Using Internet for Telemedicine in Cardiology and Pneumonology - the general strategy

Piotr Kasztelowicz <pekasz@am.torun.pl>

Computers find many applications in medicine as well provide support for medical scientific experiments. But, if the first physician of world ever had thoughts how to use computer in clinical practice, he did not expect, that computing network would begin the new era of progress in the World. At the present time, we can't imagine to exist without computers – the awareness of this simple fact became particularly visible by "Y2K" problem, when the danger of possible complication of "small date bug" made us painfully aware, how many fields of our live depend from computers. Medicine has also accepted already existence of "chips" in medical devices including those implanted in the human body. Heart pacemakers seem to be the first, initialising this chapter in medical technology. This rapidly growing use of computers in many fields, including medicine originated from universal function of steering, data collection and processing, digitalisation and remote transfer. This replaces the traditional form of communication. In my opinion, communication became the most important factor to decide about further expansion of computing systems in medicine. The most advanced form of communication encompasses now creating the virtual networks and remote access/ presence. The Law, Ethics and Virtual Psychology are also important issues, which accompany "strong medical" aspects of Telemedicine. Telemedicine is still a new branch of medicine, thus this is difficult to find the "pure" enthusiasts and "pure" opponents, but most groups of peoples seem to discover cautiously it as promising form of medical practice.

Telemedicine – New Definitions

If the term: *virtual*[1] is defined as "being in essence or effect but not in fact or name" *virtual network*[1] has the definition: "interconnected or interrelated chain, group, or system". This suggests, the peoples may use remote networking to participate in discussions, consultations, planning, other said often at work, if conceptual activity could be named as work. In this conception of basis of the *virtual activity* I'll underline the possibility to "drive" reality through virtual activity. First, Internet has been used rather as informational skill, to inform, planning appointment, make entries for agenda - for events which shall be performed really. After any meetings, , the real presence can be withdrawn and replaced by the "virtual meeting", which shall give the directives to follow it with concrete action as result after. Internet in managing and scientific work has also become the accepted norm. In medicine, in Poland, this process according to my personal observation, has been delayed in comparison to other sciences. Therefore, I think, this function of Internet should be stressed and recorded. The full acceptation including Internet to professional contacts in medicine, what it seems was in Poland in 1995-1997 has been opening the next step – including distance contacts directly to different forms of medical practise. Also this first step of progress in the Polish medical Internet was necessary to initiate telemedicine in our country.

Telemedicine – Organisation and Implementation

To describe telemedicine as effective tool, it is necessary to delineate structure of this organisation . This can be named *communication environment* in regard[2] to the local centre and *virtual network.*. To achieve success any organisational dimension should be met, which is known as *telecompetence*[2]. Telecompetence described by J. Warisse Turner has such purpose[3] as: rationale, access, expertise, communication environment, norms and rules and protocols. From this defined features expertise and protocols should be more closely described. Expertise is recognised as the forms of evaluation to measure the success of telediagnosis (or treatment). Expertise allowes also to establish what tools must be used to apply it to any form of telediagnosis – which computers, cameras, methods of picture transfer, sound transfer and other. The most often, met in Poland mistakes seems to be the following sequence: first buy hardware and other digital instruments secondary figure out, what this shall make. Very often in such bad sequence the hardware is not compatible to the used diagnostic devices. The properly strategy should obtain expertise and aims at creating the whole projects, where the hardware is one part this only. For instance – establishing first the needs and tasks of main computer in KARDIONET (Polish Cardiac Society Internet Network) allowed us to choose the appropriate hardware and transfer rate capacity at connecting it to Net. Expertise should answer also the questions

- *Who* (patients, families, supportive groups, medical professionals only) will join (created by us) virtual community. If the service were provided for professionals, it should be decided, if the service will be free for all or any form of restriction giving access only for physicians (patients) will be established. Now are the trends to give access for professionals or patients (interested with problems groups of peoples) only, but this is questionable, if the methods of identification used by known medical portals (who is doctor, who not) can properly distinguish professionals from others (lay peoples).
- *Medical staff* – it is very important to establish the scientific board of any medical services or professional medical project realised in Internet (virtually) as this is usually made in non-virtual. This should assure the medical quality and establish the professional value. The known authorities will be responsible for guarding the scientific position of our initiative.
- *Technology* – this is very important point to create the virtual initiative in medicine. Technology allowes ability to perform all, what is associated with data collecting, information transfer and virtual contacts. Technology must be safe and take into consideration security as well as confidentiality (privacy).
- *(Scientific) methodology* – is strong associated with project and consultations by medical staff. Here it should be provided with the methods of statistical analysing, comparing results with goals[4], evaluating and formulating outcomes of the study.
- *Feedback* – gives the ability to contact with "external world" or with all participants of any project. The opinion should be collected and analysed.

Protocol replaces case report form with the patient medical record, but this is also term more broadly used than case report. Protocol answers such questions as:

- "Who can be referred for telemedicine?" – (inclusion criteria),as well "who not?" – (exclusion criteria).
- "What data should be available by specialists before telemedicine session?" – patient medical record
- The methods of feedback

J.Warisse Turner writes also, that evaluation of such project should provide "a framework of stages:

- planning and establishing;
- learning and use;
- formalizing routines that govern telecompetence within a virtual environment.

The conditions that operate within each stage offer insights into the managerial activities defining virtual organization development.[5]"

Public and/or Privacy

Public and/or Privacy in this context is the basic ethical problem, how to use Internet in professional communication. Except technical matter (security systems, cryptography, secure transfer), the knowledge of user, decides about it's efficacy. First the participant of the group have to distinguish whether postings on an internet community are "private" or "public", in this group's meaning[6]. Internet based research raises several ethical questions, especially pertaining to privacy and informed consent. G. Eysenbach advises to perform qualitative analysis of internet postings to systematise and codify needs, values, and preferences of consumers (patients) and professionals relevant to health and health care[4]. I'm of the same opinion, since for many years I have systematically looked to Usenet groups, where patients describes their problems (needs and problems regarding their health) making them known to broad audience, requesting opinions. The formal issues in regards to Internet communication should be obtained according to the "general" internet's etiquette. There is a fact, that the best prepared, based on Internet communication, study can be criticised, if even small points of network privacy principle were broken. The e-mail headers can be here a good example. There are certain fields in e-mail header, which provide information about sender of the posting. Two fields inform about an author of email. Field "from" and field "reply-to". There is generally said, the "reply-to" can be changed by author, whether he will to get reply on other address, than the first email had been sent. This possibility has been used very often in mailing lists by a server to enable send answer to list instead to sender. This also needs to be changed automatically the "reply-to" field by listserver into it's address. Although it is very often used in practice, this is by any internet authorities very strong and still often criticised as bad practice, because it is said, that address changing during transfer of postings by listserver (other person, who this email has been sent changes filed "reply-to"- in this cause makes it listserver and such practice is named "munging") can be qualified as internet privacy violation. Ch. Cazabon, known Internet software author and expert said on Qmail mailing list about munging: " it's an extremely bad idea to do this[7]". In this context the listserver remains the "automatic replies machine" only, not being active (enhancing or amending content of message) element in data transmission The mail is taken, as "it is " and as will be sent to each subscriber separately. The next problem - using public commercial services to professional and research communication can cause the harm by the habit to add

by such servers the advertising spots and others lines as footnote. The reaction on it can be different, etiquette of some lists may qualify it as "abuse". This two problems presented as examples demonstrate how "sensible" after psychological viewpoint is Internet and how many elements play important role to be seen as honest, professional and confidential. I am quite concerned , that cited by me already G. Eysenbach advises to perform analysis of internet posting to help recognise it. "Researches and institutional review boards must primarily consider whether research is intrusive and has potential for harm, whether the venue is perceived as "private" or "public" space and how informed consent should be obtained"[4].Published by American Medical Association Guidelines for Medical and Health Information Sites on Internet[8] is named as "the right of an individual to not have personally identifiable medical or other information disclosed to others without that individual's express informed consent" This is clear, medical websites or other data bases have a particular obligation to protect privacy and confidentiality of patients and their families.

Diffusion of Innovation – how to propagate use of Internet and Telemedicine

In 1995[9] E. M. Rogers has published the theory presented how the individuals adopts an innovation over time, and a normal curve to illustrate the distribution of adopting populations, including the categories of innovators (pioneers) , early adopters, early majority, late majority, and laggards. This theory is widely cited[10] in medical books in context of rationalisation and progress of medicine and technology in medical sciences. Here are explained how the telemedicine are becoming more widely used. Rogers say, "Most individuals evaluate potential benefits of a innovation thought the subjective experiences of others with the new idea, rather on the basis of objective evaluation made by themselves or others." First the most important role play innovators. This small group of peoples, who see benefit to include the new technology, can be described as innovators. They are also "risk takers", who must cope with the game of problems with including this technology to medical use. Here are also pointed the problems with human barriers, lack of reference and experience. The technical problems must on this stage also be solved. The next group individuals named early adopters, who take great role as leaders, to adopt innovative technology to practice. The group of early adopters represent a group of peoples high in organisational hierarchy – they are able to establish any innovation as new standard, accessible for use in future practice. The early adopters, commonly with innovators become also consultants and further experts of new method. The proper feedback to innovators and authors of technology is very important on this stage. The next groups – early majority and late majority include the late part of diffusion process. There are the normal users of any innovation and finish the process of it implementation. The individuals, who reject (never adopt) the innovation are named by Rogers laggards. They resign to use the innovation and prefer to resist with the traditionally used methods. (no computers but only papers)

Internet for Telemedicine in Cardiology and Pulmonary Medicine

Known principle "move the information not the patient" became a big incentive to search possible methods of remote consultation. As first appear that in the form of consultation "doctor to doctor" via telephone. Today it is used to phone doctor or to obtain an emergency help by patient or to contact with pharmacist to pass any prescription. Videoconferencing became widely used as an advanced tool, used in medical education (including postgraduate

training) and medical practice. There are described different clinical projects fist of all in United States and in Canada, which attempted to use new technologies in order to obtain more complete medical consultation remotely. Internet was controversial as tool suitable for teleconsultation. Primarily it posses unquestionable advantages to offer completely infrastructure (network, specialised resources, specialists, who manages with them, standards, which let to communicate with every places of the world), and standardised applications as email, WWW, ftp, search engines. Development of the Polish medical internet is quite advanced leading to foundation of formal governing and advisory structures. For instance Polish Medical Internet Society exists since 1997 and the 1st Polish Medical Internet Conference has been first time held in 1995. The infrastructure and experience of experts allows to adapt Internet for Telemedicine. Moreover, the natural progress of Internet arising from the fact, that Internet began already to be used in interpersonal communication, first of all to ask and answer question. I will in further part my presentation to describe closely how , that "ask and answer question" is simple but most often using form of telemedicine. J. Parker and E. Coiera[11] has described, based upon other studies and own experience, that about 50 percent information requests by clinicians in clinic were met by colleagues, rather from the other formal sources. Internet offers not only ability to contact between colleagues but possibility to document it on searchable web-archives. Since 1998 with help of sources granted by Stefan Batory Foundation has been begun to realise the program of creating Internet centres of Polish Cardiac Society (http://www.ptkardio.pl). This fact has open the doors to access remotely publications, as well leading multicenter trials and research to in order to utilise this info in clinical practice. The first in Poland web-based trial using this informatical infrastructure has been performed in 1999. The web-designed questionnaire study was completed between October and December 1999 in Poland. Patients baseline characteristics, clinical data and outcomes appearing during hospitalisation were evaluated by 25-question form[12]. (more details in dr J. Drożdż presentation on this session). Controversies in this regard were in the area of security . It was arising from the fact, that during a long time , that security and identifications problems (hacking, spoofing, network forgery, spams and other abuses) constituted significant problem. Internet was not suitable for banking transactions as well as for conducting telemedicine , as keeping information secret was difficult. There are known the painful examples of hacking including the complete destruction of medical servers in Poland or spreading viruses, which made many harm by deleting of files (information) and damaging computers. The adopting of proper software now assures much greater security. Possibility precise user identification has been changing this risk and Internet now plays great role in e-comerce, banking transactions, stock exchange. Now it is known, that using known (or not known, kept by his authors secret) security and network monitoring allowes to reduce the number of breaking accidents of the system . Number of accidents is not high or there are detected and suppressed. There is already sufficient legal support, what allowes to punish such actions. Others intruders can be restricted succesfully by the local regulation (coded by the medical resources or network organisers and authorities or network institutions). In my opinion Internet may be described as simplest transfer agent for telemedicine and for education. Created already relationships on mailing list, webchates, and others, between physicians and in relation physician to patient and his family/supportive group are the best confirmation of this opinion.

Asking and Answering Questions – the most widely using form of Telemedicine/Teleconsultation.

It is difficult to establish, when took place a first professional contact between physicians through Internet. Likely one may say it was a contact by the e- mail. Since this time three applications – email, www and ftp are used to discuss, read and create resources and retrieve the files including documents and software. The "filogenetic" oldest form and still most commonly used is asking and answering questions. This form in Internet has been nota bene codified as FAQ, but under term we should understand all form of interchanging and storing in archives information using different technologies. Most commonly it is :

- email – including mailing list and groups (this is most old originated from time, where www did not exist yet, but any come back of this tool has been now meet and thus mailing lists and usenet groups are very popular)
- wwwboards – named after most often used Matt Wright software to serve email distribution based on web[13] (this is modification of mailing web-archive such, that message send by user is at once placed to www-page by common gateway interface - cgi - instead prior to transfer it by mailserver)
- webchat (internet café) – enables simultaneous discussion – the each written by any participant text is placed in the window (with nickname identifieyng each user). Webchat software has evolved from old screen discussion software, which let to discuss two persons - written be each participant text was placed into one of two textboxes

In Poland, I have occasion to personally participate in creation and to use of all those technologies. Each can be helpful, but undoubtedly the standard email transfer using the proven listserver software offers the highest security. In confidential correspondence, I will recommend the standard email enriched by electronic signature system and large virus protection, which can be performed already on mailserver and stop including virus posting before it delivered to the user. At web technology such high level of security can be achieve including Secure Socket Layer (SSL) with appropriate key. Such technology is used by e-comerce and banking transactions and sometimes enriched by additional access verification system, but based usually on 128 or more bits keys. Additional protection could be obtained by using PGP encryption, specially with the use of 256 and higher level of coding.

Mailing list and usenet groups as first "Asking and Answering Questions" resources in Poland – First should be listed "mailing list Lek-Med"

In 1994 has been established by M. Pytko and currently supervised by K. Rzepecki and J. Kubica . This existing today the first Polish medical mailing list uses e-mail address : lek-med.@achilles.wam.lodz.pl. The purpose of this list has been formulated on 1st Polish Medical Internet Conference in 1995 in Poznań[14] and further evaluation has been performed five years later in 2000 on 5th Conference held in Poznań [15]. The list is open for all group of individuals – medical professionals as well as patients, their families, supportive groups, medical organisations to discuss on all subject regard to Polish health care. List has about (numbers are changing) 600 – 700 subscribers, offers the public open archive and www page with careful code and etiquette for it users. It is most important, that opened formula of this list thus more than seven years it existing and regulation and moderator (J. Kubica) activity

enables to avoid abusive and intrusive behaviour. The list seems to be good platform to initiate many medical initiatives, formulated by a group of physicians – in example organising conferences, meetings. This fact – the big role in progress of medical internet in Poland has been pointed in 1997 in Krakow, while creating Polish Medical Internet Association. This list assures a contact between physicians, as well physicians and patients. There has been noted in history of this list that many patient benefited from this list , as they were helped in case of difficulties. There was the cases of saving lifes of patients by giving appropriate advises what to do , whom to visit , where to seek assistance to be properly diagnosed and treated. This allows to avoid worsening and possible death of patient, steaming from lack of information or proper contact with doctor. This is every case respected the principle to advice each asking question individuals to apply to his own doctor. Only the general information about any disease has bin given as remote advice. The patient must known, Internet doesn't replace the normal contact with doctor, but constitutess very supportive source for patient education and solving many problem, which can be met during living with chronic disease.

Mailing list and usenet groups as first "Asking and Answering Questions" resources in Poland – The Polish physicians professional mailing list "Lekarze"

The list has been established dr Adam Poradzisz – living and working in Canada Polish physician in 1998 . This list has limited and restricted membership. It was designed to maintain professional and social ties between physicians working abroad as well to allow communication and professional integration for physicians practicing medicine in Poland. Significant attention was paid up to now to the selection of list participants with the higher than average Internet skills. With the purchase of professional quality server (almost 200 GB hard disk space) this mailing list is able to move to another level of interprofessional contacts, including also international (free) telephone , exchange of mpg (avi) files as well server may serve as a depository of CME materials. List is totally independent from outside bodies and utilizes own domains.

The KARDIO-L mailing list as common initiative of Polish Cardiac Society and Polish Arterial Hypertension Society.

The list has been created as common initiative the Polish Cardiac Society and Polish Arterial Hypertension Society to enable professional discussion in the field of heart conditions. There are about 100 subscribers – the subscription is "technically" free and the moderator takes as good intention of declaration of every subscriber, so that no formal confirmation of qualification to join this list are required. The list has been provided for interested in this area of expertise medical professionals only, as it is recorded in list's rules. The intrusive person can also be removed from the list, if his/her postings suggest, that subscribing criteria has not been meet (this principle acts at lek-med.@achilles.wam.lodz.pl too and has legal and ethical background in cited already paper written by G. Esenbach and J.E. Till[6] – "the perceptions of privacy depends on an individuals group's norms and codes... ." The matter of discussion obtains the consulting problems with medical practice, presenting new methods of diagnosis and therapy and relationships from conferences and congresses, when the discussion do at this time more active.

Web-assisted data collection

The web data bases since 1994 became to be useful platform for clinical and research information collecting and presentation. Although this topic is more associated with electronic publishing, it can also support the telemedical projects and many programs. There are not only the portal technologies to include, that self in nature complete in web based structure ability to read information from data base, sending information as mail or retrieve enhancing in file documents or software. I am kkeping in mind also option of remote access to patient's records or research data records (which can performed on different ways using web based forms and self created reports). Partly , formally, such methods resemble a remote group work software still often used by medical professionals. The core of this idea it is remotely access data planer with calendar of events and linked to it documents. Such simple based on PERL (working on www server as cgi-bin executable) are widely meet as GNU Public License software. Some medical portals offers access to such technologies including to automatically to call and notify appointment with concrete physician in any time, if the doctor wishes himself it. Most crucial and not solved problem is to find any common standard (obtained in our country) and also to organise and transfer electronic patient record using unified standard. There has been established over all world the common standard for medical image files name DICOM but in context the whole case report form, which could be portable read by different patient medical record systems the consensus has been not achieved. G. Brelstaff et all presented the new techniques based on originated from www languages as XML (eXtensible Markup Language), XLS (eXtensible Style Language) and DOM (Document Object Model) supported by Java technologies to created comprehensive and portable ready by web-browser electronic case form[16] . This can be transported via net safely using cryptographic methods (for instance Secure Socket Layer). Such form can be suitable to use it for teleconsultation or as educational material for students or physicians in training . Polish Medical Internet Society described this step as a priority in nearest future to support creation of unified electronic record (the first step and necessary condition to implement telemedicine widely in our country). The co-operation in this area with foreign medical centres to seek one European standard was nice to observe. The simple questionnaire data collecting or transferring data trough net has been already initiated. First was the initiative to electronic participants registrations on 2nd International Congress of Polish Cardiac Society in 1998 as initiative Informatics Committee (J. Drożdż, P. Kasztelowicz, P. Guzik et others) and 4th Polish Medical Internet Conference in 1999 in Toruń by simple PERL-script software, which will be evolved to more sophisticated form and used be collecting the data of physicians searching a job in foreign countries (oferty@polscy-lekarze.org) as initiative mailing list lekarze@polscy-lekarze.org as initiative of dr A. Poradzisz with my technical support. Both projects has been presented on 5th Polish Medical Internet Conference available in Polish as separate paper[17]. A professional technology has been used to cited in this presentation already study POL-WEB-AMI performed from initiative of Informatics Committee of Polish Cardiac Society[12].

Advanced Technology by Internet, the Further Progress

Advanced technology using in Internet seems to be simpler to use than any years ago, nevertheless the obstacles still exist causing difficulties in completion of this challenge. First

we have to have the high-speed transmission lines between centres, second there are the legal obstacles to use such advanced technology in Poland and in some European countries. Polish law doesn't permit to use widely telemedicine for completion of patient's diagnosis and therapy. It is permitted only to interpret diagnostic tests including the diagnostic imaging (X-ray, ecg, echocardiography, other) by remote expert . This interpretation may become part of complete medical examination performed by attending physician directly . So, the telepatology, ecg taking or spirometry by phone are legal by law. This remains, as consultation results of test results, rather than consultation of patient. Otherwise, the attending any specific patient's physician can consult the test, which has obtained during medical examination and is supported by the remote opinion, but the last decision and responsibility must take the doctor, who have directly contact with a patient. The restriction has been enhanced in Polish Medical Ethics Code in 9th article, where has been established in, that all medical decision must be completed after personal examination a patient by diagnosis and treating physician[18]. In many states of United States and in many provinces of Canada it is possible to perform more complete examination of patient and most legal and professional authorities in those countries see benefit in permiting to do .

The "Dorota" Project[19]

In 1997 I have published the draft of the standards for telemedicine, consistent with the Polish Medical Ethical Code. This project has named "Inicjatywa Dorota" and is presented on separate www-page. The kernel of it, is to consideration, that teleconsultation should be based upon relationship of a giving for it informal consent patient and two doctors – directly caring of the patient as well remotely. Teleconsulation should be held by active participation of this three individuals and physician directly taking care of the patient should be also a presenter of patient's for remote consultant. The ultimate diagnostic and therapeutic decisions should be undertaken be the "local" doctor, since he/she is given by the Polish law most responsibility for a patient. Surprisingly, since 1997, this project was not bradly discussed by authorities. I am under the impression that the physicians were not interested with "strong" telemedicine yet ? So, except the cost, what in Poland are important obstacles ? What are several question not answered yet:

- How can be changed the recommendation in Ethical Code to allow "more wide" use of telemedicine in Poland and European countries in the clinical practice?
- How to establish the technology standard (hardware, software) to achieve transmission with appropriate quality to avoid errors ?
- How to educate practising professionals to assure the knowledge about remote consultation ?
- How to establish the problem of responsibility and reimbursement, while telemedicine after time of clinical experiments will become to be normal form of practice?

In my opinion answering the above questions, before practical implementation of telemedicine, should help to find a place of this technology in medical practice. The experiences of already existing in US and Canada structures (including legal) as well projects may be very helpful.

Conclusion

Telemedicine is now (in the computer age) very fashionable topic of medicine. Under this term, often has been understood existence of the most innovative multimedia technology, which offers great ability to "see" and "touch" patient remotely . But in many countries such innovative technologies can be used in limited specialities and forms. I will first of all convince all practising physicians, that a big role can be undertaken by playin the simple "asking and answering question" and created "web based documents. In aspect to any general medical knowledge this should be named as distance learning. In aspect of specific patient, in my opinion, this become any form of telemedicine. The achieved thus such contact experience can be implement more advanced form of telemedicine, if they will become more available.

---

[1] F. Lau, R.Hauward – „Building a Virtual Network in a Community Health Reaserch Training Program" J Am Med. Inform Assoc. 2000;7:361-377

[2] S. Viegas – „Past as Prolog" in [ed.] S.F. Viegas , K. Dunn – „Telemedicine, practicing in information age" Lippincot-Raven, Philadelphia-New York 1998

[3] Warisse, J. (1996). Communicative implications of implementing telemedicine technology: A framework of telecompetence. (Unpublished Doctoral dissertation, The Ohio State University, 1996). (University Microfilms No. 9710670).

[4] Buerke T et all. Evaluation of clinical informations system. What can be evaluated and what not. Journal of Evaluating in Clinical Practice 7(4):374-85

[5] Turner, Jeanine Warisse , Becoming Virtual: Creating a Virtual Organization Within a Telemedicine Network http://www.aom.pace.edu/aom/htmlprogram/prog0130.html

[6] G.Eysenbach, J.E. Till. Ethical issues in qualitative research on internet communities. BMJ 2001; 323:1103-5

[7] See http://cr.yp.to/proto/replyto.html and http://www.unicom.com/pw/reply-to-harmful.html for details.

[8] M.A. Winkler et all. Guidelines for Medical and Health Information Sites on the Internet. Principles Governing AMA Web Sites. JAMA 2000; 283(12):1600-6

[9] E. Rogers. Diffusion of Innowvation, New York, The Free Press 1995

[10] P. Fowler, L. Levine A conceptual Framework for Software Transition 1993 available in network http://webfuse.cqu.edu.au/Information/Resources/Readings/papers/tr31.93.pdf

[11] J. Parker, E. Coiera. Improving Clinical Communication. J. Am. Medical Assoc. 2000;7:453-461

[12] P. Guzik, J. Drozdz, K. Rzetecka, P. Kasztelowicz, T. Rosiak, L. Chrzanowski, E. Jankowski, J. Kasprzak, M. Krzeminska-Pakula, H. Wysocki. Treatment, complications and rescue revascularization procedures in older patients in Poland - POLish multicentre WEB-based trial on acute myocardial infarction (POL-WEB-AMI) XXIII Congress of European Cardiac Society, September, 1-5 Stockholm 2001

[13] see on http://worldwidemart.com/scripts/wwwboard.shtml

[14] J. Kaczmarek, K. Rzepecki i wsp. – "Czy studenci medycyny korzystają z Internetu" W: [red] J.Szymaś, R Śpiewak – "Lekarski Internet" – Ad Punctum 1995, 1996 – Papers to 1st Polish Medical Internet Conference, Poznan 1995 (Polish)

[15] K. Rzepecki, J. Kubica, M.Pytko – Lista dyskusyjna Lek-Med – 6 lat istnienia. Internet Medyczny 2000 – Papers to 5th Polish Medical Internet Conference, Poznan 2000 (Polish)

[16] G. Brelstaff et all, Internet Patient Records: new techniques; J. Medical Internet Research 2001;3:e8

[17] P. Kasztelowicz. Formularze – jako przykład prostych rozwiązań pocztowych i bazodanowych – Internet Medyczny 2000 – Papers to 5th Polish Medical Internet Conference, Poznan 2000 (Polish)

[18] The Polish Medical Ethical Code (Kodeks Etyki Lekarskiej) – see http://www.nil.org.pl/prawo/bbaa.htm (Polish)

[19] The „Dorota" Project (Inicjatywa „Dorota") – see http://www.uni.torun.pl/~pekasz/dorota.html (Polish)