristeći jednu ili dvije tipke na računalu. To nas je ohrabrivalo. Dosta brzo smo sve to i uspjeli odraditi sa željom da se sve što prije implementira u sustav. Kod pokušaja unošenja podataka shvatila sam da je to puno jednostavnije nego ručno unošenje, zbrajanje, određivanje kategorije bolesnika i sl. Postupno smo neke stvari naknadno nadograđivali. Moram priznati da mi je bilo zanimljivo a tako je i danas.

Pedijatrijski odjeli su specifični i uvijek nekako kasne u odnosu na odjele gdje se liječe odrasli. Sporije ide izrada protokola. Postojeći protokoli nisu primjereni za pedijatrijsku populaciju. Za sada Klinika za pedijatriju u KBC-u Zagreb nema kompletno implementiranu E-njegu, nego se i dalje piše ručno u sestrinske liste koje su stare najmanje trideset godina. U međuvremenu smo nadopunjavali i dodavali liste za praćenje koje možemo pisati na računalu ili ručno. E-njega je dio informatičkog sustava za medicinske sestre koje provode složene postupke zdravstvene njege i sve evidentiraju u sestrinsku dokumentaciju. Sestrinska dokumentacija sadrži niz obrazaca s ciljem kontinuiranog praćenja i poboljšanja kvalitete zdravstvene njege.

Pojava pandemije korona virusne bolesti je svakako dodatno usporila uvođenje sestrinske dokumentacije, koja je na provjeri u Komori medicinskih sestara. Radna skupina educiranih i kompetentnih medicinskih sestara izradila je dokumentaciju. Nadam se dobrom rješenju koje će omogućiti kvalitetnije praćenje i skrb naših bolesnika. Bez obzira na trenutnu situaciju, zdravstveni informacijski sustav pruža mnoštvo mogućnosti koje sada koristimo u svakodnevnom radu.

Bolnički informacijski sustav

Bolnički informacijski sustav (BIS) je program kojim se podiže kvaliteta rada u bolničkoj ustanovi, kvaliteta skrbi, brži oporavak, sprečavaju se komplikacije te se povećava zadovoljstvo i sigurnost bolesnika. Svakodnevno koristim BIS na svom radnom mjestu. Na ekranu su vidljivi zapisi svih pacijenata koje možemo rasporediti po sobama. Iz sustava se mogu dobiti svi administrativni i medicinski potrebni podaci o pacijentu, primjerice starosna dob, dijagnoza i sl. U svrhu praćenja i prevencije bolničkih infekcija, BIS je izvrsna platforma za brzu i kvalitetnu provjeru mikrobiološkog statusa. Uvidom u nalaze, možemo pravovremeno poduzeti mjere prevencije prijenosa infekcije, izolirati pacijenta ili poduzeti druge potrebne radnje. Sustav nam omogućuje pristup svim podacima o pacijentu ali nas isto tako obvezuje na zaštitu osobnih podataka koji su regulirani zakonom (1). Za ulaz u BIS sustav, potrebna nam je šifra koja se mijenja svaka tri mjeseca. Program nas sam traži promjenu.



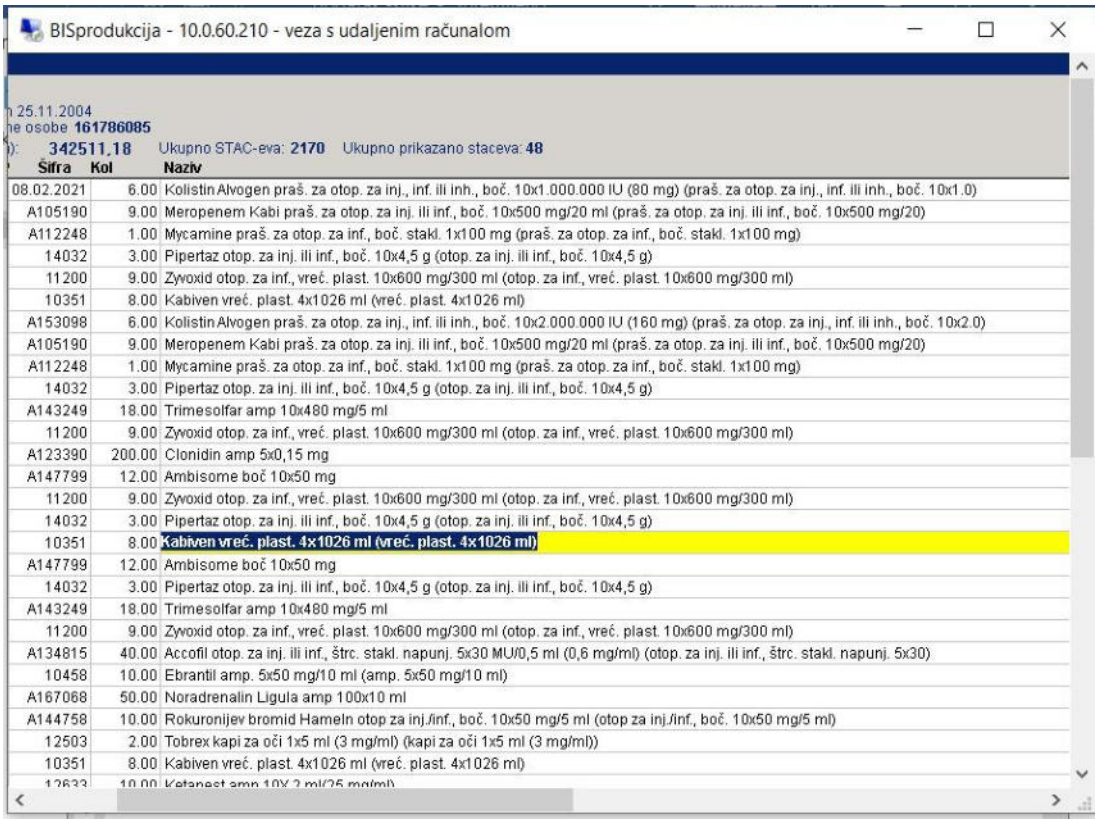
Slika 1. Ekran BIS-a

Ovisno o stručnoj spremi i funkciji, imamo i određene ovlasti u pristupu informacijama. Liječnik specijalist ima pristup anamnezi specijalista s drugih Klinika, dok ostali nemaju. Liječnici obično ne znaju kako se dijete zove, koliko je teško i slično. U tim situacijama je

telefon od velike važnosti, pa ako još znamo i otkud je prijem, uspijemo sve saznati. Naravno, potreban je utrošak određenog vremena. Medicinske sestre voditeljice smjene imaju mogućnost pristupa AX zahtjevnicama (zahtjevnice za ljekarnu), mogućnost premještaja pacijenata na druge klinike. Ako se pokaže potreba za dodatnim ovlastima može ih se dobiti uz pismeno odobrenje predstojnika klinike. U BIS vodim evidenciju rada medicinskih sestara. Postupak evidencije je jednostavan, lako se može provjeriti status radnih sati za svakoga od nas. Točan je, precizan je, automatski zbraja i raspoređuje prijepodnevni, popodnevni i noćni rad. Svakako je lakše i brže nego bez informatizacije. Može se provjeriti ukupan prijam pacijenata, raspoređen po dijagnozama u određenom vremenskom razdoblju i puno drugih mogućnosti što olakšava svakodnevni rad. Lakše se planira prijam i otpust (2). U svrhu istraživanja, BIS omogućava brz pristup informacijama, raznim izvješćima. Bilo bi poželjno omogućiti eksportiranje podataka u Excel i dalje u programe za statističku obradu podataka. Na taj način bi pregled bio još bolji i brži. Nažalost, medicinska sestra u bolnici ima jako malo vremena za istraživanje i sudjelovanje u istraživačkom radu.

Evidencija postupaka i materijala

Za svakog pacijenta svakodnevno unosim potrošnju materijala, lijekova i provedenih postupaka (STAC). Sustav je jednostavan i efikasan. U svakom trenutku se može vidjeti potrošnja u određenom vremenu i svakako je preciznija i vjerodostojnija nego kod okvirnog „obračunavanja“ kako se to radilo ranije.



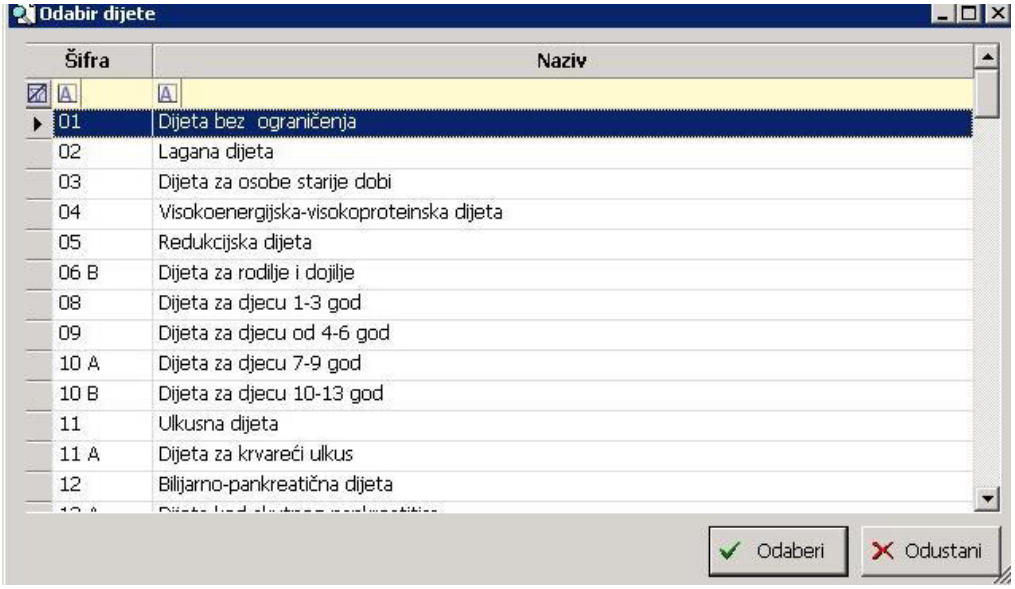
Slika 2. Prikaz unosa STAC-ova

Dobra strana je što se sve može nadopuniti, izmijeniti, provjeriti ili obrisati. Samo je važno sve pohraniti, odnosno izabrati opciju „zapamti“. Ovim načinom unosa podataka imamo precizan uvid u potrošnju materijala, efikasnije i racionalnije se unosi potrošnja, prikazuje se stvarno

stanje kako za naš odjel tako i za sve ostale odjele i djelatnosti. Svakodnevni unos podataka omogućuje bolji nadzor i praćenje (3). Prikazuje se ukupan broj unesenih materijala i ukupan utrošak. STAC-ovi i DTS su međusobno povezani na način da se unosi onaj utrošak koji je i stvarno prikazan u DTS-u što znači da je za određeni dijagnostičko medicinski postupak upotrijebljen određeni potrošni materijal i lijek. Otkad je BIS u uporabi jako rijetko se dogodi da nam iz Hrvatskog zavoda za zdravstveno osiguranje (HZZO) dođe povrat računa zbog nepravilnog unosa obračuna. Ako i vrate račun onda je to zbog nepravilnog unosa glavne liječničke dijagnoze koja nije odgovarajuća poveznica s DTS postupkom. Ranije bi po dvije osobe iz HZZO-a dolazile na reviziju ukoliko je njima izgledalo previše potrošenog materijala. Tražili bi hrpu papira od nekoliko kilograma za određenog pacijenta koji je dugo boravio u bolnici. Zajedno bi prolazili utrošak, brojili, množili utrošeni materijal po danu boravka i to bi obično trajalo jedno prijepodne. Svaki put mi je to stvaralo izuzetnu neugodu iako je to bila samo provjera, trebalo se objasniti i obrazložiti sve upisano.

Dijetetika

Aplikacija u BIS-u omogućuje centralno naručivanje prehrane za pacijente. Nudi se izbor širokog spektra dijeta i dijetetskih pripravaka ovisno o starosnoj dobi, navikama i zdravstvenom stanju. Da bi kvalitetno odradili odabir dijete potrebno je unijeti tjelesnu težinu i visinu. Pri tome sustav sam izračuna indeks tjelesne mase i na taj način odrede se potrebna energetska svojstva. Uz odabir određene dijete imamo odmah opis namirnica i opis hrane kome je i za što namijenjena.



Slika 3. Izbornik dijeta

Nedostatak ove aplikacije je što automatski ne odjavljuje dijetu kad otpustimo pacijenta, već se prvo mora odjaviti dijeta s vremenom otpusta. Mogla bih zaključiti da aplikacija nije u potpunosti integrirana u BIS. To ostavlja lošu sliku o neodjavljenim dijetama a u stvari nismo znali da aplikacija tako funkcionira. Kod premještaja pacijenta između odjela, automatski se poništi i dijeta za tog pacijenta. Mi na odjelu dječje intenzivne nemamo često pacijente na prehrani iz centralne kuhinje ali vjerujem da ovaj način evidencije stvara problem na pojedinim odjelima. Naši koordinatori za informatički sustav su upoznati s tim nedostatkom i očekujemo

rješenje (4). Dok se to ne riješi, na medicinskim je sestrama da i dalje vode pojačanu brigu oko odjave i isporuke dijeta.

Sestrinska dokumentacija

Prema izrađenim smjernicama, sestrinska dokumentacija je opsežna i prilagođena odraslim pacijentima. Aplikacija E-njega još nam nije implementirana, jer čekamo odobrenje od Komore medicinskih sestara. „Otpusno pismo zdravstvene njege“ je jedini obrazac koji nam je dostupan i implementiran u BIS sustavu. Imali smo na uvid papirnati prikaz dokumentacije koji je dosta sličan postojećoj dokumentaciji za odrasle.

Praćenje dekubitusa, stanja boli i slično bit će prilagođeno za pedijatrijsku populaciju i procjenjivat će se prema ljestvicama za djecu. Jedan dio će se sastoji od osnovnih podataka o roditeljima, društvenom statusu, percepciji roditeljstva i odgoju djeteta, emocionalne privrženosti djetetu i emocionalnih poteškoća roditelja.

Osobno smatram da medicinska sestra nije kompetentna za procjenjivanje psihološkog profila roditelja i taj je dio poslan na doradu. Dokumentaciju su radile medicinske sestre koje su dio radne skupine za izradu sestrinske dokumentacije pri Komori medicinskih sestara. Iz Komore smo dobili dokumentaciju na uvid kako bismo je mogli procijeniti, predložiti izmjene i dopune. Ostali dio sestrinske dokumentacije će zadovoljiti potrebe za praćenjem malih bolesnika.

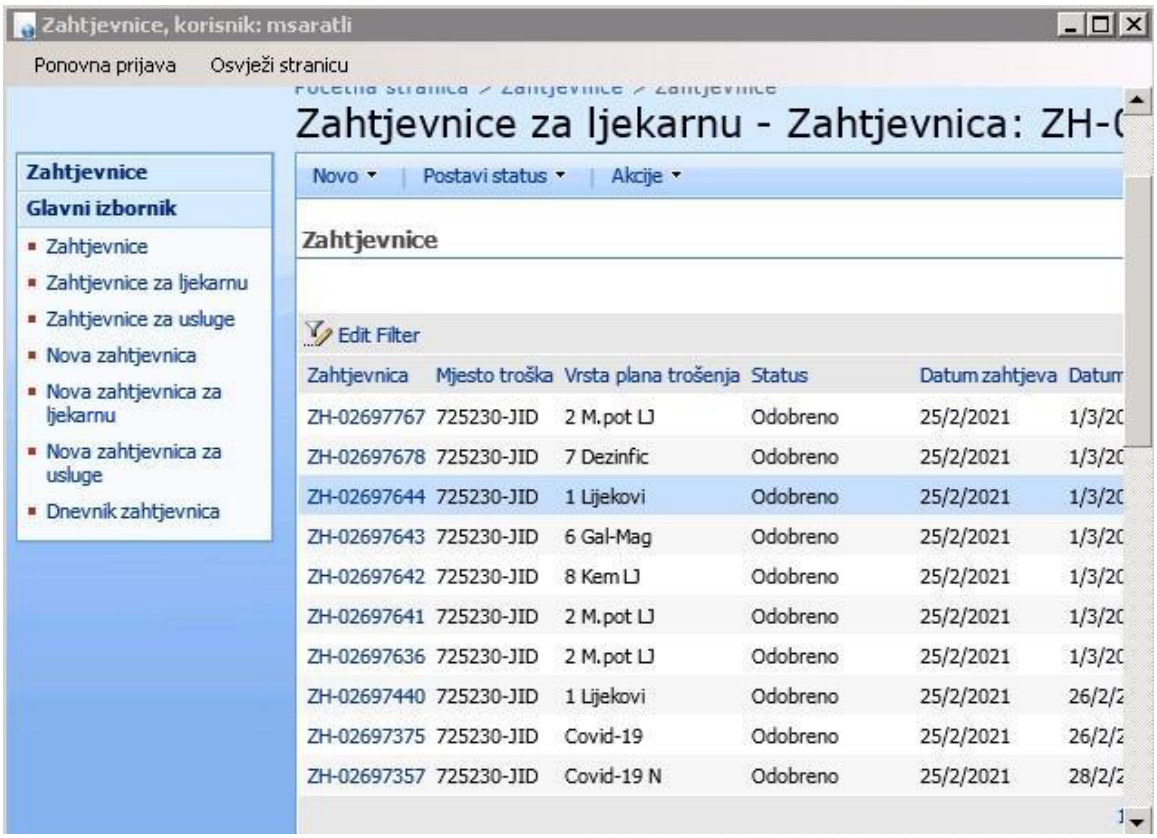
Za pedijatrijsku intenzivnu trebaju specifični obrasci za vođenje liste bilance tekućine, za kontinuirano praćenje neinvazivnih vitalnih funkcija poput pulsa, disanja, tjelesne temperature s dovoljno mjesta za upisivanje svaki sat. Za invazivni monitoring poput centralnog arterijskog tlaka (CAP), centralnog venskog tlaka (CVP), intrakranijalnog tlaka (ICP) na listi nema podataka, te ih je potrebno dodati. Otpusno pismo zdravstvene njege se pokazalo dobro i korisno, ostaje kao kontinuirani pisani trag. Pišemo ga za svakog pacijenta

To je posebno važno za kronične bolesnike, na potpori kisikom, bolesnike nakon traheotomije, s raznim pomagalima. Uvijek imamo uvid u postojeće stanje i od velike koristi je primarnoj zdravstvenoj zaštiti i medicinskim sestrama u patronaži. Omogućava i osigurava bolju skrb za pacijenta. Na pedijatrijskim kongresima se često raspravljalo o palijativnoj skrbi kod djece gdje su upravo patronažne sestre iskazale potrebu za sestrinskim otpusnim pismom pri otpustu

pacijenata iz bolnice. Kad dijete ide s raznim pomagalima kući, kontaktiramo njegovog pedijatra i patronažnu sestru kako bi ih upoznali sa stanjem pacijenta. Sestrinsko otpusno pismo tu ima svoje mjesto. Majka čije je dijete bilo na peritonejskoj dijalizi, nakon edukacije je kod kuće sama provodila postupak dijalize. Zvala nas je i rekla da svakodnevno čita sestrinsko otpusno pismo jer joj daje sigurnost u radu.

Zahtjevnica za ljekarnu

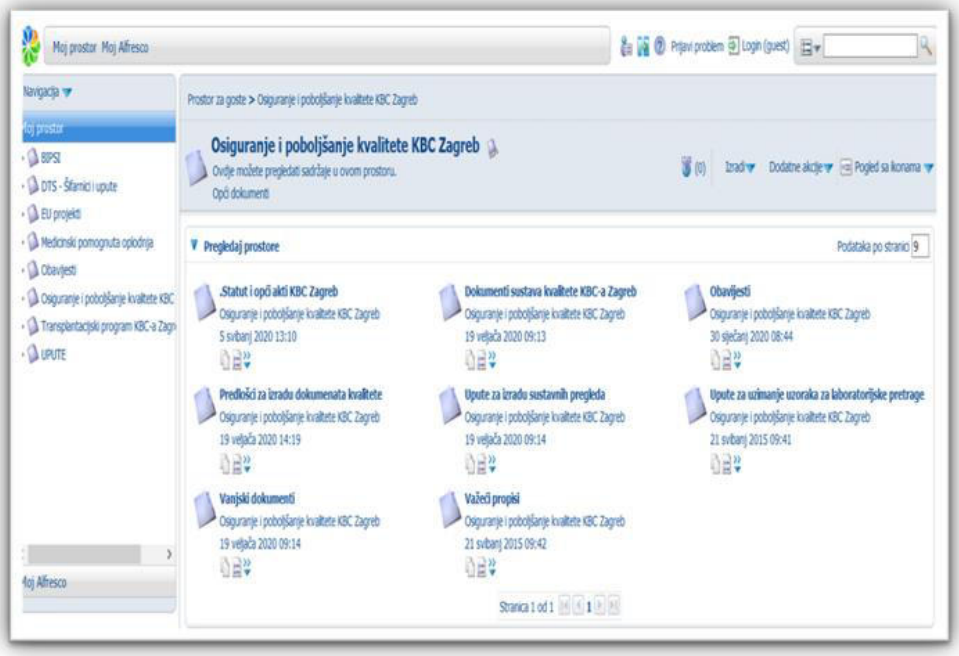
Zahtjevnicu za ljekarnu (AX) prosljeđujem svakodnevno prema ljekarni. Jednostavan je način unosa i traženja potrebnih lijekova i medicinskih proizvoda. Može se kopirati i po potrebi ažurirati (5). Dostupan je status zahtjevnice koji omogućuje pregled i na taj način znamo da li je zahtjevnica u izradi, da li čeka odobrenje ili je odobrena. Nakon odobrenja vidi se status ljekarne iz kojega saznajemo da li je zahtjevnica isporučena, neisporučena ili je djelomično isporučena. Ovisno o statusu možemo preuzeti potrebni materijal i lijekove. Nedostatak aplikacije je u tome što ako nekog proizvoda nema u ljekarni, zahtjev se automatski izbriše i u konačnici ne možete dokazati da ste artikl naručili.



Slika 4. Zahtjevnica za ljekarnu

Alfresko

Alfresko se pokazao kao dobra literatura mlađim kolegicama koje su tek počele raditi. Postupak olakšava edukaciju i omogućava standardizirani postupak za određenu intervenciju. Za sestrinsku struku je važan obrazac „Neželjeni događaji“ pomoću kojeg se isti mogu proslijediti kontroli kvalitete, anonimno ili s imenom i prezimenom. Svrha mu je poboljšanje i održavanje kvalitetne zdravstvene njege. Alfresko je u uporabi od 2008. godine. Dokumente i smjernice izrađuju timovi s voditeljem tima za kontrolu kvalitete. U izradi smjernica sudjeluju tri člana, osoba koja piše smjernice, osoba koja provjerava i osoba koja odobrava smjernice, temeljene na znanstvenim spoznajama. Smjernice se moraju nadograđivati kako bi pratile najnovije spoznaje.



Slika 5. Alfresko

Zaključak

Za uspješnu i učinkovitu primjenu informatike u sestrinstvu potrebno je osigurati educirano osoblje, tehničku opremljenost i programsku potporu. Dodatna edukacija, školovanje medicinskih sestara svakako pridonosi novim tehnologijama. Svjesni smo činjenice da živimo u tehnološki naprednom svijetu i moramo ići u korak s novim izazovima. Iz svoga iskustva mogu reći da se noviteti uspješno nauče ukoliko postoji dobra volja i želja za učenjem i usavršavanjem. Kvalitetna zdravstvena njega je odraz sestrinskog poziva a kvalitetan informacijski sustav pridonosi lakšem načinu rada, ostavlja više vremena za rad uz pacijenta, omogućava pristup svim informacijama na jednom mjestu. Primjenom standardiziranih protokola koje možemo lako naći i provoditi jedinstvene postupke u konačnici će poboljšati kvalitetu rada, skratiti boravak u bolnici, spriječiti razvoj komplikacija od raznih infekcija, sepse i sl. I ne manje važno, smanjiti troškove liječenja. Ono što se može utjecati na kvalitetu je činjenica da medicinskih sestara nema dovoljno, posebno u bolničkom okruženju. Kvalitetan

zdravstveni informacijski sustav poboljšava praćenje i evaluaciju svih dobnih skupina u korist svih naših primatelja usluga, bilo bolesnih ili zdravih.

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Zahvala

Zahvaljujem izv. prof. dr. sc. Kristini Fišter, dr. med. na poticaju i pomoći pri pisanju ovoga osvrta.

Nacionalni registar pružatelja zdravstvene zaštite

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Godišnji provedbeni plan statističkih aktivnosti u Republici Hrvatskoj predviđa istraživanje o ljudskim resursima u zdravstvu. Podatke o zaposlenima kontinuirano dostavljaju poslodavci u zdravstvu. S ciljem unaprjeđenja kvalitete statističkih istraživanja i podrške donošenju odluka o upravljanju i planiranju ljudskih potencijala u zdravstvu, Hrvatski zavod za javno zdravstvo utemeljuje i vodi Nacionalni registar pružatelja zdravstvene zaštite.

Ključne riječi: registar zdravstvenih radnika; registar ustanova u zdravstvu; Hrvatski zavod za javno zdravstvo

Uvod

Jedna od temeljnih djelatnosti Hrvatskog zavoda za javno zdravstvo (HZJZ) je provođenje zdravstveno-statističkih istraživanja, odnosno nadležnost za upravljanje javnozdravstvenim registrima (1). Prema Godišnjem provedbenom planu statističkih aktivnosti Republike Hrvatske provodi se istraživanje o ljudskim resursima u zdravstvu za koje podatke o zaposlenima kontinuirano dostavljaju poslodavci u zdravstvu (2). Radi unaprjeđenja kvalitete statističkog istraživanja i podrške donošenju odluka o upravljanju i planiranju ljudskog potencijala u zdravstvu, HZJZ utemeljuje i vodi registar zdravstvenih djelatnika i ustanova u zdravstvu.

Prema odluci Ministarstva zdravstva iz 2015. godine registar dobiva naziv Nacionalni registar pružatelja zdravstvene zaštite (dalje NRPZZ).

Uspostava NRPZZ-a spominje se u Nacionalnom planu razvoja kliničkih bolničkih centara, kliničkih bolnica, klinika i općih bolnica u Republici Hrvatskoj 2015.-2016. te u Strateškom planu razvoja ljudskih resursa u zdravstvu 2015. -2020. Kao registar NRPZZ se po prvi puta navodi i u samom Zakonu o zdravstvenoj zaštiti („Narodne novine“, broj 100/18) (3).

Strateški plan razvoja ljudskih resursa u zdravstvu navodi da su najvažniji dionici za upravljanjem ljudskim potencijalom u sustavu zdravstva Ministarstvo zdravstva s ključnim državnim zavodima: Hrvatskim zavodom za zdravstveno osiguranje (HZZO) i Hrvatskim zavodom za javno zdravstvo, a uz njih su značajna i druga ministarstva i agencije te posebice strukovne komore te stručna društva (4).

NRPZZ u istraživanju zdravstvenih resursa

U povijesnom i razvojnom smislu, nekadašnje jednogodišnje izvještavanje o broju radnika sa zaposlenjem u zdravstvu, preraslo je tijekom 1990/91. godine u kontinuirano prikupljanje i praćenje podataka putem tada utemeljenog državnog Registra zdravstvenih djelatnika.

NRPZZ nastavlja voditi podatke o svim zdravstvenim radnicima i zdravstvenim suradnicima, dok se o nemedicinskom tj. „administrativno-tehničkom osoblju“ podaci vode samo brojčano - broj stalno zaposlenih krajem godine.

U odrednicama zakonskog okvira, uz Zakon o zdravstvenoj zaštiti, registar spominju Godišnji provedbeni plan statističkih aktivnosti prema Zakonu o službenoj statistici kroz Istraživanje o ljudskim resursima u zdravstvu te posredno (5) i Zakon o podacima i informacijama u zdravstvu (6).

Podatke o radnicima dužne su dostavljati ne samo zdravstvene ustanove u državnom i županijskom vlasništvu, već i sve privatne ustanove, zdravstveni radnici koji samostalno obavljaju privatnu praksu kao i trgovačka društva za obavljanje zdravstvene djelatnosti.

Kao sastavni dio iste relacijske baze podataka pojavljuju se i podaci o zdravstvenim ustanovama, odnosno pružateljima zdravstvene zaštite kao fizičkim i/ili pravnim osobama u zdravstvu. Tako uz podatke o radnicima, registar na temelju preslika rješenja Ministarstva zdravstva o odobrenju za rad, bilježi i osnovne podatke o pružateljima, tj. zdravstvenim ustanovama, ordinacijama i o svim ostalim vrstama samostalnih zdravstvenih jedinica bez obzira na ugovor s Hrvatskim zavodom za zdravstveno osiguranje ili osnivača. Kako za radnike, tako se svakodnevno ažuriraju i pristigli podaci o odobrenju/prestanku odobrenja za rad, promjeni naziva, adrese, vrsti i djelatnosti pružatelja zdravstvene zaštite.

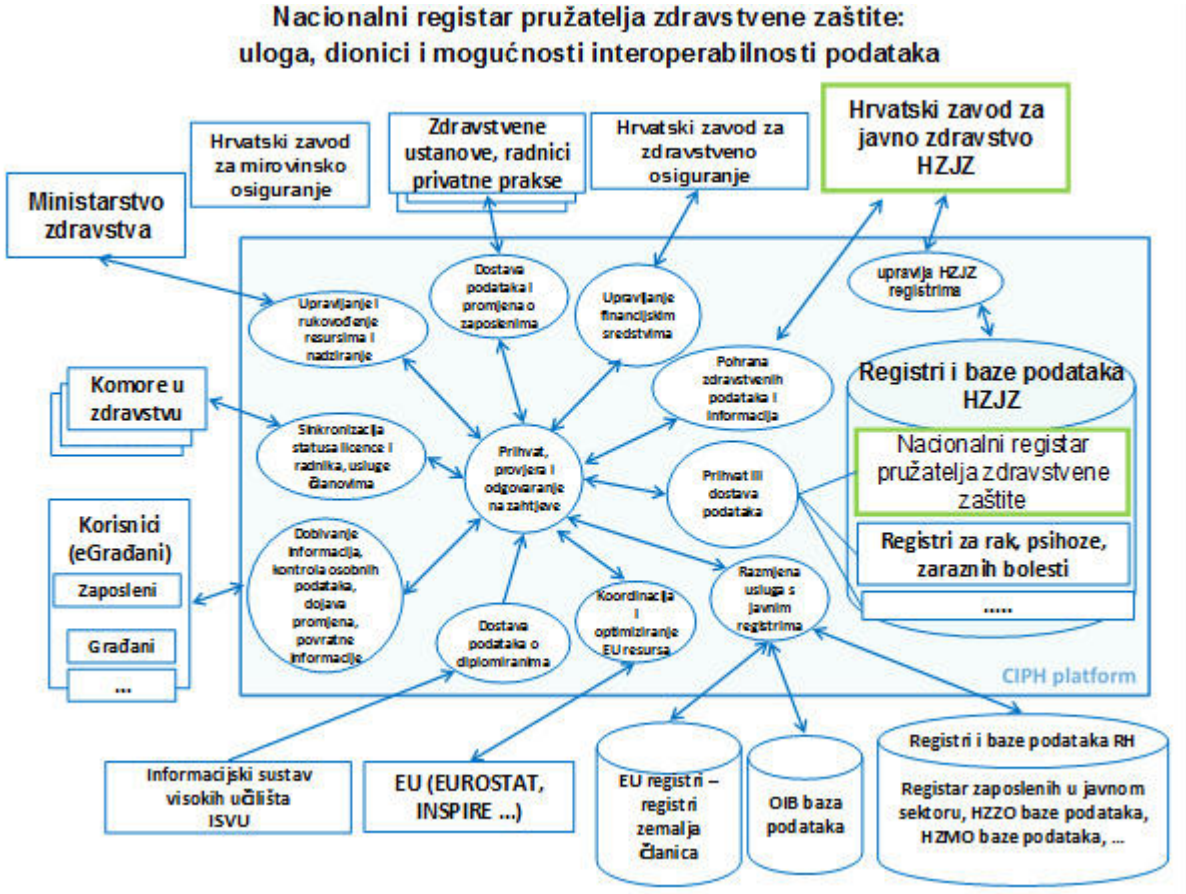
Na taj način se prati i organizacijska struktura zdravstvenog sustava, prema razinama zdravstvene zaštite, vrstama zdravstvenih ustanova, zdravstvenim djelatnostima koje ustanove obavljaju, podjeli s obzirom na vrstu vlasništva odnosno osnivača, kao i prema teritorijalnom ustroju RH.

Prema Strateškom planu razvoja ljudskih resursa u zdravstvu 2015. -2020. godine, uz osnovne podatke o ustanovi, njenom osnivaču, strukturi, kontaktu, odgovornim osobama, odobrenim i ugovorenim djelatnostima, radnicima ustanove, registar bi sadržavao i posteljne kapacitete ustanove, kako za stacionarne odjele/djelatnosti, tako i za dnevne bolnice i jednodnevne kirurgije.

Registarski broj u NRPZZ kao osnova evidencije radnika u zdravstvu

Prvi upis u registar, obično danom zasnivanja radnog odnosa, kao i identifikacija osobe obavlja se kroz povezanost i uvoz osnovnih podataka iz OIB registra. Svim zdravstvenim radnicima se upisom u registar dodjeljuje registarski broj (šifra) kao dodatno „prepoznavanje“ zaposlenika koji je aktivan (u radnom odnosu) unutar zdravstvenog sustava.

Tako registarski broj služi kao osnova za upis u ostale evidencije radnika u zdravstvu. Koristi se u zdravstvenoj dokumentaciji, na faksimilu zdravstvenog radnika te za dodjelu vjerodajnica i kontrolu korisničkih i poslovnih ovlasti (primjerice ovlasti za propisivanje eRecepata, eUputnica) za rad kroz Centralni zdravstveni informacijski sustav Republike Hrvatske (CEZIH).



Slika 1. Nacionalni registar pružatelja zdravstvene zaštite: uloga i dionici

Podaci u NRPZZ

Podaci o dva osnovna entiteta registra, pružatelju zdravstvene zaštite (fizička i/ili pravna osoba) i radniku zaposlenom kod pružatelja zdravstvene zaštite navedeni su u nacrtu pravilnika kojeg na temelju članka 42. stavka 3. Zakona o zdravstvenoj zaštiti („Narodne novine“, broj 100/18), uz prethodno pribavljeno mišljenje nadležnih komora, donosi ministar zdravstva.

Prema Nacrtu pravilnika o sadržaju i načinu vođenja Nacionalnog registra pružatelja zdravstvene zaštite (7), Nacionalni registar je zbirka podataka i informacija o pružateljima zdravstvenih usluga koji je uspostavljen za unaprijed određene javnozdravstvene, upravljačke i/ili znanstvene potrebe i koji se vodi u Hrvatskom zavodu za javno zdravstvo (u daljnjem tekstu: Zavod).

Prema pravilniku, pružatelj zdravstvene zaštite je fizička i/ili pravna osoba u zdravstvu (zdravstvena ustanova, trgovačko društvo za obavljanje zdravstvene djelatnosti, nositelj privatne prakse) koja poduzima odgovarajuće mjere i aktivnosti te pruža zdravstvene usluge za očuvanje i unapređenje zdravlja, sprečavanje bolesti, rano otkrivanje bolesti, pravodobno liječenje te zdravstvenu njegu i rehabilitaciju. Obveznik dostave podataka u Nacionalni registar je uz pružatelja zdravstvene zaštite i Ministarstvo zdravstva, Hrvatski zavod za zdravstveno osiguranje i komore u zdravstvu. Ovlaštena osoba za dostavu podataka je osoba imenovana od obveznika dostave podataka i odgovorna je za dostavu točnih podataka Zavodu. Registarski broj je jedinstveni identifikacijski broj koji dodjeljuje Zavod svakom zdravstvenom radniku i zdravstvenom suradniku pružatelja zdravstvene zaštite i služi kao osnova za upis u ostale

evidencije radnika u zdravstvu te se koristi na faksimilu zdravstvenog radnika kao i za dodjelu vjerodajnica i kontrolu korisničkih i poslovnih ovlasti za rad kroz Centralni zdravstveni informacijski sustav Republike Hrvatske.

Nacionalni registar sadrži podatke o:

- pružateljima zdravstvene zaštite
- djelatnosti pružatelja zdravstvene zaštite
- radnicima pružatelja zdravstvene zaštite

Pružatelji zdravstvene zaštite – fizičke i/ili pravne osobe

Podaci Ministarstva zdravstva:	*Podaci koje dostavlja pružatelj:*
Naziv ustanove	Odgovorna osoba
Naziv nadležne ustanove	Telefon odgovorne osobe
Skraćeni naziv ustanove	E-mail odgovorne osobe
OIB	Telefon
MBS	Fax
Datum otvaranja	E-mail
Datum zatvaranja	Web
Razlog zatvaranja	HZJZ šifra ustanove
Klasa rješenja	
Urudžbeni broj rješenja	*Podaci koje dostavlja HZZO:*
Datum rješenja	HZZO šifra ugovorene ustanove
Županija	
Grad/Općina	
Naselje	
Ulica	
Kućni broj	
Poštanski broj	
Osnivač	

Dodatno predviđeno praćenje posteljnih kapaciteta – akutni /dnevna bolnica /produljeno liječenje /dugotrajno i kronično liječenje te palijativna skrb:

- aktivni broj kreveta po djelatnosti – podatak HZJZ
- maksimalni broj kreveta po djelatnosti – podatak Ministarstva zdravstva

- ugovoreni broj kreveta po djelatnosti – podatak HZZO

Djelatnosti pružatelja zdravstvene zaštite

- Odobrena djelatnost - *podatak Ministarstva zdravstva*
- Datum otvaranja odobrene djelatnosti - *podatak Ministarstva zdravstva*
- Datum zatvaranja odobrene djelatnosti - *podatak Ministarstva zdravstva*
- Ugovorena djelatnost - *dostavlja HZZO*
- HZZO šifra ugovorene djelatnosti - *dostavlja HZZO*

Radnici pružatelja zdravstvene zaštite - dostavlja pružatelj

OIB	Naziv ustanove zaposlenja	Radnih sati/dan
Ime	Nadležna ustanova zaposlenja	Datum prestanka zaposlenja
Prezime	Datum zaposlenja	Razlog prestanka zaposlenja
Spol	Primarno ili sekundarno zaposlenje	Status specijalizacije
Datum rođenja	Temelj pružanja usluge (vrsta radnog odnosa - ugovor o djelu)	Naziv specijalizacije
Državljanstvo	Kumulativno zaposlenje	Naziv uže specijalizacije
Zvanje	Djelatnost zaposlenja	Datum odobrenja specijalizacije
Stupanj stručnog obrazovanja	Dodatna djelatnost zaposlenja	Datum početka specijalizacije
Kratica (zvanje i znanstveno-nastavni stupanj)	Radno mjesto u sistematizaciji	Datum prekida specijalizacije
		Registarski broj radnika

Nemedicinsko osoblje:

- Administrativno osoblje – brojčani podaci krajem godine prema stupnju stručnog obrazovanja

- Tehničko osoblje – brojčani podaci krajem godine prema stupnju stručnog obrazovanja

Dodatno predviđeno za zdravstvene radnike - *dostavljaju komore u zdravstvu:*

- Vrsta licence
- Datum izdavanja licence
- Datum obnavljanja licence
- Datum isteka licence
- Broj licence
- Zemlja diplomiranja

Dodatno predviđeno za nemedicinsko osoblje:

- unos podataka kao i za zdravstvene radnike

Definicije i klasifikacije NRPZZ

Prema usuglašenim definicijama koje koriste Eurostat, WHO i OECD, zdravstvene djelatnike možemo „brojiti“ prema različitim konceptima: „praktičari“, „profesionalno aktivni“ i „licencirani“. Pri tome je najvažniji i najzastupljeniji koncept onaj koji evidentira podatke o djelatnicima koji neposredno pružaju i/ili sudjeluju u procesu pružanja zdravstvene zaštite, rade u djelatnostima zdravstvene zaštite, odnosno koji se odnosi na one sa zaposlenjem u zdravstvenom sustavu (practising healthcare personnel). (8)

Upravo se ti podaci bilježe kroz NRPZZ te je HZJZ izvor i ovlaštena ustanova za dostavu podataka o zdravstvenim radnicima prema međunarodnim tijelima. Najvažnije izvještavanje je prema Eurostat-u, a prema istraživanju o nefinancijskim zdravstvenim pokazateljima (Joint Questionnaire on non-monetary health care statistics) koji se dostavljaju za zajedničku bazu podataka OECD/Eurostat/WHO-Europe.

Informacije NRPZZ

Popis pokazatelja koji se godišnje, rutinski priređuju na godišnjoj razini je podložna promjenama, odnosno uključuju se novi indikatori/definicije, a neki se prestaju prikupljati. (9) Podaci iz NRPZZ o djelatnicima zaposlenim u sustavu zdravstva koji će se dostaviti za 2020. godinu za bazu podataka OECD/Eurostat/WHO-Europe su sljedeći:

Health Employment

- Practising physicians
- Physicians by age group (under 35, 35-44, 45-54, 55-64, 65-74, 75 and over) and by gender
- Physicians by categories:

Generalist medical practitioners

- General practitioners
- Other generalist (non-specialist) medical practitioners

Specialist medical practitioners

- General paediatricians
- Obstetricians and gynaecologists
- Psychiatrists
- Medical group of specialists
- Surgical group of specialists
- Other specialists not elsewhere classified

Medical doctors not further defined

- Practising midwives
- Practising nurses
- Professional nurses
- Associate professional nurses
- Practising caring personnel (personal care workers)
- Practising dentists
- Practising pharmacists
- Physiotherapists

Hospital Employment

- Total hospital employment
- Physicians employed in hospitals
- Professional nurses and midwives employed in hospitals
- Associate professional nurses employed in hospitals
- Health care assistants employed in hospitals
- Other health service providers employed in hospitals
- Other staff employed in hospitals

Health workers and physical resources at regional level

- Physicians at regional level (NUTS2)

Workforce Migration

- Foreign-trained doctors
- Foreign-trained nurses

U suradnji s Hrvatskom liječničkom komorom, Hrvatskom ljekarničkom komorom, Hrvatskom komorom medicinskih sestara, Hrvatskom komorom primalja za istu bazu podataka dostavlja

se broj licenciranih liječnika, ljekarnika, sestara i primalja te brojčani podaci o liječnicima i sestrama koji su školovanje završili u inozemstvu. Također, za ovo istraživanje, Ministarstvo znanosti i obrazovanja dostavlja potrebne podatke o diplomiranim zdravstvenim radnicima.

Uz ove navedene, popis mogućih pokazatelja se nimalo ne iscrpljuje. Izrađuju se razni drugi indikatori i pripremaju drugi detaljniji podaci, primjerice oni prema: stanovništvu, pojedinim zanimanjima, specijalnostima, djelatnostima, vrstama zdravstvenih ustanova, međusobnim omjerima/udjelima, pojedinačnoj dobi, prema županijama, naseljima.

NRPZZ na platformi Nacionalnog javnozdravstvenog informacijskog sustava

NRPZZ je integralni dio Nacionalnog javnozdravstvenog informacijskog sustava (NAJS) te je povezan s dijelom državne informacijske infrastrukture, kao s temeljnim državnim registrima, npr. s OIB registrom Ministarstva financija i s Nacionalnim registrom prostornih jedinica Državne geodetske uprave.

Ostale evidencije i registri, gdje je to smisleno, koriste NRPZZ podatke o zdravstvenim ustanovama i djelatnicima.

NAJS funkcionira razvijen u razvojnoj, testnoj, edukacijskoj i produkcijskoj okolini, ima omogućenu redundantnu arhitekturu, automatsko oporavljenja (recovery) i failover mehanizme, skalabilan je i visoko raspoloživ.

Aplikativnim uslugama za upravljanje NRPZZ-om te ostalim registrima u NAJS-u pristupa se preko Reverse Proxy-a (TAM WebSeal) za identifikaciju i autentikaciju korisnika. Podaci NRPZZ-a se, kao i ostali podaci u NAJS-u, nalaze u Oracle bazi podataka na AIX operativnom sustavu.

NPRZZ je, kao i ostatak NAJS-a, razvijen u programskom jeziku Java u AJAX frameworku i

podržava aplikativni upis i izmjenu podataka, a navedeno je moguće nadograditi razvojem web servisa za prihvat (ili pak slanje) podataka.

Također, NRPZZ predstavlja kontrolni mehanizam većine javnozdravstvenih evidencija, a u cilju je daljnje unapređenje kvalitete podataka o svim pružateljima zdravstvene zaštite, uspostava međuinstitucijske interoperabilnosti, a radi izrade i provedbe politika i mjera usmjerenih k poboljšanju planiranja ljudskih potencijala u sustavu zdravstva u Republici Hrvatskoj.

Razmjena i objava podataka i informacija

Podaci se kao službeni objavljuju u Hrvatskom zdravstveno-statističkom ljetopisu, Statističkom ljetopisu Republike Hrvatske, a NRPZZ je izvor podataka za Statistički ljetopis Grada Zagreba te za ljetopise koje priređuju županijski zavodi za javno zdravstvo.

Ipak, veći dio podataka i informacija se zapravo priređuje za potrebe i razne upite koji nisu u okviru službene ili rutinske zdravstvene statistike.

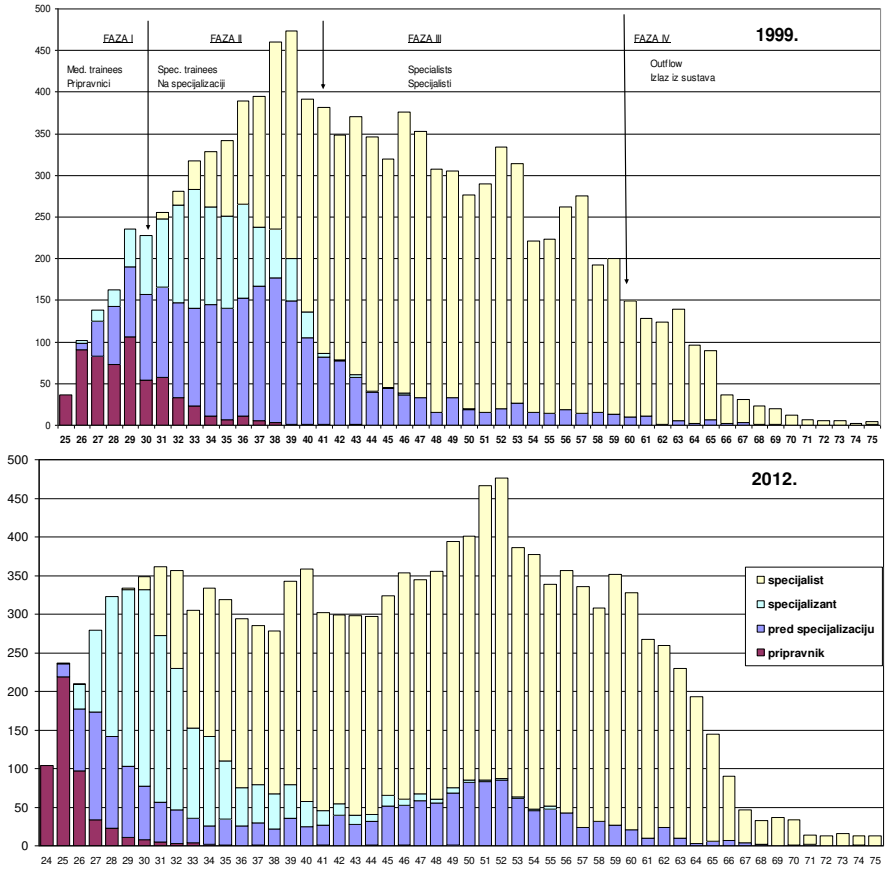
Najviše za nadležno Ministarstvo zdravstva u smislu podatkovne i informacijske podrške i podloga za daljnju analizu i donošenje odluka, kao i za potrebe drugih ministarstava i tijela javne vlasti.

Potraživanja su česta i od međunarodnih organizacija (WHO, UN) za potrebe posebnih istraživanja, kao i istraživača za potrebe izrade stručno-znanstvenih radova, doktorskih disertacija.

Primjeri informacija dobivenih iz NRPZZ-a

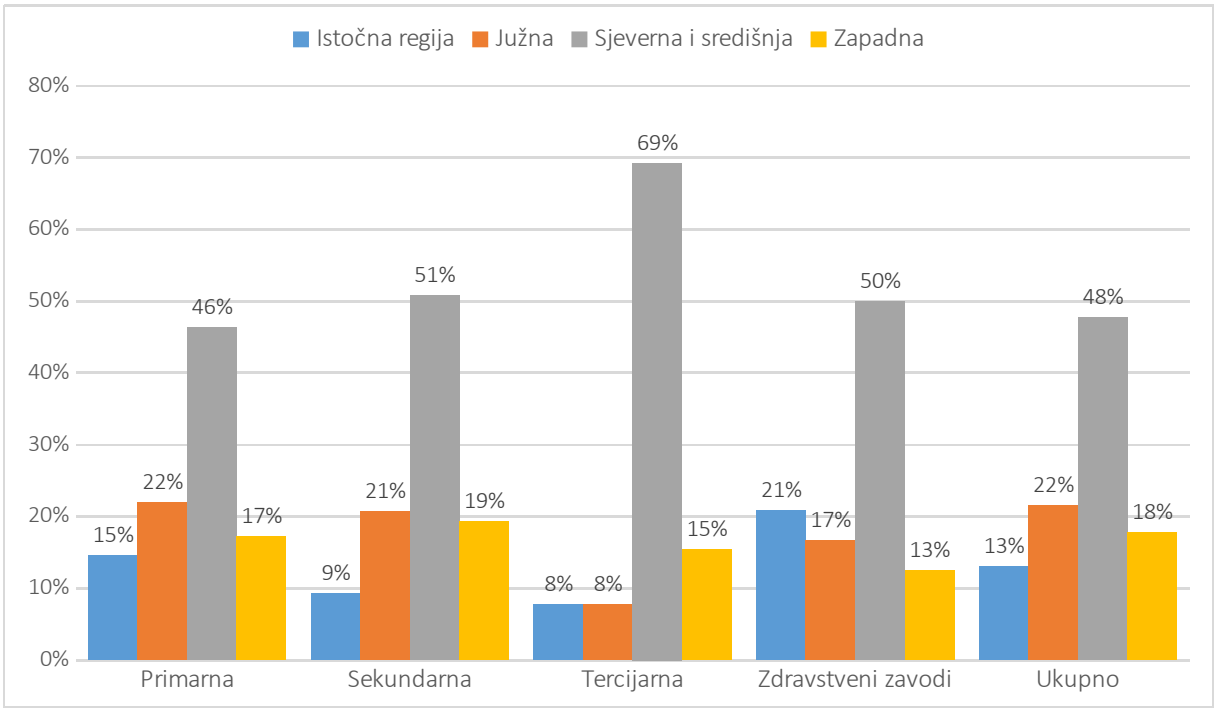
Usporedba liječnika 1999. i 2012. godine prema dobi i razini izobrazbe:

pripravnik - liječnik bez specijalizacije – specijalizant – specijalist

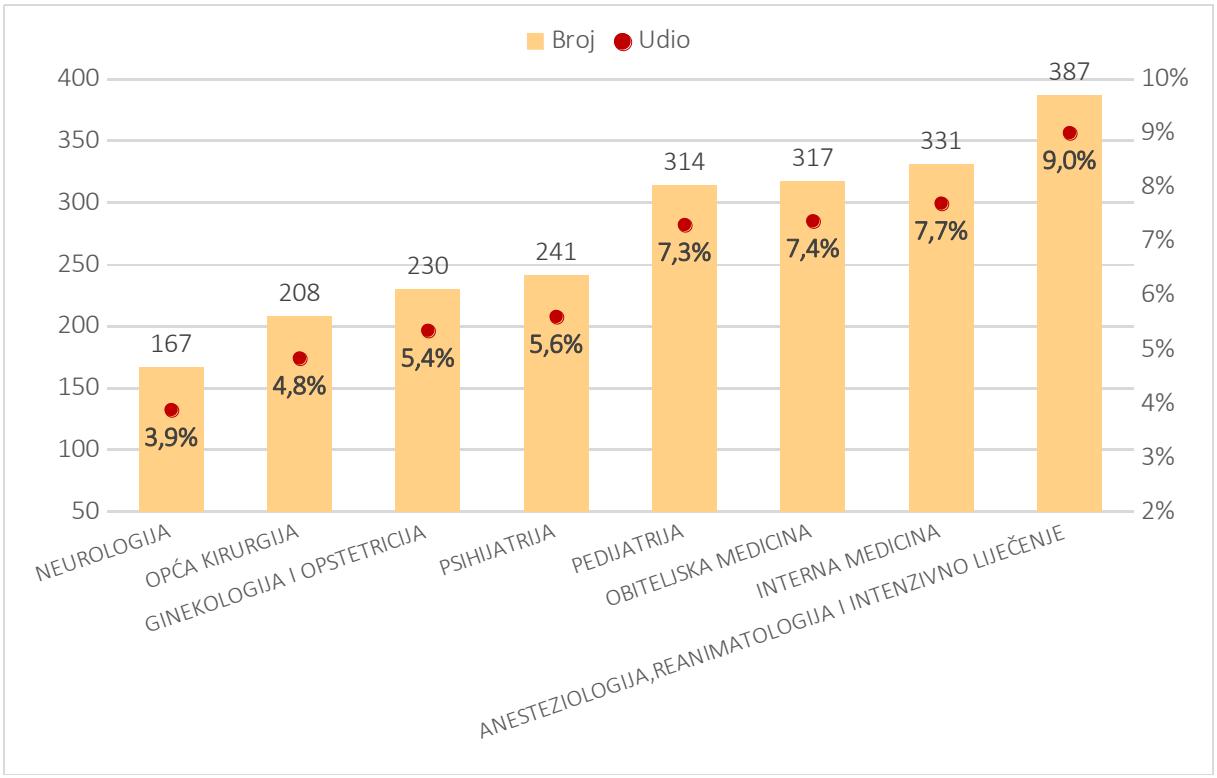


Slika 2. Primjer informacija dobivenih iz NRPZZ

Značajan doprinos u stvaranju Demografskog atlasa hrvatskog liječništva bili su upravo podaci i informacije NRPZZ te Odjela za ljudske i materijalne resurse u zdravstvu.

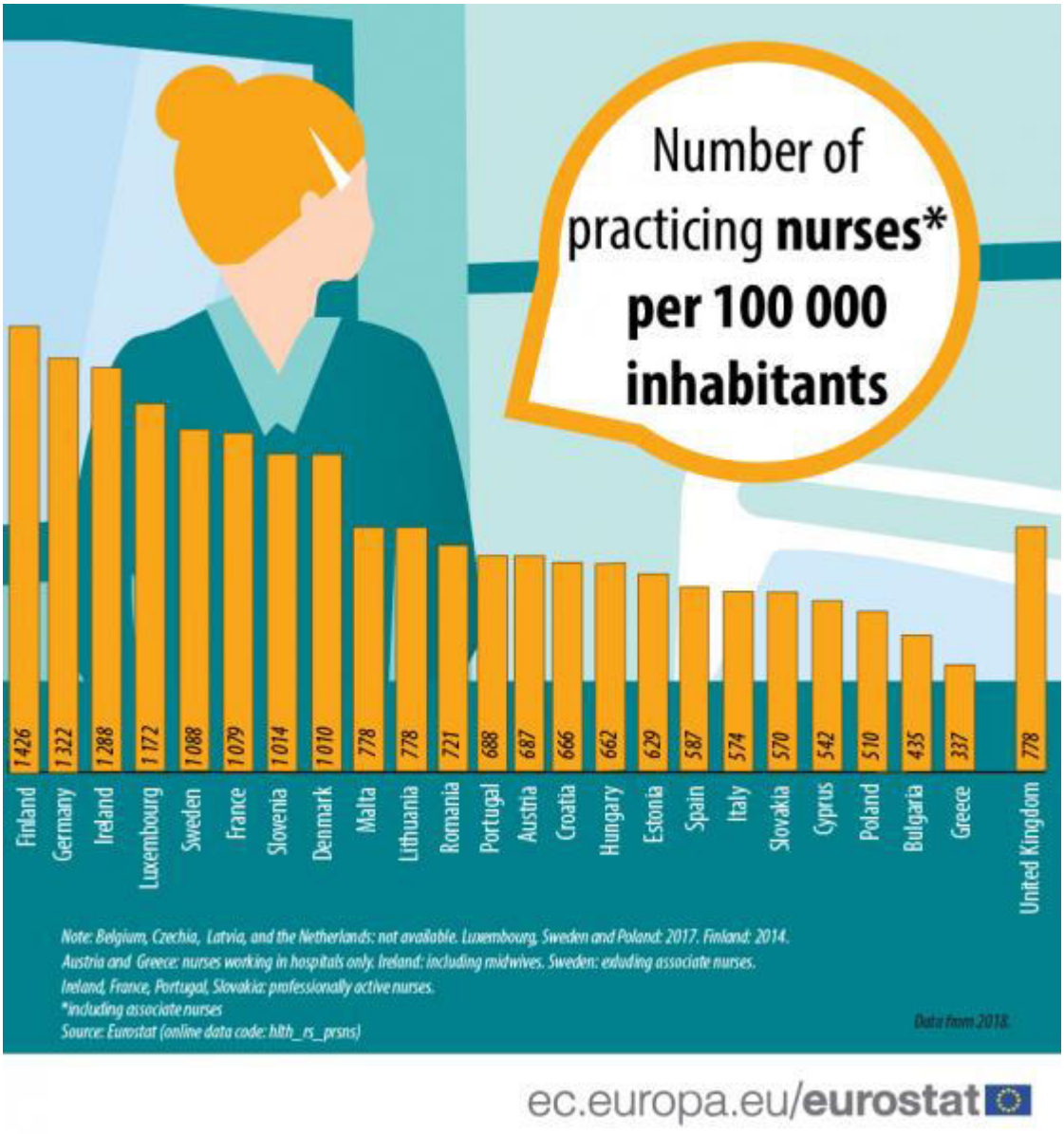


Slika 3. Distribucija zdravstvenih ustanova po zdravstvenim regijama (Demografski atlas hrvatskog liječništva); Izvor: HZJZ



Slika 4. Broj najučestalijih specijalizacija koje su liječnici započeli u razdoblju 2007.-2016. godine (Demografski atlas hrvatskog liječništva); Izvor: HZJZ

Podaci koji se temelje na službenoj nacionalnoj statistici i dostavljeni Eurostatu i OECD-u, koriste se u pripremi publikacija, kao za seriju „State of Health in the EU“, za izradu «Pregleda stanja zdravlja i zdravstvene zaštite» (Country Health Profiles) te publikacije „Health at Glance: Europe“ ili „Companion Report“.



Slika 5. Primjer korištenja informacija iz NRPZZ u međunarodnim publikacijama

Daljnja unaprjeđenja i razvoj

S obzirom na važnost kao i sve detaljnija potraživanja podataka s očekivanjima odgovora u što kraćem roku, jasno je da bi registar u budućnosti trebao imati još veću ulogu ne samo u proizvodnji rutinske zdravstvene statistike. To znači i stvaranje analitičkih informacija s naznakama mogućih rješenja za potrebe planiranja ljudskih potencijala ali i zdravstvene zaštite općenito.

U tom smislu, pojam registra u sebi mora sadržavati i mogućnost za stalnim unapređivanjem elemenata i procesa za poboljšanje funkcionalnosti registra.

To se treba i može odnositi na poboljšanje načina prikupljanja podataka, proširenje skupa podataka, načina dostave podataka, povezivanje i korištenje drugih klasifikacija i šifrarnika.

Iskorak u prikupljanju podataka i povećanju kvalitete i ažurnosti bio bi u većoj interoperabilnosti između dionika ne samo unutar zdravstva nego i svih drugih koji imaju relevantne baze podataka iz kojih se može ostvariti povezivanje potrebnih podataka s NRPZZ-om.

Formiranjem Registra zaposlenih u javnom sektoru kao i sustava Centraliziranog obračuna plaća nije se još, nažalost, dogodilo povezivanje s NRPZZ-om. Zbog toga je i u samom Nacrtu pravilnika o sadržaju i načinu vođenja NRPZZ-a spomenuto kako podatke o radnicima pružatelja zdravstvene zaštite HZJZ može pribaviti i iz baze podataka Hrvatskog zavoda za mirovinsko osiguranje (HZMO) i Registra zaposlenih u javnom sektoru (RegZap).

Jedan od rezultata takvog povezivanja bio bi, recimo, evidentiranje nezdravstvenih, nemedicinskih radnika u zdravstvu („administrativno-tehničko osoblje“). To bi bilo sustavno rješenje, za razliku od pojedinačnog, povremenog upisa nemedicinskog osoblja kojeg je do sada u registru upisana četvrtina od ukupnog broja.

Također tu je i mogućnost preuzimanja, usklađivanja s drugim klasifikacijama, primjerice, razinama obrazovanja prema Hrvatskom kvalifikacijskom okviru. U tom smislu uvijek je aktualno i pitanje korištenja istih, zajedničkih šifrarnika u zdravstvu. Šifrarnik djelatnosti pružatelja zdravstvene zaštite održava i koristi HZZO, a i NRPZZ. Niz drugih istih šifrarnika se koristi u sustavima NRPZZ i CEZIH. Podudarnost postoji i sa šifrarnikom vrsta zdravstvene ustanove i šifrarnikom zanimanja. No, uz ostale podatke koje sadržava RegZap, on svakako sadržava potrebne šifrarnike koje bi preuzeo i NRPZZ, kao primjerice, šifrarnik razine školovanja i/ili akademskih zvanja. Povezivanje sa RegZap predviđeno je do kraja 2022. godine.

Razmjena i dopuna podataka onima kojima raspolaže HZMO, posebno je korisna i potrebna zbog osiguranja veće ažurnosti i kvalitete podataka o zaposlenima u privatnom sektoru zdravstva jer s tim podacima ne raspolaže Registar zaposlenih u javnom sektoru. Razmjena tj. usporedba podataka HZMO-a i NRPZZ-a događa se periodično, ali bez informatičkog rješenja za usporedbu stanja, određivanje razlike u atributima za radnika, tako da se za sada to obavlja ručno, odnosno kroz funkcije koje nudi program Excel.

Povezivanje je i u skladu sa Zakonom o državnoj informacijskoj infrastrukturi (10) čija je i svrha „osiguranje interoperabilnosti javnih registara i informacijskih sustava tijela javnog sektora te osiguranje zajedničkih elemenata za interakciju s građanima ili drugim korisnicima.“

Jasno da za tako nešto treba osigurati adekvatnu informatičku podršku i rješenja za sam registar.

Dio potrebnih podataka o zdravstvenim radnicima ipak ne sadrže ni RegZap niti HZMO, primjerice o nazivima specijalizacija, užih specijalizacija, datumima kad ih je radnik započeo, završio ili prekinuo kao i statusima u odnosu na specijalizaciju (specijalist ili specijalizant), volonterskom radu. Te podatke trebat će i dalje zaprimati od pružatelja. Tako da se poželjno poboljšanje odnosi svakako na nadogradnju razvojem web servisa za prihvat ili pak slanje podataka jer se pružateljima nakon upisa radnika dostavlja obavijest o registarskom broju e-poštom.

U smislu povezivanja s drugima bazama podataka treba spomenuti i komore u zdravstvu, registar je primjerice predvidio prikupljanje podataka o odobrenju za samostalan rad (licenci) zdravstvenih radnika.

Radi uspješnijeg planiranja potreba za zdravstvenim radnicima bilo bi svakako korisno i povezivanje sa Informacijskim sustavom visokih učilišta.

Uz to, moguće je i potrebno daljnje povezivanje s bazama podataka unutar HZJZ-a, tako je također predviđeno povezivanje sa podacima koji nastaju kroz istraživanje Godišnje izvješće o radu bolnica (GIORB), a prikuplja podatke o posteljnim kapacitetima ustanova. Za dvije ranije godine već je izvršen upis podataka o posteljnim kapacitetima, no ručnim unosom, a u pripremi je rješenje za učitavanje podataka iz GIORB datoteka.

Spominjanje resursa također podsjeća na raniju ideju koja objedinjuje najvažnije čimbenike planiranja (kadrovi, prostor, oprema) na jedinstvenoj informatičkoj platformi (11). Podatkovni temelj registra predstavlja mreža zdravstvenih ustanova, odnosno svi pružatelji zdravstvene zaštite, sa svojim zaposlenicima, s djelatnostima koje su registrirane, a i posteljnim kapacitetima po pojedinim djelatnostima.

Jasno da se u pojedinim zdravstvenim ustanovama i djelatnostima mogu evidentirati i važni medicinski uređaji odnosno skupa oprema koja se želi pratiti.

Također je stalna potreba za što boljim uvidom u obavljene, pružene usluge, kako one dijagnostičke tako i izvršene medicinske zahvate (pretrage, operativne postupke). Tu je opet mogućnost povezivanja, identifikacije zdravstvenog radnika unosom registarskog broja nakon obavljenog medicinskog postupka.

U navedenim primjerima spominje se izraz „povezivanje“, a važno bi bilo da to uključuje rješenja za integraciju s drugim bazama podataka uz što manje ručnog unosa, kako bi taj termin stvarno predstavljao poboljšanje stanja i funkcionalnosti NRPZZ.

Uz osnovne podatke koje registar prati, u budućnosti je potrebno povezivanje radi stvaranja još više podataka i informacija kojima se opisuju potencijali, resursi, organizacija i funkcioniranje zdravstvenog sustava.

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Interview with Professor Gjuro Deželić, Former President of the Yugoslav Association of Medical Informatics and EFMI Council member (1990-1992), Honorary President of the Croatian Society for Medical Informatics

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Gjuro Deželić, full member of the Croatian Academy of Medical Sciences and full professor of Medical Informatics at several universities in former Yugoslavia, one of pioneers of Medical Informatics in Europe and the world. With pioneers of Medical Informatics professors Štefan Adamič in Slovenia, Rajko Vukašinović in Serbia and Izet Mašić in Bosnia and Herzegovina in the late 80s of the last century he formed the Yugoslav Association of Medical Informatics (YAMI), which became official member of EFMI and IMIA in 1990. This interview has been realized by two pioneers of Medical Informatics in South Eastern Europe, but, also, as some kind of interview of learner and teacher. Interview is realized during May 2020.

Key words: Gjuro Deželić; Interview

I.M.: *This interview was planned for the first issue of „EFMI Inside", but your health condition prevented it. The reason for making this interview was a picture, from your collection, from the MIE '79 Congress in Berlin, published in the first issue of EFMI Inside (on page 14), in which you actively participated. The details from that and the following MIE congresses are, unfortunately, modest, and you are one of the few living participants from that period. Can you list some events and describe their actors whose contribution to the development of medical informatics (MI) is illustrative, so that MI experts and professionals of the younger generations can experience them, at least through this text?*

G.D.: The Congress of „Medical Informatics Berlin 1979" (September 17-20) was the second EFMI congress, held in West Berlin (a part of Belin then governed by France, the United States and Great Britain, and the remaining part of which was the capital of the then Democratic Republic of Germany). At that time, as early as 1970, as a professor at the School of Medicine in Zagreb, I taught medical informatics as a compulsory subject to graduate and postgraduate students, future medical doctors. At the same time, I led the project of creating the Health Information System of the City of Zagreb (ZIS), which was based on the application of medical informatics methods. When EFMI organized its first congress in Cambridge, UK (September

4-8, 1978), the health authorities of the Croatian capital considered it is important that ZIS designers, under my leadership, take part in that congress, because health information systems were one of the themes of the Congress. This is how the first contacts of Croatian medical informaticians with the leading people of EFMI came about. It was especially important to me that I met there the colleagues who were engaged in education in medical informatics. When the panel on education in medical informatics was included in the program "MIE Berlin 1979", I was invited to participate in that panel as a long-term teacher of medical informatics to medical students. The topic of my paper was „Educational Problems in Teaching Health Informatics to Medical Students", and it was published in the Congress proceedings. The panel was led by John Anderson, and other participants were Francis Roger France, Klaus-Peter Adlassnig, Cristopher J. Dickinson and Jochen R. Möhr. Of the EFMI leaders, I have continued to maintain contacts in particular with Hans Peterson, Barry Barber, Rolf Hansen, Peter Reichertz, Francois Grémy, Jean-Raoul Scherrer, Stellan Bengtsson and Assa Reichert. All of them have contributed to the development of medical informatics, and our younger generations will find a lot of information about them in your book „Biographical Lexicon of Medical Informatics".

Figure 1. Panellists at MIE '79, Berlin, FR Germany, 1979: John Anderson, Francis Roger France, Klaus Peter Adlassnig, Jochen R. Möhr, Gjuro Deželić (from left to right).

I.M.: *I was one of your students among several thousand whom you taught at universities throughout the former Yugoslavia, just in the years of the aforementioned MIE congresses, which you described above. In your lectures, we acquired the first and, for that time period, comprehensive and essential contents on MI, but also the aspects nurtured by the main „schools of MI": Anglo-Saxon (Abbot, Anderson, etc.), French (Gremy, Remond, etc.), German (Reichertz,. et al.), American (Collen, Green, et al.), whose terms „Health Informatics" (Abbot) and „Medical Informatics" (Gremy and Reichertz) have entered the European and world medical literature. Why did you decide in those years to use the term Health more than Medical Informatics in the former Yugoslav areas (your first lecture notes and the first textbook were with that title). What was the difference?*

Figure 2. Assa Reichert, Gjuro Deželić and Izet Mašić (from left to right).

G.D.: Part of the answer to your question can be found in the text of my paper at the 1979 MIE Congress in Berlin mentioned in the answer to your previous question. In the part of the text entitled „The Development of Curricula in Medical Informatics at the Medical Schools in Yugoslavia“ it literally reads (on p. 77): „In 1970 the Medical Faculty in Zagreb introduced compulsory appreciation courses in medical informatics at the undergraduate and postgraduate levels for all medical students. A very strong impetus to the development of medical informatics on both teaching and research was given by setting up the University Computing Center in Zagreb in 1972 operating a UNIVAC 1110 Computing System with the installation of interactive terminals at the School of Public Health (in Zagreb).“……”Since in Zagreb a health information system is planned in the near future, a proposal for a two-year postgraduate program in ”Health Informatics” has been made”. From such formulations it clearly follows that the terms „Medical Informatics“ and „Health Informatics“ were considered synonymous, but in the former Yugoslavia areas (with a socialist society organization, in which there was no private medical practice) the adjective „health“ was prefrred. With the appearance of the international associations IMIA and EFMI, the name Medical Informatics finally prevailed in our country. This can be well seen in the titles of university textbooks of which I am the author. The first of them, issued with the approval of the Publishing Committee of the Assembly of the University of Zagreb in 1976, has a „neutral“ title „Fundamentals of Informatics“ and was published in several editions. The second, published as the 10th volume in the Library of Textbooks and Manuals of the School of Medicine, University of Zagreb in 1986, is entitled „Health Informatics“ and by 1989 had three editions. The last textbook under my name was published by the Croatian Society for Medical Informatics in Zagreb in 1997 and it is entitled „Medical Informatics“. Today, a modern university textbook of the same title „Medical Informatics“ (the official textbook of the universities of Zagreb, Rijeka, Osijek and Split) can be obtained on the market in Croatia. It was published by Medicinska naklada in Zagreb in 2009, edited by Josipa Kern and Mladen Petrovečki. The authors are 42 Croatian medical informatics experts (and I am one of them), and you were one of the four reviewers. The

description of that book on the internet portals reads as follows: „The textbook deals with medical informatics issues relevant to students of medicine, dentistry, nursing and similar medical and health fields. It is intended for all current and future health professionals – doctors, dentists, medical biochemists, pharmacists, sanitary engineers, nurses and technicians, and all other health professionals and health professionals who encounter the use of information technology on a daily basis“.

Figure 3. Some of EFMI Council Members and congress participants at MIE '88 Oslo Congress dinner; from left around the table: 1st Van Bemmel, 3rd Van Goor, 4th Deželić, 8th Serio, 9th Roger France.

I.M.: *In the late 1980s, you led a team from the former Yugoslavian republics that, after founding societies/associations in those republics that brought together qualified people in the field of health informatics, founded the Yugoslav Association for Medical Informatics – YAMI. YAMI organized the First MI Congress in Belgrade in 1990 with an impressive participation of over 500 participants. This scientific meeting of MI left positive effects on the later development of MI in Europe and the World. Can you recall of any details about this?*

G.D.: YAMI was founded in 1989 in Osijek by the republic societies for medical informatics in Bosnia and Herzegovina, Croatia and Slovenia, as well as the Section for Medical Informatics of the Serbian Medical Society. It was decided that the headquarters of YAMI would be in Zagreb, and I was elected as president. At the time of the 1990 MIE Congress in Glasgow at a meeting of the EFMI Council and the IMIA Annual Assembly, YAMI was admitted to the membership of both international medical informatics organizations, but this did not last long. Already at that time, Yugoslavia entered a period of political unrest that led to its disintegration. In the text „Medical Informatics in Croatia – a Historical Survey“ [authors Gj. Deželić, J. Kern, M. Petrovečki, V. Ilakovac, M. Hercigonja-Szekeres, Acta Inform. Medica. 2014 22 (1): 49-59] this is described in detail (on p. 54). It should be noted here that after the wars against

Slovenia and Croatia in September 1991, both MI associations – Slovenian and Croatian – withdrew from YAMI, followed by the MI association of Bosnia and Herzegovina a few months later. After the Republic of Croatia and other republics of the former Socialist Federative Republic of Yugoslavia (SFRJ) were internationally recognized in January 1992 and became members of the UN in May of the same year, the conditions were met for medical informatics societies of the former three Yugoslav republics – Bosnia and Herzegovina, Croatia and Slovenia – to become members of IMIA and EFMI. This happened during the 1992 MEDINFO congress in Geneva.

As the war in Slovenia was relatively short, the Slovenian Society for Medical Informatics was able to quickly organize its first national symposium in the autumn of 1992, and after being admitted to EFMI, it managed to organize the 1999 MIE Congress in Ljubljana. In Croatia, the war lasted longer, so the Croatian Society for Medical Informatics (CSMI) could hold its first national symposium only in 1993, but had to abandon plans made during YAMI's existence, to run for the 1998 MEDINFO Congress in Zagreb. It was only with the efforts of my successor in leading CSMI, Josipa Kern, that the EFMI Special Topic Conference was organized at the Brijuni Islands in 2007. The worst time was for the Medical Informatics Society of Bosnia and Herzegovina (BHSMI), because the armed conflict lasted between March 1992 and November 1995, with the siege of the capital Sarajevo. But even in such a terrible situation, BHSMI, which you led, has had a fruitful activity, amazing in such circumstances, managing to organize professional gatherings, produce numerous publications and launch the magazine "Acta Informatica Medica". In the post-war period, BHSMI organized national symposia and applied for the MIE Congress, which was held in 2009. In my keynote lecture at MIE 2009 in Sarajevo (Proceedings of XXII International Congress of the European Federation for Medical Informatics, MIE 2009, Sarajevo, 2009. Amsterdam-Berlin Tokyo Washington, DC: IOS Press, 2009, 3-7) I wrote: "We should consider the mandate to organize the MIE 2009 Congress in Sarajevo as the crown of all efforts of Prof. Masic struggling for it for a long time… I added that the credit should be given to EFMI, which, by choosing Sarajevo, supported the construction of new medical, biomedical and health-information bridges between the western and eastern parts of the European world".

I.M.: *You have been a participant in numerous scientific conferences in the field of MI in Europe and the world. Many have remained in your memory. Which in this case we would like to mention and for what reasons?*

G.D.: Regarding my previous answers, it is clear that I most fondly remember my participation as a keynote speaker at MIE 2009 in Sarajevo. Besides the fact that I can consider it a great recognition of my then 40-year work in medical informatics, I certainly want to point out that, apart from Zagreb, where I was born and where I spent most of my life, Sarajevo is the city of my youth. I lived there for 7 years – from 1949, when I was 14 years old, until 1956 when I returned to my native Zagreb. During that period, I finished high school and started to study chemistry. In Zagreb I graduated in chemistry (completing my chemical education with a doctorate in science, as it says in my resume that you published in your popular "Biographical Lexicon of Medical Informatics"). I acquired many dear friends in Sarajevo, including you.

Figure 4. Opening ceremony of MIE 2009 at the National theatre in Sarajevo, Sarajevo, 29-8-2009.

Figure 5. Introduction lecture of Professor Gjuro Deželić at Opening Ceremony of MIE 2009 at the National Theatre in Sarajevo, Sarajevo, 29-8-2009.

I.M.: *You come from a respectable Deželić family. Your late great-grandfather Gjuro Stjepan Deželić was an important figure in Zagreb and Croatia. Your late father Mladen Deželić was the initiator of chemical science in BH and one of the founders of the Academy of Sciences and Arts of BH in 1966. Your ten years diplomatic activity in two European countries has been*

fruitful. Do you think that the future at the global level, when it comes to socio-political and economic aspects, has gone into a kind of downfall and that the events related to the current events surrounding the COVID-19 pandemic will significantly affect the future of world science globally, so then Biomedical Informatics (a term proposed by Ted Shortliffe in Pisa during MIE 2012 for use).

G.D.: In my answer to your previous question, it is stated that I am a doctor of chemical sciences. As I was still in high school among those students who loved science subjects and excelled in mathematics, I wanted to become a theoretical physicist. But there was no possibility to study physics in Sarajevo at that time, so my father advised me to enroll in chemistry, since I would later be able to do research in the field of physical chemistry, which itself has all the features of a theoretical profession based on mathematical methods. Almost a decade later, as an assistant professor at the School of Medicine in Zagreb I was on postdoctoral training at Indiana University in the USA. There I had the opportunity to work in the Computer Center of that University and thus enter the „world of informatics". From all the above, it is clear that my way of thinking through schooling in the natural sciences is primarily related to matter (its chemical composition and structure, and the physical laws that govern it, including information describing the events that take place in it). When one wants to think about what will happen in the world in the future from a socio-political and economic point of view, it is good to be an expert in the social sciences. Therefore, to your specific question how much the events related to the COVID-19 pandemic will affect the future of world science, as a naturalist I cannot give an argumentative answer, but only express how I believe that, as before in the history of mankind, science will progress, but with a change in the dynamics of that progress and the extent of its funding.

Since you mention my ancestors at the beginning of this question, it is necessary to say that my way of thinking consists not only of what I acquired through schooling (that it is primarily related to matter), but also from my ancestors that (there I will use a quote from the memoirs of my father) „instilled in my heart and soul is the respect for human dignity and the realization that only with honest work and with love for neighbor and homeland one can gain full satisfaction in this world".

Professor Gjuro Deželić, PhD, (1935-) was born in Zagreb, Croatia. After graduating chemistry in 1958 at the Faculty of Science of the University of Zagreb, he earned his PhD in chemistry in 1960 at the same institution. He began his academic career at the Department of Physical Chemistry of the Faculty of Science in 1958, and after completing his military service, he became in 1964 assistant professor at the Andrija Štampar School of Public Health, School of Medicine of the University of Zagreb. During his postdoctoral fellowship in 1965-66 at the Indiana University (IU) in Bloomington, Indiana, USA, while working in the field of light scattering of dense liquids and macromolecular systems, he started to work in the IU Computer Center by developing computer programs for his research. Returning to Zagreb, he expanded his interests in computer science to the general areas of informatics, especially to the use of computers in medicine and healthcare, thus entering this at that time a new emerging field, called now (bio)medical informatics.

During following years, he could expand his informatics horizons in Italy, the UK, France, Belgium and Japan. After advancing to the associate professorship in 1970, and being appointed 1973 head of the Computing Laboratory of the Andrija Štampar School of Public Health, he became in 1975 full professor of medical informatics at the School of Medicine in Zagreb. He ended his academic career as full professor with the permanent title and retired in 2001. During the first period of his scientific activity, predominantly in physical chemistry and macromolecular science, he was also engaged as a senior research fellow at the "Ruđer Bošković Institute" in Zagreb from 1968 to 1975. In 1971 he was one of the founders of the Postgraduate Study of Macromolecular Science at the University of Zagreb and its first head. During this period he also served as a member of the Editorial Board of "Croatica Chemica Acta" (1966-1980) and its Advisory Board (1980-1990). His teaching activity in medical informatics started at the School of Medicine in Zagreb in the academic year 1970/71, both for graduate and postgraduate medical students. As a visiting professor he taught medical informatics at other Croatian Schools of Medicine (Osijek, Rijeka, Split), as well as at many medical faculties and institutions in former Yugoslavia, (Ljubljana, Maribor, Sarajevo, Skopje), doing pioneer work for this discipline in that part of Europe (1-4). In 1984 he founded the Postgraduate Study "Health Information Systems" at the Medical School in Zagreb and was its first director until 1993. The study has been enrolled by a notable number of students from Croatia, but also from other parts of former Yugoslavia, being the basis for education of first medical informatics specialists in the country. He was also one of the founders of the University Computing Center in Zagreb, which introduced 1972 in Croatia distributed data processing via a network of terminals in all Croatian university centers of that time (Osijek, Rijeka, Split, and Zagreb). In this center he served from 1980 to 1983 as head of its Sector for research, teaching and development.

Gjuro Deželić published more than 150 scientific and professional papers as well as several textbooks and monographs, among them the first Croatian textbook on medical informatics. In 1975 he was awarded with the "Ruđer Bošković" prize for scientific achievements. After being elected in 1991 associate member of the Croatian Academy of Medical Sciences, since 1994 he is its full member. He is the founder of the Croatian Society for Medical Informatics (CSMI 1989), being its first president and its representative in the European Federation for Medical Informatics (EFMI) and the International Medical Informatics Association (IMIA). Since 2004 he is honorary president of CSMI. After the retirement he was mostly devoted to the problems of standardization in medical informatics, and in 2002 he was one of the initiators of the founding the HL7 Croatia, Affiliate of HL7 International, serving as its first president until 2008, when he was elected as its honorary president.

At the 22nd International EFMI Congress "Medical Informatics Europe 2009" in Sarajevo (August 30 – September 2, 2009), as a participant of the first EFMI Congress in Cambridge (1978) he was invited to present a keynote lecture ((5-8).

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Tekst je reprint intervjua „Interview with Professor Gjuro Deželić, Former President of the Yugoslav Association of Medical Informatics and EFMI Council member (1990-1992), Honorary President of the Croatian Society for Medical Informatics“ prilagođen koncepciji Biltena Hrvatskog društva za medicinsku informatiku. Objavljuje se uz dozvolu autora intervjua i glavnog i odgovornog urednika (I. Mašić) časopisa u kojemu je intervju izvorno objavljen (IJBH. 2020; 8(1): 53-57).

Uz intervju profesora Mašića s profesorom Deželićem

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Profesor Mašić je u prosincu 2020. poslao intervju s profesorom Deželićem svim članovima EFMI Council-a (European Federation for medical Informatics Council) kao najavu za drugi broj novog EFMIevog glasila *EFMI Inside Newsletter*, (https://efmi.org/news/efmi-inside-newsletter/), čiji je prvi broj objavljen u ožujku 2020. Intervju o kojem je riječ objavljen je u časopisu *International Journal on Biomedicne and Healthcare,* ISSN 1805-8698 (https://www.ijbh.org) IJBH 2020; 8 (1): 53-57.

Potaknuta nekim napisanim povijesnim činjenicama, a koje su još i sada, povremeno, predmet diskusija zamolila sam i profesora Deželića i profesora Mašića za suglasnost da taj intervju objavimo u Biltenu Hrvatskog društva za medicinsku informatiku. Oba su se profesora sa zadovoljstvom suglasila, a profesor Mašić je dozvolio da profesor Dežeić napravi minorne promjene i ispravke.

Zahvaljujem profesorima!

Nadopune Međunarodne klasifikacije bolesti - 10. revizija u 2020. godini

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Svjetska zdravstvena organizacija (dalje: SZO) svake godine objavljuje nadopune Međunarodne klasifikacije bolesti i srodnih zdravstvenih problema - deseta revizija (dalje: MKB-10). Nadopune se provode radi pojave novih bolesti i stanja, promjena i unaprjeđenja u zdravstvenim sustavima. Pojava novih bolesti nameće potrebu za njihovom kategorizacijom u MKB-10. Za tu svrhu, cijelo novo poglavlje od U00 do U99 pod nazivom „Šifre za posebne namjene“, uvedeno je u MKB-10 u 2012. i 2013. godini.

Godine 2019. pojavila se nova bolest čiji je uzročnik novi korona virus (COVID-19) te je SZO pandemiju COVID-19 proglasila javnozdravstvenim izvanrednim stanjem od međunarodnog značaja. Bolest uzrokovana novim korona virusom nakon što je identificirana i imenovana pod nazivom COVID-19, Svjetska zdravstvena organizacija je tijekom 2020. godine uvrstila u MKB-10. U ožujku 2020. godine imenovane su već postojeće dvije šifre iz poglavlja U00-U99 i to U07.1 i U07.2 koje se odnose na COVID-19 (1). U rujnu 2020. godine dodano je još nekoliko novih šifri iz prethodno navedenog poglavlja koje se odnose na COVID-19 a to su U08, U09, U10, U11 i U12 (2).

Nove MKB-10 šifre za COVID-19 su:

U07 Hitna uporaba U07

U07.1 COVID-19, virus identificiran

U07.2 COVID-19, virus nije identificiran

U08 Osobna povijest COVID-19

U08.9 Osobna povijest COVID-19, nespecificirano

U09 Post COVID-19 stanje

U09.9 Post COVID-19 stanje, nespecificirano

U10 Multisistemski upalni sindrom koji je povezan sa COVID-19

U10.9 Multisistemski upalni sindrom koji je povezan sa COVID-19, nespecificiran

U11 Potreba za cijepljenjem protiv COVID-19

U11.9 Potreba za cijepljenjem protiv COVID-19, nespecificiran

U12 COVID-19 cjepiva koja uzrokuju štetne učinke u terapijskoj primjeni

U12.9 COVID-19 cjepiva koja uzrokuju štetne učinke u terapijskoj primjeni, nespecificiran

Detaljniji opis šifri MKB-10 koje se odnose na COVID-19 mogu se pronaći na stranicama WHO-a (1,2). SZO preporuča navedene MKB-10 šifre bolesti koristiti za potrebe bilježenja

pobola i smrtnosti stanovništva te kod aktivnosti cijepljenja od COVID 19. Zadnja verzija MKB-10 2019 u koju su uključene spomenute nove šifre dostupna je na web stranicama SZO (3).

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E-zdravstvo u novom normalnom - iskustva

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Krajem izazovne 2020. godine, uz velike napore organizatora ali i svih sudionika, ipak je održano nekoliko redovitih pa odgođenih konferencija vezanih uz informacijske tehnologije (IT), a koje tradicionalno prate i područje informatizacije u zdravstvenoj vertikali (npr. Microsoft Windays), ali i specijalizirane konferencije u području zdravstva (npr. FuturZ) gdje informacijske tehnologije uvijek imaju svoj dio. IN2 kao jedna od vodećih IT tvrtki na ovom području u Hrvatskoj, sudjelovao je na ovim - što virtualnim, što polu-virtualnim događanjima - s temama vezanim uz glavne aktivnosti informatizacije kroz 2020. godinu, a koje su neminovno bile određene okolnostima rada pod Covid-19 pandemijom.

Naime, ovogodišnje projektne aktivnosti IT tvrtki u području zdravstva su uglavnom bile motivirane potporom cijelom zdravstvenom sustavu prvo u borbi za praćenje i ograničavanje širenja virusa, a zatim i na svladavanju organizacijskih i podatkovnih problema tijekom liječenja pacijenata. U tim naporima bilo je očekivano da će se neki postojeći projekti dodatno ubrzati (npr. uvođenje eUputnice), ali je ovakvo okruženje stvorilo i potrebu za novim promišljanjem kako postojećih poslovnih procesa zdravstvenog sustava, tako i dizajniranje novih i inovativnih procesa i proizvoda. Naravno, više od 20 godina iskustva informatizacije zdravstvenog sustava u Republici Hrvatskoj je bio dobar temelj za brzu reakciju koja nije izostala.

U samo nekoliko mjeseci, počevši od kolovoza 2020., s novom fazom implementacije projekta eUputnice potpuno je ukinut papir i uvedena obvezna elektronička komunikacija prema bolničkom zdravstvenom sustavu. Da bi se naša „dobra stara crvena uputnica“ potpuno ukinula, potrebno je bilo redizajnirati procese naručivanja na zdravstvene usluge, s obzirom da je taj papir primarno služio kao komunikacijski medij od obiteljske medicine, kroz ruke pacijenta do odredišne zdravstvene ustanova čineći od pacijenta nositelja te informacije. Ukidanjem te svrhe, potaknuto željom da se u okvirima Covid-19 pandemije kontakti i kretanja ograniče, dodjela termina za zdravstvene usluge je potpuno prebačena na ustanove putem elektroničke automatske komunikacije (kroz CEZIH, između postojećih G2-obiteljskih i G100-bolničkih informacijskih sustava), i to u trenutku izdavanja uputnice kod uputnog liječnika. Pacijent je umjesto papira dobio kopiju elektroničke komunikacije u svoj pretinac elektroničke pošte na sustav eGrađani, te je dodjelu termina preuzela zdravstvena ustanova. Time je inicijativa s pacijenta prešla na ustanovu, ukidajući nepotrebni dolazak ili zvanje zdravstvene ustanove, a osim ubrzanja procesa naručivanja potpuno ukinula potencijalni fizički kontakt. Paralelno s tim projektom bolničke zdravstvene ustanove su podigle korištenje eNalaza, kojim je zdravstvena informacija mogla doći natrag do obiteljskog liječnika putem CEZIH-a - opet bez fizičkog nošenja samo papira. No, ipak izazovi na potpunom ukidanju i tog papira ostaju za 2021. godinu i završnu fazu projekta eNalaz. Ovim aktivnostima dokazali su svi dionici da se u kratko vrijeme može značajno unaprijediti rad zdravstvenih ustanova korištenjem informacijskih tehnologija, pa je nužnost održavanja ovakvog ubrzanog tempa digitalizacije zdravstva glavni zadatak zdravstvene administracije.

S druge strane, i same zdravstvene ustanova su potaknute vlastitim potrebama, u partnerstvu sa svojim dugogodišnjim IT partnerima, inicirale i realizirale nove poslovne procese i nova IT rješenje za potporu tom „novom normalnom“ okruženju. IN2 je na tom valu tijekom 2020. godine izradio niz prilagodbi BIS rješenja za hrvatske bolnice, primjerice integriranu detekciju pacijenata u samoizolaciji (unutar BIS-ovog procesa prijema), beskontaktni prijem na prijemnim šalterima zdravstvenih ustanova (korištenjem prepoznavanja i očitanja identifikacijskih dokumenata putem AI algoritma), ali i inovativna info-rješenja za usmjeravanje pacijenata (korištenjem tableta za informiranje pacijenata u čekaonicama i na hodnicima). Dio tih rješenja se prirodno nadovezao na eUputnicu, ali i podigao kvalitetu pružanja usluge u zdravstvenim ustanovama. Osim što olakšavaju posao u trenutnim Covid-19 okolnostima, ta rješenja također aktivno podupiru promjene u bolnicama vezane uz novo eNaručivanje, gdje zdravstvena ustanova vodi sam proces umjesto pacijenta. Moram istaknuti i intenzivne aktivnosti bolničkih službi, bez čije potpore promjene poslovnih procesa inicirane informatizacijom na nacionalnoj razini ne bi uspjele.

Sa završetkom godine i ipak polaganim jenjavanjem pritisaka na zdravstveni sustav akutne faze drugog vala Covid 19 pandemije, pojavili su se novi izazovi u organizaciji i podršci procesu cijepljenja protiv Covid 19 bolesti, te očekujemo da će IT zajednica i na ovaj izazov uspješno odgovoriti.

O IN2 sektoru zdravstva: IN2 grupa u svom Sektoru zdravstva danas broji stotinjak stručnjaka koji kontinuirano rade na unapređenjima i prilagodbi bolničkog informacijskog sustava (BIS-a) specifičnim uvjetima pojedinih zdravstvenih ustanova. U protekla dva desetljeća, samo u Hrvatskoj implementiran je u više od 45 bolnica. IN2 grupa je od početka pandemije angažirana na pružanju dodatne podrške zdravstvenom sustavu u upravljanju posljedicama ove javnozdravstvene krize.

O autoru: Siniša Košćina, rođen 1974. u Zagrebu. Diplomirao računarstvo 1999. godine na Fakultetu elektrotehnike i računarstva u Zagrebu, magistrirao poslovno upravljanje na IEDC Bled 2013. godine. Trenutno je direktor razvoja poslovanja u sektoru zdravstva IN2 grupe zadnje 4 godine (zaposlen u IN2 zadnjih 20 godina), a već prije toga stekao je višegodišnje iskustvo u vođenju IT projekata u različitim područjima (telekom, promet, financije, razvoj i implementacije ERP sustava…). U aktualnom području eZdravstva izdvajaju se 2,5 godine vođenja projekta implementacije integriranog bolničkog informacijskog sustava na KBC Zagreb, vođenje projekata eListe čekanja i eNaručivanje za Ministarstvo zdravstva Republike Hrvatske u suradnji s Hrvatskim zavodom za zdravstveno osiguranje, vođenje istog projekta u Republici Sloveniji (eNaročanje + eNapotnica), te nedavno i realizacija izvoznih poslova u segmentu implementacije bolničkih informacijskih sustava u inozemstvu (Azerbajdžan, Vijetnam, Saudijska Arabija). Kroz sudjelovanje i u ostalim projektima eZdravstva, sudjelovanjem na konferencijama posvećenim informatizaciji zdravstva, djelovanjem u Upravnom odboru HL7 Hrvatska te gostujućim predavanjima i vođenjem seminara na kolegiju medicinske informatike Fakulteta elektrotehnike i računarstva u Zagrebu, aktivno sudjeluje u razvoju eZdravstva u regiji.

Izvješće iz EFMI i IMIA za godinu 2020.

Mira Hercigonja-Szekeres
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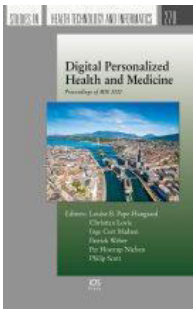
EFMI skupovi

Kako je već napisano u prošlom broju Biltena, skupovi planirani za 2020. godinu ili nisu održani ili su održani virtualno zbog pandemije COVID-19 bolesti.

EFMI MIE 2020

Mjesto i termini održavanja Konferencija MIE 2020 (Medical Informatics Europe): Geneva, Švicarska od 28. travnja do 1. svibnja 2020. dogovoreni su još 2018. godine, a organizacija je bila vrlo detaljna jer je to trebao biti prvi EFMI skup organiziran prema novoj shemi organizacije. Međutim, 12. ožujka 2020. svi su već registrirani i potencijalni sudionici te šira javnost dobili službenu obavijest da je konferencija MIE 2020 otkazana zbog pandemije Covid-19, točnije da su otkazani svi skupovi s više od 100 sudionika.

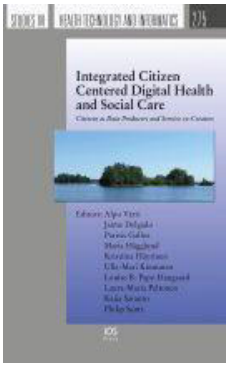


Ipak, organizatori su uspjeli dovršiti sve poslove vezane uz izdavanje Zbornika radova tako da on postoji i, kako je uobičajeno, dostupan je *online*:

https://www.iospress.nl/book/digital-personalized-health-and-medicine/

EFMI STC 2020

STC 2020 (Special Topic Conference) prvi je EFMI skup koji je održan *online* i primjenjujući novu shemu organizacije.



Glavna tema je bila: „Integrated Citizen centered digital health and social care – Citizens as data producers and service co-creators“. Domaćin skupa bola je finska udruga Finnish Social and Health Informatics Association (FinnSHIA), a datum održavanja 26. – 27. studenoga 2020. Pozvana predavanja održali su Jean-Pierre Hubaux „Secure Sharing of Pandemic Dana“ i Bernd Blobel „Methodologies and Technologies for Enabling Intelligent Citizen-Centered Digital Health“. Na STC 2020 prezentirani su radovi te održane radionice i paneli.

Zbornik radova je dostupan *online*:

https://www.iospress.nl/book/integrated-citizen-centered-digital-health-and-social-care/

EFMI Council

U 2020. godini održana su tri sastanka EFMI Council-a, svi virtualno.

1. 82. EFMI Council Meeting, 28. travnja 2020.
   - Izvješća svih članova EFMI Board i voditelja EFMI WGs.

   Sva su izvješća prihvaćena

   - Skupovi:
     - MIE 2020, Geneva, otkazan zbog Covid-19.
     - STC 2020, virtualno, studeni 2020, Finska.
     - MIE 2021, kraj svibnja, možda uživo, Atena, Grčka.
     - STC2021, kraj studenoga, možda uživo, Sevilla, Španjolska.

     Izvješća o skupovima su prihvaćena. Planiranje sljedećih skupova odgođeno s obzirom na pandemiju.

   - Izvješće od Accreditation and Certification Committee.

Prihvaćeno, detaljnije o tome na mrežnim stranicama:

www.efmi.org.EFMI i http://efmi-ac2.bmhi-edu.org/

- EU projekti:
    - CrowdHEALTH Project – u tijeku.
    - Fair4Health – pred završetkom.
    - HOSMARTAI, prijedlog, (nove tehnologije bazirane na umjetnoj inteligenciji).
- Suradnja:
    - EFMI – Kina: nakon prvog, vrlo uspješnog, EU-China Health Summit u kolovozu 2019. očekuje se drugi krajem 2020.
    - EFMI – EUSEM: očekuje se veća suradnja.
- Izbori:
    - Sadašnjoj predsjednici EFMI Lăcrămioari Stoicu-Tivadar, Rumunjska mandat završava u studenome 2020. i za novu predsjednicu izabrana je sadašnja dopredsjednica Catherine Chronaki, Grčka. Automatizmom dosadašnja predsjednica postaje IMIA dopredsjednica za Europu
    - .Za dopredsjednicu je izabrana Luise Pape-Haugaard, Danska.
    - Za Institutional Membership Officer izabran je Lars Lindsköld, Švedska.
    - Za blagajnika je izabran Carlos Luis Parra-Calderón, Španjolska.
    - Izabran je i novi Auditing Committee: Mira Hercigonja-Szekeres (predsjednica), George Mihalas, i Michael Shifrin.

2. 83. EFMI Council Meeting, 3. srpnja 2020.
    - U izvješću predsjednice između ostalog istaknuto je da je počeo proces prve akreditacije univerzitetskog studija u skladu s postavkama EFMI akreditacija. Sveučilište UMIT TIROL, u Hallu, Austrija će diplomske i poslijediplomske studije iz područja Biomedicinske i zdravstvene informatike akreditirati u skladu s EFMI Accreditation and Certification process across Europe
    - Detaljno izvješće o neodržanoj konferenciji MIE 2020, Geneva. Izdan je Zbornik, bila su organizirana online predavanja (dio).
    - Izglasane su promjene Statuta EFMI vezane uz organizaciju EFMI Board-a prvenstveno zbog novog dužnosnika u EFMI Board-u: yEFMI professional officer.
    - Osnovana je nova EFMI WG: Young EFMI - yEFMI. Voditeljica je Ivana Ognjanović, Sveučilište Donja Gorica, Crna Gora

3. 84. EFMI Council meeting, virtualno, 23. studenoga 2020.
   - Izvješća svih članova EFMI Board i voditelja EFMI WGs.

   Sva su izvješća prihvaćena

   - EU projekti:
     - CrowdHEALTH Project: dovršen, ocjenjen uspješnim, više: https://efmi.org/special-projects/crowdhealth/
     - Fair4Health Project: dovršen, konačno izvješće: https://hdmi.hr/images/doc/2101_fair4health_press.pdf
   - HOSMARTAI Project je prihvaćen i počinje u siječnju 2021., sve EFMI WG su pozvane da sudjeluju.
   - Suradnja:
     - EFMI – Kina održan je drugi EU-China Health Summit u listopadu 2020. detaljnije na: https://efmi.org/eu-china-health-summit/
     - EFMI – EUSEM potpisan je Memorandum of Understanding, više na: https://efmi.org/special-projects/eusem-efmi/
   - Izbori za članove EFMI Board-a:
     - Young Professional Officer: Ivana Ognjanović, Crna Gora.
     - Executive Officer: Arriel Benis, Izrael.
     - Publication Officer: Parisis G. Galos, Grčka u još jednom mandatu.

Detaljnije iz EFMI-a na: https://efmi.org/

IMIA General Assembly

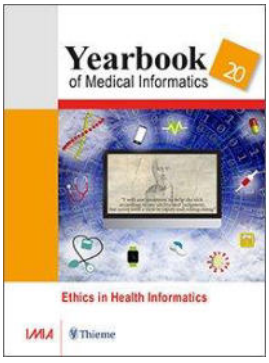
Održana je virtualno, 6. prosinca 2020.

Dnevni red se sastojao od:

- Izvješća, koja su sva usvojena.
- Odluka o promjenama održavanja skupova MedInfo:
  - MedInfo 2021 virtualno, domaćin IMIA
  - MedInfo 2023 u Australiji, domaćin AIDH
  - MedInfo 2025 na Tajvanu, domaćin TAMI.
- Izbora dužnosnika u IMIA kojima ističe mandat.

Sve novosti iz IMIA može se vrlo detaljno naći na mrežnim stranicama IMIA:

https://imia-medinfo.org/wp/



Osobito:

IMIA Yearbook of Medical Informatics 2020

"Ethics in Health Informatics"

https://www.thieme-connect.com/products/ejournals/issue/eFirst/10.1055/s-00034612