INTERNET SEARCH OF ARTICLES CONCERNING THE GEOGRAPHIC INFORMATION SYSTEMS (GIS)

D. P. ŢÎRŢ

PdD candidate, "Lucian Blaga" University of Sibiu

Abstract: The purpose of this paper is to find relevant scientific articles about geographic information systems, (GIS) published in medical literature. Due to the fact that, today we assist at an exponential development of the available medical information, I chose PubMed as the search engine and the study period of time between 1990 and 2007. 610 articles about GIS resulted from this research. I analysed each article or abstract; I drew up a database, which also included the place where the study was developed, the public health area concerned in the study and the geographical covering area. This paper also presents a descriptive statistics of the published materials, according to the mentioned criteria and proposals for applying GIS in Romania as well, based on the results obtained abroad.

Keywords: geographic information system, GIS, medical information search, Internet, public health.

Rezumat: Scopul lucrării este identificarea articolelor relevante privind sistemele informatice geografice publicate în literatura medicală de specialitate. În conditiile cresterii exponentiale a infomatiilor medicale disponibile în zilele noastre, am optat pentru utilizarea unui motor de căutare (PubMed), alegerea unei perioade de studiu cuprinsă între 1990 și 2007 și întocmirea unei metodologii proprii de sinteză a rezultatelor furnizate de motorul de căutare. Din căutarea efectuată au rezultat un număr de 610 articole referitoare la SIG, articolele sau rezumatele acestora au fost analizate, s-a întocmit o bază de date care a inclus în afară de identificarea articolului, locul în care a fost efectuat studiul prezentat, domeniul sănătății publice abordat în studiu, amploarea geografică a studiului. Lucrarea prezintă și o statistică descriptivă a articolelor publicate în funcție de criteriile menționate dar și propuneri pentru aplicarea în România a SIG, bazat pe rezultatele obținute în străinătate.

Cuvinte cheie: sistem informatic geografic, SIG, căutare informații medicale, Internet, sănătate publică

INTRODUCTION

In large, a geographic information system (GIS) is a system used for tailoring the information, processes and structures that reflect the real world, including the past events, in order to be able to understand, analyse and administer resources and facilities. GIS may be described as a management database system, which usually gives

the user the possibility of knowing the data interactively and by graphics and of interrogating and analysing them. Yet, GIS is not a pure hardware system, it is an ensemble made up of computing equipment, soft, people, methods and standards that allow data processing and the exploitation of geographic-topographic maps.

G. Dumitriu (1) presents seven definitions for GIS and conclude that the common elements of the definitions are the following: computing system (hard and soft), geographic data (spatial data), management and analyse procedures. The geographic data refers to a datum which is correlated to a position well determined on Earth.

Searching medical literature on the Internet was transformed in the last years by the search engines. Even if we still read magazines and skim through their updated contents online, the online search engines are also of great help. These search engines may find an article, an author, a certain issue of medical interest, providing the bibliography and the abstract of the article or the complete version of this. The full access to certain articles is not always for free, being necessary to pay for a subscription to the journal in which that particular article will came out. Most often, the results of the article are freely distributed.

There are numerous search engine and many ways to obtain the online access to the medical literature. Today, **Google** (www.google.com) is the most used search engine. Another widely used search engine is **PubMed** (www.ncbi.nlm.nih.gov/entrez/query.fcgi), a portal of the U.S.A. government, which offers access to an enormous database with quotations and abstracts of the National Library of Medicine; **Google Scholar** (www.scholar. google.com/), **Yahoo** (www.yahoo.com), Sunnyvale, California, search engine, which belongs to the company with the same name. These search engines are available to any person with Internet connection and do not require registration or any paid subscription.

Each of the above-mentioned search engines has its advantages or disadvantages; choosing one of the search engines usually takes into consideration the type of the searched information and the user's preferences. *Google, Google Scholar* and *Yahoo* are easy to use and offer a wide range of information that varies according to the chosen term. These search engines index the contents of PubMed, as well as the online contents of different publications of students and school pupils. *PubMed* offers a more profound search, but needs to know how to search; training help the users to better understand the results. *Google and Yahoo are general search engines. PubMed* and *Google Scholar* are mainly used for finding scientific articles. PubMed is able to sort the results according to date, author, journal but it does not take into account the number of quotations. Google and Google Scholar search may go deeply by introducing a search term as specific as possible.

PubMed search is facilitated by a database with extensive index and quality control. Moreover, for the search of the text, it uses a controlled lexicon of the medical subjects and titles, the so called MeSH ("medical subject headings"). This feature allows searching by different stages of specificity. PubMed clinical articles search may be limited to one of the four study categories (therapy, diagnosis, etiology or prognostic), studies accomplished on people or studies with a certain research method, such as the systematic revision.

Google Scholar is not as specific as PubMed – but, it may find theses, books, abstracts that cannot be found in the database of the National Library of Medicine.

A study performed in 2005 (quoted by Steinbrook R.-2) reveals that Google supplies the majority of the articles found by a search engine (56,4%), followed by PubMed (8,7%) Google Scholar (3,7%) and Yahoo (3.4%).

MATERIAL AND METHOD

I chose GIS abbreviation for the geographic Information Systems, which corresponds to the English translation. At the level of the window search of the PubMed site (www.ncbi.nlm.nih.gov/entrez/querz.fcgi), I inserted the searched term ("GIS"), limiting the search to: articles with abstracts, studies concerning people, published between 1.01.1990 and 31.12.2007, while for the rest, the fields of the search remained unchanged (Picture 1).





After lecturing the articles or their abstracts, which were found by the search engine, I drew up a database in Excel format, with a view to grasp the aspects regarding the use of the geographic information systems at international level, reflected through the publishing of the specialized articles. The fields of the accomplished database are: authors, title, journal, year of publishing, public health concerned area (human biology, health in relation with the environment factors, fighting and preventing the infectious and parasitary diseases, accidents and disasters, preventing and controlling the nontransmissible diseases, planning and evaluating the health services and community health, information technology, methodology for using the GIS). Taking into account the contents, each article could be found in one or more categories. I registered and analysed the place of the study mentioned in the article (in case, there was no express reference of the geographic area within the article contents, I took into consideration the author's geographical localization), the proportion of the GIS usage within the study (local, county, national, international, continental, not mentioned).

RESULTS AND DISCUSSIONS

GIS term search brought about a number of 810 results, out of which only 610 referred to geographic information systems – GIS (Geographic Information Systems). The other 200 articles contained the letters "GIS" within the text, but they mostly represented an e-mail address, the name of an organization, abbreviations for "glycaemic indices", "government insurance scheme", "Gastrointestinal schwannoma" etc.

The next picture reveals the situation of the number of articles published within the searched period of time.





The next picture emphasizes the place where the study took place, as well as the absolute and percentage situation per continents and subcontinents.

AMT, tomel II, no. 3, 2008, page 263

Picture no. 3. The number and the percentage of the developed and published studies per continent/subcontinent, between 1990 and 2007, PUBMED source.



Taking into account the importance of the study, I noticed a predominance of the studies with local coverage area (districts, municipalities) as against those at national level. The situation of the number of studies and articles published taking into account the importance level of the study is emphasised in the next table.

Table no. 1 – Numbe	r of studies	according	to the
importance level		_	

Importance level of the study	No. of articles
local	316
county	77
national	80
International	27
continental	8
Not mentioned	102
Total	610

Public health and GIS areas which are approached in the analysed articles are used for planning and evaluating the health services and the community health (Table 2).

Table no. 2 – Areas approached in the analysed articles

Area	Human biology	Health in relation with the environment factors	Preventing and controlling the infectious and parasitary diseases	Accidents and disasters	Preventing and controlling the non transmissible diseases	Planning and evaluating the health services and the community health	Information technology	GIS usage methodology
No. of	26	376	192	72	139	491	286	491
articles								

CONCLUSIONS

- **1.** The majority of the published articles refer to studies developed in North America and Europe;
- 2. There are no studies made in Romania and GIS usage is almost inexistent at the level of our public health system;
- **3.** The studies that use GIS are more frequent at local and county level, which is explicable due to the lower costs for starting and developing an infrastructure for data gathering;
- **4.** Any area of the populations' health may be researched using GIS; the large number of the articles published in the last years makes us believe that the use of GIS is spreading;
- **5.** GIS application in the Romanian public health system must include studies at county level, comprising territorial and administrative units and at national level, by using the counties' data.

BIBLIOGRAPHY

- 1. Dumitriu G. Sisteme informatice geografice. Ed. Albastră, Cluj-Napoca, 2001.
- Eremia A., Tatiana Constantinov, Vieru S.Cartier Dicționar – Statele Lumii, Ediția a II, Editura Cartier, Chişinău, 2004.
- Steinbrook R. Searching for the Right Search Reaching the Medical Literature. N Engl J Med 354;1. www.nejm.org January 5, 2006.
- 4. www.scholar.google.com/
- 5. www.ncbi.nlm.nih.gov/entrez/query.fcgi