

# Electronic Health Center (eHC): Integration of Continuing Medical Education, Information and Communication for General Practitioners

Hrvoje IVEKOVIC, Jadranka BOZIKOV, Denis MLADINIC-VULIC<sup>1</sup>,  
Zdravko EBLING<sup>2</sup>, Josipa KERN, Luka KOVACIC

*Andrija Stampar School of Public Health, Medical School, University of Zagreb,  
Rockefellerova 4, Zagreb, Croatia;*

<sup>1</sup> *Mertojak Pediatrician Unit, Doverska 2, Split, Croatia;*

<sup>2</sup> *Medical School, Josip Juraj Strossmayer University of Osijek,  
Huttlerova 4, Osijek, Croatia*

**Abstract.** The Electronic Health Center (eHC) is aimed as an Internet service for continuing medical education of general practitioners (GPs) at the national level. It integrates education, access to relevant and trusted information sources and group communication in order to meet the needs of both daily work and continuing education at home.

## 1. Organization of Health Care and Licensing System in Croatia

General/family practitioners (GPs) are seeing in their daily practice cases from all medical fields and frequently are faced with borderline medical problems and social issues (e.g. social, economic, familial, occupational and other). They must be lifelong learners and keep up with the exploding medical knowledge. Acting at local and regional level as “gate-keepers” in health care system they are supposed to have not only broad and solid medical knowledge but also to be acquainted with health care infrastructure and interrelations at a regional level. The majority of traditional forms of continuing medical education require too much time or absence from workplace, sometimes are inefficient, too expensive or even unavailable to GPs (courses, congresses, workshops, visits to centers of excellence, library searches, etc.). The situation for Croatian GPs is even worse: until recently they were brought together in the so called “health centers” (see below), and today they are “scattered around” and “atomized” each one in his/her own practice, very often unable to communicate with each other or with their colleagues specialists. The traditional organization disappeared and the new type of association (group practice) is not yet established: a GP lacks communication and can hardly, or even not at all, be out of workplace for educational purposes (especially the ones who live in remote areas).

The health care system in Croatia operates at three levels. At the primary level of health care the type of integrated health institution was established after the World War II, named “dom zdravlja” (translated literally from Croatian as the “home of health”, i.e., health center), with the GPs as the key persons [1]. As a rule, one health center corresponded to

one administrative unit (municipality). Although a general practice constituted the major part of those integrated services, the primary level also included a pediatrician for 0-6 year-old children, school health physician for 7-18 year-olds, and occupational medicine specialist for specific measures related to work hazards and for general care in larger companies, as well as dentists. Specialization of general/family medicine was also introduced and in the case of some municipalities (larger ones) some other specialized outpatient units were also attached to health centers (radiological units, labs) and situated within the same building as a part of public health services. This type of institutions was preserved until the 1990s, when they started to disintegrate gradually in the process of privatization. After the re-organization of health insurance system in 1993 and 1998 the primary level of health care is still based upon an integrated type of general/family practice with the power of the referral system (GPs are acting as gate-keepers to higher levels of health care) but the physicians (general/family practitioners, outpatient pediatricians, and gynecologists as well as dentists) and their associates are not any more employees in health centers. Today, they are private practitioners renting facilities as the only connection with a health center while only a small number of them is working in their own or otherwise rented premises. Patients have a free choice of their primary level physician and both types of practitioners have contracts with the Croatian Institute for Health Insurance concerning coverage of primary health care costs on the basis of age-adjusted capitation system. Outpatient pediatricians still take care of their patients as primary level physicians (in case when they have enough patients) while the school health physicians (specialists) work exclusively on health promotion and prevention of school children instead of covering both preventive and curative practice like earlier. According to data provided by the Croatian Medical Chamber, the network consists of 2,425 GPs, 276 pediatricians and 170 gynecologists [2].

Mandatory licensing system for all physicians was introduced in 1997 and includes credits given by the Croatian Medical Chamber for participation in traditional forms of CME (congresses, symposia, professional meetings, continuing education courses, workshops, lectures, study visits, publishing in professional and scientific journals, master and doctoral degrees and specialization) but computer-based or Internet-based education/training is not recognized as a CME activity yet [3]. Physicians are obliged to collect 120 credits during a six-year period.

Although a percentage of GPs having a personal computer at home or in practice is roughly estimated to be as low as 20% with only half of them having access to the Internet it is expected that this number would increase markedly in not so distant a future [4]. It seems that barriers are mainly of psychosocial and not of economic origin. Internet accessibility is definitely not a problem and younger generations are already much more familiar with computers and the Internet, also as a result of having taught students medical (basic) informatics in well equipped and networked computer lecture rooms at universities (high schools).

## 2. Electronic Health Center Objectives

The Electronic Health Center (eHC) is aimed as an Internet service for continuing medical education for general/family practitioners at the national level. Its objective is the integration of education, access of relevant and trusted information sources and communication for both daily work and continuing education at home. The project goal is to establish information infrastructure based on a web-portal that would enable and support the individual activities of GPs and their associates on continuing education and group communication, focusing on problems of daily practice.

Particularly, eHC will enable and facilitate:

- Access to scientific and professional literature
- Presentation of case studies for group consultation
- Exchange of experiences and opinions
- Teleconsultation with experts
- Discussion, formulation and consultation of diagnostic and therapeutic guidelines
- Acquisition and use of educational materials
- Acquisition and exchange of materials for patient education
- Professional association activities
- Information on scientific and professional meetings and events

Use of eHC should foster quality assurance of general/family practice.

### 3. Results

The idea of eHC was conceived by the first author during his postgraduate studies in public health and the very first version was launched in the fall of 2000 and hosted at the Andrija Stampar School of Public Health server, URL: <http://www.snz.hr/edz>. The project was accepted and supported by one-year grant from the Ministry of Science and Technology of the Republic of Croatia within the framework *IT Implementation* in October 2001.

The GPs from all over Croatia are solicited to contribute to web-site modules or participate in discussion groups, and contributions and consultations made by specialists from different medical fields are welcome.

In order to fulfill the eHC objectives, the content has been structured in several modules:

- *Teaching Room* – module for multimedia educational and training materials, diagnostic and therapeutic guidelines, other learning tools and courses.
- *Links* – links to relevant and reliable information sources like databases, electronic journals, search engines, universities, research centers and institutes, laboratories, national and international organizations, etc.
- *Address Book* – links to professional and health care organizations at national level (public health institutes, Ministry of Health, health insurance, medical associations/societies, hospitals, labs, patient organizations, and other useful links).
- *Forum* – module for discussion, consultation with experts, presentation of cases from practice, exchange of experience and opinion, group communication, discussion groups, etc.; this module is intended only for physicians and authentication is necessary; it also includes several lists (mailing and web lists).
- *Waiting Room* – information and guidelines for patient education (e.g. guidelines for cancer prevention or diabetes self-monitoring and control); information is designed for patients (and accessible to them) but they are here primarily to be used (distributed) by physicians; the exchange of these materials is an advantage: it saves efforts for their preparation.
- *Calendar of Events* – meetings, congresses, announcements, news from professional associations, topical issues, etc.

There are some additional pages like *Project Description*, *Help*, *Registration Form*, *Contacts*, and possibly others will be added.

Gradually, new components would be added depending on interest like teleconferences, streamed video, chat, etc.

The web-site is open to the public except for the module *Forum*. Registration procedure for this particular module is necessary and its implementation is now under way. It is

necessary to ensure that patient data are hidden from patients (although cases are presented without personal data).

Here are some of the very first contributions included in the *Waiting Room*:

Denis Mladinic-Vulic prepared for publication *Healthy children visits* [5], the recommendations and advice she gives to parents (caretakers) at regular baby check-ups in her practice: into the well structured material for parents she included essential and clearly formulated guidelines regarding nutrition, hygiene, child development, vaccinations, prevention of accidents etc., and note of next visit/vaccination term at the end of each visit (at the age of 1, 3, 6, 9, 12, 15, 18, 24, and 48 months).

She is also the author of two other contributions: a very useful handouts concerning skin care of a patient with neurodermatitis and description of disease development and care taking for a child with chickenpox.

Another example taken from the same module is *A guide for cancer prevention*, a series of pages with information concerning risk factors, healthy and preventative behavior, warnings for early detection (including self-inspection), etc. for most common human cancers.

We consider peer review and editorial policy very important. The Editorial Board was set up and included members coming from all four Croatian medical schools (Zagreb, Osijek, Rijeka, and Split).

All contributions should be reviewed and special attention is paid to those in modules *Teaching Room* and *Waiting Room* and for them three-level review process is envisaged: (C) review by the eHC Editorial Board; (B) review made by two independent extramural reviewers, and (A) positive evaluation made by eHC users. According to evaluation made, each material is classified and marked as A, B or C.

Another very important issue is that of information quality, especially transparency of authorship and sponsorship. We consider the eight ethical management principles for medical and health web-site developers very good [6] and we are following them.

Electronic Health Center is included in the list of web-sites visited and described by Health on the Net (HON) on March 14, 2001.

#### 4. Future Perspectives

During the next year further development of eHC is planned including: recruitment of users and participants (collaborators), implementation of registration procedure, implementation of counters and evaluation of attendance, registration on search engines, continuation of review of contributions, building and maintaining of user database, and evaluation of web-site by users.

Till the end of this period we expect to have diagnostic and therapeutic guidelines for up to ten common diseases, several case studies, discussions and consultations, etc.

Further development depends on results, mainly on usage and acceptance of eHC from the user side. Besides a support from users and their organizations (private physicians and other health care providers, medical and patient associations, public health institutions, health care organizations) we expect support from other potentially interested subjects (e.g. pharmaceutical and medical equipment industry, computer and software producers). Although a lot of enthusiastic work has been done within the eHC project, its sustainability depends on permanent funding.

If eHC is well accepted, further collaboration with the Croatian Medical Chamber as the institution responsible for licensing would be desirable in order to establish accreditation of on-line CME courses for both the authors and the users.

## 5. Discussion

Although we have been inspired by our own ideas, there are, of course, many web-sites based on similar concepts all around the world made by different developers in a whole range from not-for-the-profit organizations to commercial ones. The Post-Doc project in the Euroregion Maastricht (NL) - Liege/Hasselt (B) - Aachen (D) is especially well founded and described [7,8]. The analysis of user requirements has been done very carefully and initial project evaluation gave interesting and valuable results.

Traditional educational and training largely focuses on enhancing competence (knowledge, skills and attitudes) [9], while Internet-based services like Post-Doc and eHC offer opportunity for self-directed CME for lifelong learning from everyday environment. Therefore they are suitable to educate not merely for competence, but for capability (the ability to adapt to change, generate new knowledge, and continuously improve performance) what is necessary in today's complex world [9].

We completely agree with conclusions made elsewhere [8] that web-based CME service will be more than just a "fashion" if (1) traditional rules of publishing are respected and (2) end-users can influence its content. Furthermore, we have found ourselves in a dilemma whether such services have a potential to improve final outcome (i.e. quality of decision making in general practice and thus patients' outcomes). Therefore further evaluation studies should employ methodology for quality measurement.

## Acknowledgment

The paper is result of work on the project "Electronic health center – web-site for general practitioners and their associates" supported within *Information Technology (IT) Implementation* framework by the Ministry of Science and Technology of the Republic of Croatia, contract No 353-28-11-2001.

## References

- [1] Kovacic L, Sosic Z. Organization of health care in Croatia: needs and priorities. *Croat Med J* 1998; 39:249-55.
- [2] Hrvatska liječnička komora. Mreža primarne zdravstvene zaštite. [on-line] 2001 December 6. Available at: <http://www.hlikom.hr/mreza/sadrzaj.asp>. Accessed 2002 January 15.
- [3] Hrvatska liječnička komora. Pravilnik o sadržaju, rokovima i postupku stručnog usavršavanja i provjere stručnosti liječnika. [on-line] Available at: [http://www.hlikom.hr/hrv/dokumenti/usavrsav/dok2\\_1.asp](http://www.hlikom.hr/hrv/dokumenti/usavrsav/dok2_1.asp). Accessed 2002 January 15.
- [4] Ivekovic H, Grgurovic D, Lelic R, Drobnjak K, Pancic S. Zivot u kameno doba: znanje, stavovi i vjestine u sluzenju racunalom medju liječnicima primarne zdravstvene zaštite u Vukovarsko-srijemskoj zupaniji. In: Vukovic H, Vucak J, Klarin L, editors. *Zbornik. VII kongres obiteljske medicine. Psihosomatski poremećaji i gastroenterološke bolesti*. Zadar 2000. Zadar: Hrvatska udruga obiteljske medicine, 2000: 205-13.
- [5] Mladinic-Vulic D. Pregledi zdrave djece. [on-line] 2000 October. Available at: <http://www.snz.hr/edz/pedijatrija/pregledi.htm>. Accessed 2002 January 15.
- [6] Health on the Net Foundation (HON). Health on the Net Foundation . [on-line] 2002 January 11. Available at: <http://www.hon>. Accessed 2002 January 15.
- [7] Dickmann C, Baaren J van der, Spitzer K. Post-Doc: Satisfying the information needs of general practitioners in continuing medical education and daily practice. In: Kokol P, Zupan B, Stare J, Premik M, Engelbrecht R, editors. *Medical Informatics Europe '99*. Amsterdam: IOS Press, 1999: 463-6.
- [8] Dickmann C, Habermeyer E, Spitzer K. WWW-based continuing medical education: how do general practitioners use it? In: Hasman A, Blobel B, Dudeck J, Engelbrecht R, Gell G, Prokosch H-U. *Medical Infobahn for Europe. Proceedings of MIE2000 and GMDS2000*. Amsterdam: IOS Press, 2000: 588-92.
- [9] Fraser SW, Greenhalgh T. Coping with complexity: educating for capability. *BMJ* 2001;323:799-803.