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## Teaching how to read and write science: a library-journal partnership

### Lehren wie man die Wissenschaft liest und schreibt: eine Partnerschaft zwischen Bibliothek und Zeitschrift

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Zusammenfassung

#### Kontext

*Croatian Medical Journal* (CMJ) ist eine allgemeine medizinische Zeitschrift in englischer Sprache, die einzige kroatische medizinische Publikation in *Current Contents*. Die *Zentrale Medizinische Bibliothek* (CML) ist die wichtigste in Kroatien, somit auch die Mittelpunkt der biomedizinischen Information. Beide gehören zu der grössten und ältesten medizinischen Fakultät in Kroatien, der Medizinischen Fakultät der Universität in Zagreb.

CMJ ist erst in 1992 erschienen, und die Redaktion hat gleich die CML für die Hilfe gefragt, wie kann man die beste internationale herausgeberische Praxis an die bestehende lokale Gelegenheiten anwenden. CMJ insistierte dabei auf einen Politik die medizinischen Autoren helfen konnte, und CML war sowieso bereit die Literatur und die Referenzen für die Autoren ausfindig zu machen. So war auch der Leiter der CML in die Redaktion des CMJ kooptiert.

### Lernen wie man die Wissenschaft liest und schreibt: eine Partnerschaft zwischen Bibliothek und Zeitschrift

Die Redaktion des CMJ war schon lange bewusst dass die kroatischen Ärzte über wichtige und interessante Daten verfügen, aber auch die ungenügende Fertigkeit haben diese in einen wissenschaftlichen Text zu präsentieren. Um diesen offensichtlichen Mangel in wissenschaftlichen Forschung zu mildern, hat man einen Pflichtfach in wissenschaftlichen Methodologie und Kommunikation eingeführt. Das Fach ist im Gange seit 1995/96 und im Mittelpunkt sind: 1) *Die Grundsätze der wissenschaftlichen Forschung*; 2) *Wie man eine medizinische Information findet*; 3) *Wie man ein Studien- design macht und die Daten präsentiert*; 4) *Wie man überhaupt eine wissenschaftliche Arbeit schreibt*. Der Fach hat drei Bestandteile: die Vorlesungen, die Gruppendebatten, und die Übungen in Problemlösung (in kleineren Gruppen). Dabei sind immer drei Bibliothekare anwesend, wie in Vorlesungen, so auch in kleineren Problemlösengruppen.

CMJ und CML haben in 2002 und 2004 auch mit zwei kontinuierlichen Kurse begonnen, nämlich *Medizinische Forschung: Planieren und Schreiben*, und *Die Bewertung der medizinischen Information*. Diese Kurse sind für die jungen Ärzte wie auch für die Allgemeinärzte bestimmt. Die Kroatische Ärztekammer, als zuständig, hat die Kurse sehr hoch bewertet.

Wie weiter?

CMJ und CML haben für das nächstes akademisches Jahr auch drei Wahlpflichtfächern in Evidenz-basierten Medizin entwickelt (*Die Wichtigkeit eine gute Evidenz zu finden*; *Wie man eine Forschung plant und die Daten analysiert*; *Die Datenanalyse und der Forschungsbericht*). Es gibt auch ein anderes gemeinsames Unternehmen – *CMJ antwortet auf Ihre klinische Fragen*. Das ist eine CMJ web-Seite, die den kroatischen Ärzten helfen soll die Grundsätze der Evidenz-basierten Medizin in ihre klinische Praxis zu übernehmen. Dabei ist ein Bibliothekar verantwortlich für die Suche und die bestmögliche Evidenz zur Beantwortung der klinischen Fragestellung.

## Summary

### Setting

Croatian Medical Journal (CMJ) is a general medical journal published in English and the only Croatian medical journal covered by the most selective bibliographic databases, such as SCI-Expanded and Current Contents. Central Medical Library (CML) is the most important Croatian medical library serving as a central point for biomedical information. Both are affiliated to the Croatia's largest and oldest medical school, the University of Zagreb School of Medicine.

The CMJ started in 1992 and its Editorial Board asked CML for help in formulating exchange policy and bringing best editorial practice to the local setting. When CMJ introduced an «author-helpful» policy, CML helped to the authors in finding literature and organizing the references. CMJ also co-opted the Head-librarian to the Editorial Board.

### Teaching how to read and write science: a library-journal partnership

Early in their work, CMJ Editorial Board learned that Croatian physicians had important and interesting data but inadequate skills for presenting them in a scientific article. To alleviate the lack of education in research methods and writing, a mandatory course in scientific methodology and communication was developed and introduced into the School's curriculum. The course has been running since academic year 1995/96 focusing on (1) principles of scientific research; (2) finding medical information; (3) study design and presentation of data; (4) writing a scientific article. The course has three components: lectures, discussions in medium-sized groups and problem solving exercises in small groups. Three librarians are participating in the course, giving a core lecture and hands-on problem-solving exercises using PubMed.

CMJ and CML started two continuing education courses in 2002 and 2004, respectively: *Planning and Writing about Research in Medicine* and *Finding and Appraisal Medical Information*. The courses are aimed at young academic physicians and general medicine practitioners. The courses have been highly rated by the Croatian Medical Chamber, which serves as a licensing body.

Where to next?

CMJ and CML developed three electives in evidence-based medicine (*The importance of finding good evidence, Planning research and Research data analysis and writing research report*) which are to be introduced in the next academic year. Another collaborative effort – *CMJ answers your clinical question* – consists of developing a web service on the CMJ's web site to help Croatian physicians in transferring the evidence-based medicine principles into the clinical practice. A librarian will be responsible for searching and critical appraisal of evidence.

**Key words:** libraries, medical; periodicals; education, medical, graduate; curriculum; education, medical, continuing

## Introduction

Academic librarians have, for many years, been involved in teaching users how to find information and use library resources effectively (1). As early as in 1984, medical educators from the Association of American Medical Colleges (AAMC) made a number of recommendations about involving libraries in medical education (2). Among these was a call to incorporate information-seeking skills into the curriculum to promote independent learning and problem solving. Academic libraries have also played a similar role in Europe, with libraries in Great Britain and Nordic countries at the forefront. Information overload and new focus on student learning in a lifelong context created in recent years a need for a reconceptualization of the roles and responsibilities of library and information professionals in a new learning environment (3). In the 1999 report on the Medical School Objectives Project (MSOP), AAMC recommended that each medical school graduate demonstrate not only the ability to retrieve, manage, and utilize biomedical information for solving problems and making decisions that are relevant to the health care, but also an understanding of the need to engage in lifelong learning to stay abreast of relevant scientific advances (4). According to WFME Global Standards for Quality Improvements, the changes and innovations in the structure and process of medical education have been essential, among others, to prepare physicians to cope with the explosion in medical scientific knowledge and technology, inculcate physicians' ability for lifelong learning, and to ensure training in the new information technologies (5). This document emphasizes the mandate of the medical school to teach the principles of scientific method and evidence-based medicine, including analytical and critical thinking, throughout the curriculum.

Librarians may play key roles in these activities. Evidence-based medicine (EBM) brings to librarians a possibility of participation in the problem-solving process (6), as well as in promoting the active learning principles (7). Library instruction programs should therefore undergo the shift from bibliographic instruction to information literacy, seen as the process of recognizing information need, retrieving, evaluating, using and disseminating of information to acquire or extend knowledge (8). For information literacy instruction to succeed, it must be integrated, relevant, ongoing, collaborative, and applied (9). In other words, effective partnership between library and faculty is of utmost importance.

The aim of this article is to describe the program of teaching how to read and write science (10) developed in partnership between a medical library and a medical journal.

## Setting

University of Zagreb Medical School is the oldest medical school in Croatia (11). Study of medicine lasts six years with a predominance of mandatory courses. Total number of students is around 1,800 (240 is enrolled each year). Croatia has been harmonizing its higher education system with that of the European Community starting by implementation of the Bologna Process principles in the academic year 2005/06 (12). The MD programme at the medical school would last 6 years followed by the PhD program for 3 years. The curriculum's changes would be oriented toward introducing more elective courses and modular/problem-based learning.

Central Medical Library (CML) is affiliated with the University of Zagreb Medical School. Being the biggest medical library in Croatia, it provides medical information to all local health information consumers, but its primary function is to serve students, faculty and professional health staff of its parent institution. The Croatian Medical Journal (CMJ) is a medical journal of general profile, published in English since 1992. It is owned by 4 Croatian medical schools, but its editors in chief, as well as its editorial office, are affiliated with the University of Zagreb Medical School. Published before in the local language as an official organ of the Medical School in Zagreb, CMJ changed in 1992 the complete editorial policy and practice. New CMJ's editors were primarily concentrated on implementing international standards in their journal's editorial policy as well as in achieving international visibility. The library staff helped them as much as possible. CML helped in applying

for coverage in relevant indexing & abstracting services, and formulating exchange policy. CML's head-librarian joined the CMJ's Editorial Board. The co-operation has become routine over time. CML monitors the bibliometric profile of the CMJ, has been helping to the CMJ's authors in finding literature, makes accessible and deposits the exchanged journals etc. In turn, CMJ has been constantly promoting the CML's services and librarians' skills to the Faculty and to the wider medical community. However, the most important issue of that library-journal partnership proved to be the education of students in information and communication skills.

### **A library-journal partnership**

CML → CMJ
<ul style="list-style-type: none"><li>• application to the international indexing &amp; abstracting services;</li><li>• formulation of the exchange policy; monitoring of the bibliometric profile;</li><li>• helping to the authors in finding references</li></ul>
CMJ → CML
<ul style="list-style-type: none"><li>• advocacy on the School's level;</li><li>• promotion of the library services to the Faculty and wider community;</li></ul>
CML ↔ CMJ
<ul style="list-style-type: none"><li>• teaching information and communication skills at graduate and postgraduate level</li></ul>

#### CML's bibliographic instruction program

CML has a very long tradition in user education. As early as in 1960, Medical School included a bibliographic instruction program into its postgraduate curriculum. The impetus came from one of the School's librarians returning from the study visit to the USA (13). The program has been carried on for more than three decades. Its main topics were the sources of medical information, with special emphasis on medical journals and indexing & abstracting publications, as well as citation style and formats. The major change happened in the 1995/96 academic year.

#### Teaching students how to read and write science

CMJ's editors-in-chief have been both full professors at the Medical School and experienced authors publishing in international medical journals. Therefore, they were aware how important for a medical student is to learn at a very early stage about research methods and to acquire information and communication skills. Besides, they believed that promotion of the evidence-based approach to practice and research has been an imperative in a country outside of the main-stream scientific world (10). The strongest specific impetus arose from an analysis of articles CMJ have been receiving for publication. The editorial policy of CMJ has not been to reject manuscripts on account of poor presentation and language. The advice what to improve in an author's manuscript and how has been given through the so called pre-review process. CMJ works together with its authors on improving the presentation of their reports if editors recognize them as worthy of extramural review and possible publishing (14). That was not enough! The CMJ's Editorial Board realized very soon that a systematic effort was needed to elevate the reading and writing skills of the Croatian medical doctors. Four Editorial Board's members made the program of the "Introduction to the Scientific Research in Medicine" course and proposed it to the administration of the School. In the 1995/96 academic year the course was introduced into the 2<sup>nd</sup> year graduate curriculum as a mandatory course. It was designed as a 4-part course consisting of 1) principles of scientific research in medicine (study design, testing hypothesis, research methods, etc.); 2) statistical data, their interpretation and presentation; 3) finding medical information and 4) writing and publishing a scientific paper. The course gives also some basic facts on principles of evidence-based medicine and research integrity.

The course has three components: lectures, discussions in medium-sized groups (seminars) and problem solving in small groups (hands-on exercises), total of 21 class hours. The course is coordinated by the CMJ's Editor in Chief. Each of the 4 parts has its principal lecturer and 1 or 2 assistants helping in discussions and exercises. Students use *Introduction to the Scientific Research in Medicine* published by the responsible faculty as an obligatory textbook (15). They are also encouraged to read Lewis Thomas' book of essays *The Youngest Science*. *Notes of a Medical Watcher* and Edward Huth's *Writing and Publishing in Medicine*. The acquainted knowledge is tested by multi-choice questionnaire (5 questions covering each of the 4 parts).

#### Finding medical information – CML's module

Central Medical Library is responsible for the 3<sup>rd</sup> module - finding medical information. The module consists of 1 class hour plenary core lecture and 3 hours hands-on problem-solving exercises in small groups (10-15 students) in a computer classroom.

#### Content of the 3<sup>rd</sup> module on finding medical information

Plenary core lecture (1 class hour)	Scientific medical journals: most important primary resources; bibliographic databases and other relevant secondary resources; formulating search strategies; web resources and their quality assessment
Hands-on exercises (3 class hours)	CML web pages and linked resources (catalogues, accessible databases, e-journals, e-books etc.); PubMed and its the main features; MeSH; searching PubMed on a search scenario; Q&A; EBM databases

The exercises are divided in two parts. 1) A search scenario is prepared for each student. The scenario consists of a sheet of paper with a search problem and a preferred search technique (Mesh terms in most cases). Instructor performs a sample search on the central computer, and then the students work independently on their scenarios. The instructor walks the class looking for those who need a help. At the end of this part the students are asked for questions. 2) The searching of EBM databases (Cochrane databases on Ovid's platform as well as free accessible Bandolier and National Guideline Clearinghouse) is demonstrated and the students are asked to search one of these databases on the same scenario as in first exercise.

#### Continuing medical education courses

CMJ and CML planned and started together two continuing medical education courses in the School's Postgraduate Continuing Medical Education Program. The course *Planning and Writing a Research Article* was started in 2002 and has been performed by the CMJ's staff (two editors in chief, language editor and statistical editor). The other one, *Finding and Appraisal of Medical Information* was started in 2004 and has been performed by the four librarians. Both courses last for two days and are scheduled twice a year. The participants are young academic physicians, junior researchers and practitioners (16). The content is similar to that in graduate courses, but more focused and personalized. The courses are under the auspices of the Croatian Medical Chamber which serves as a physician licensing and relicensing body. A license for practice medicine is issued in Croatia for 6 years and the physicians are obliged on continuing education. Participation in our courses brings to each participant a maximum of 11 points.

#### Where to next?

In the 2005/06 academic year, Croatia started to harmonize its higher education system with the Bologna Process principles. Medical School's curriculum is going to change and a number of new elective courses will be introduced. CMJ and CML developed three electives in evidence based medicine: *The importance of finding good evidence* (CML), *Planning Research* (CMJ) and *Research data analysis and writing research report* (CMJ). *The importance of finding good evidence* has been scheduled for the 4th year's students. The course would be focused on

formulating a clinical question, searching and appraisal of evidence. It happened for the first time that the librarians designed the course and proposed collaboration to a basic and a clinical department. The topics would be presented by two librarians, an associate professor of pharmacology and an assistant of internal medicine.

Direct cooperation between CMJ and CML would be continued by a new web service on the CMJ's web site, *CMJ answers your clinical question*. It is designed to help physicians in transferring published evidence into the clinical practice. We realized that in the smaller communities with insufficient information literacy and inadequate information infrastructure, a medical librarian could play a very important role in the promoting concepts of the EBM and helping in transferring best evidence into the everyday clinical practice. CML would assign one of its librarians with an MD degree for search and critical appraisal of evidence. The questions would be sent by a web form, and search results by an e-mail together with a satisfaction questionnaire.

CMJ and CML have been preparing an extensive evaluation plan for the near future. We are going to deploy two follow-up models: a) a cohort study to measure the influence of the course "Introduction to the Scientific Research in Medicine" on the students' attitudes towards science and research in medicine, and b) a survey among young physicians admitted to the state exams to examine the influence of the course "Introduction to the Scientific Research in Medicine" on their current research activities.

## Conclusions

Though unusual at the first sight, cooperation between Central Medical Journal and editorial board of the Croatian Medical Journal in teaching students information and communication skills proved to be very successful. Started enthusiastically in an attempt to transform a local medical journal into a visible and "current contented" journal, this journal-library partnership finally resulted in the systematic and approved teaching program on graduate and postgraduate levels.

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