Poster presentations

Internet Technology: Proven Strategies that Solidify the Patient-Physician Partnership and Improve Patient Health Outcomes

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Introduction: No doubt about it, the Internet technology has influenced consumers to become increasingly vocal, assertive, and empowered in their own healthcare. With unprecedented, easy access to medical and pharmacology information, clinical research and trials, second opinions, Ask the Experts venues, chats, message boards, live events, and direct-to-consumer pharmaco marketing blitzes, consumers are upsetting the status quo in physician-patient encounters. With this newfound – and generally unsophisticated – empowerment, they're challenging physicians with news stories hot off the Net, self-diagnosis, and demands for specific treatments and medications. Is this bad? Only for those physicians who don't understand how to capitalize on the Internet technology to educate their patients and strengthen the bonds between physicians and their patients. Innovative and judicious use of email and e-newsletters, patient handouts, recommended readings, online support groups and workshops, interactive assessments, monitoring, and live events, when vetted by your professional medical expertise, are just a few of the Internet tools that powerfully mature your patients into savvy partners in their healthcare.

Materials and methods: Discussion, case studies, examples, anecdotes, analysis.

Results: This presentation, through real-world and virtual-world examples, demonstrates proven, practical Internet strategies and easy-to-implement technological tactics that move you beyond distrust of this emerging patient-physician partnership model, and allow consumers to enjoy better health outcomes, and physicians to enjoy more satisfying professional practices.

Discussion: Innovative and judicious use of email and e-newsletters, patient handouts, recommended readings, online support groups and workshops, interactive assessments, monitoring, and live events, when vetted by your professional medical expertise, are just a few of the Internet tools that powerfully mature your patients into savvy partners in their healthcare. Audience members will be armed with concrete recommendations for implementation into their own practices.

Keywords: professional-patient relations, Internet, technology, patient empowerment.

Use of the Internet in medicine

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Introduction: There is not much known about German medical Internet users as patients, medical professionals and students. We designed this study to characterize these groups: What value does the Internet offer to medical Internet users? What Internet resources are in use and how are they valued by its users?

Materials and methods: We used a standardized questionnaire. All patients and medical professionals of the Essen university medical clinic and a selected number of students were interviewed. Different aspects of Internet utilization, for example e-mail or WWW, had to be valued on either a 3-point or a 5-point scale for importance and frequency. Possible answers were 'very important', 'average', 'not important'; and 'very often', 'often', 'average', 'seldom' and 'never'.

Results: From December 1999 to January 2000 a total of 169 patients (response: 83%), 73 medical professionals (82%), 134 students 3rd preclinical semester (87%), 98 students 2nd clinical semester (99%), 84 students 6th clinical semester (98%) and 60 students practical (final) year (47%) were interviewed. Patients: Age distribution in female and male patients was identical (<40 years 14%, 40-50 years 22%, 50–60 years 15%, more than 60 years 49%). The study shows that 20% of the patients had access to the Internet. Most patients using the Internet were under 60 years old, male and member of a private health insurance. Approximately 50% of the patients with these characters were using the Internet. Patients using the Internet rate Internet resources more important (p=0.001) than those not using the Internet. Only 50% patients using the internet have been visiting medical internet sites. 25% of them have visited sites of self-help groups or the sites of the Essen university medical clinic. 12.5% visited the Internet sites of their health insurance company. Medical professionals: The study shows a higher use of the Internet since 1996. Today only 3% of medical professionals are not using the Internet. Being of higher importance to older medical professionals, mailing lists are 'often' used by them. Expert-chat, communication with students by e-mail and online advice for patients is 'seldom' or even 'never' used. Literature research and medline is rated 'very important' and is 'very often' used (both rated at 95%). For reference books (48%) and information on events and congresses (35%) the Internet is in frequent use. Older medical professionals use reference books on the Internet more often (57%) than younger ones (44%). Medical professionals use the internet more than 5 hours a week mainly for professional reason. Medical students: Internet use started in 1996. Female students equalized a former behind status (1996 female/male=1.8 – 1999 female/male=0.86). 'Important' to students was literature research (68%) and e-mail with other students (69%). E-mail is 'very often' used (45%). Searching for a thesis for doctorate is 'important' to 28%. Use of the Internet is growing with the number of semesters at university (3rd preclinical semester 57%, 2nd clinical semester 83%, 6th clinical semester 88%, Practical (final) year 100%). Students using the Internet for more than 5 hours are using it mainly for private reason.

Discussion: Only few Internet resources are in use frequently. There are specific differences in the use of the Internet for these groups. In the future the demand for the Internet will expand as its users learn how to use its tools as well as the number of patients using the benefit of Internet use will grow.

Keywords: medical Internet sites, public health, Internet education.

Numerical Taxonomy Methods in Telemedicine

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Introduction: The purpose of numerical taxonomy can be briefly defined as the construction of objective clusters of units by means of a quantitative measure of their affinity. Its name comes from the fact that the first methods were proposed for, and essentially applied to, the biological classification.

Materials and methods: Numerical taxonomy methods present a very powerful multiple comparison instrument. More general, cluster analysis is the name given to various procedures

whereby a set of individuals or units, termed as "Operational Taxonomic Units" (OTU). Techniques of cluster analysis can be applied in different fields of medicine: the recognition of various clinical forms of a disease, separation of distinctive racial groups, treatment of quantitative biogeographical data, etc.

Results: An important case for statistical data processing deals with OTUs described by binary attributes. Homogeneities for binary and for ordered multistates data are presented. Methods of automatic classification are described and two types of homogeneities for the classification in biology and the genetics of the human populations are given.

Discussion: The new extension concerns the inference in contingency table and it is applicable in any field. The connection between numerical taxonomy, one side, and the cluster analysis, as well as the discriminant analysis, on the other side, is useful to be considered.

Keywords: Numerical taxonomy, Similarity coefficient, Cluster analysis, Entropy.

In Vitro Diagnostic Net E-Marketing for Life Science (http://www.ivd-net.com)

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Introduction: Using the Internet for laboratory needs to look for quickly needed information such as special parameters, addresses, market news & innovations or a product's manual it will take you too much valuable time. There are already numerous web sites and their number is ever-increasing. But does the useful information presented there always reach the desired target group? Not so far. IVD-net has identified this gap and devoted a good deal of effort to filling it over the last 2 years. As an alternative to time-consuming searches in a large number of sources, IVD-net offers a centralized and meanwhile firmly established Internet forum devoted to in vitro diagnostics.

Materials and methods: IVD-net intends to be a guiding compass in the "jungle" of web pages dealing with laboratory medicine. This guidance is being created in a virtual community of specialists and interested people this field. It is the community of people connected by a common interest in in-vitro diagnostics, in which step-by-step a network of knowledge and experiences is created which each member can benefit from. In more than 2 successful years IVD-net collected a huge knowledge in online-marketing. Suppliers can benefit from this invaluable practical experiences simply by attending the IVD-net summits "E-Marketing in Life Science" or by using IVD-net for their online Public Relation. Very soon they will realize what works in the net and what does not and why.

Results: Presently the IVD-net community unites members from over 50 countries from 5 continents and is growing rapidly. Many use IVD-net as a gateway into the internet, they keep themselves informed about innovations, news and special offers and, if they are interested in specific information can be guided with just a few mouse clicks to the appropriate link. It is the high visitor traffic of specialists and users of in-vitro diagnostics, which makes the IVD-net attractive for suppliers of laboratory medicine. IVD-net is optimally suited to develop new markets.

Discussion: Economic globalization and increasing pressure to reduce costs in public health systems bring up a great challenge, the one of finding new solutions. Discover them in IVD-net!

Keywords: Portal site, Medical Diagnostics, Education, E-Marketing.

How to Neutralize Healthcare Professionals' Fear of E-Health: a Simulated Patient eCare Project

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Introduction: A recent study by Intel Corporation found that the medical industry is behind even the trucking industry in adoption of information technology. Provider desire vs. consumer use of the Internet in clinical practice is often in conflict as the battle of empowering the patient via the Internet continues to escalate. Providers fear loss of control and lack the time to learn Internet technology and apply it to their practice. Little is known about collaboration between providers and consumers in the use of e-health in medical practice. This presentation describes the experience of a graduate nurse practitioner course on e-health practice. A simulated patient on-line e-care project introduced actively practicing healthcare providers to e-health practice. Clinical monitoring and management via the Internet involving mock "providers" and "patients" with chronic conditions will be described.

Materials and methods: A group of six Nurse Practitioner students acted concurrently as both patients and providers, monitoring and managing patients via the Internet. Providers were assigned "mock patients" with chronic conditions e.g. hypertension, obesity, asthma, diabetes, congestive heart failure and bedwetting. The use of monitoring instruments and data entry methods were taught to the "provider" and "patient" groups. Data results were transmitted automatically by the monitoring instruments via the patient's home computer and the Internet to their provider's secure website. Provider/patient interaction was accomplished via secure messaging.

Results: Providers were observed to review Internet patient data and address significant patient problems in a timelier manner than with conventional office and telephone interaction. Providers embraced Internet technology, and their fears were diminished when they discovered that the technology could be learned quickly and applied to practice.

Discussion: This study illustrates a method by which e-health can be introduced to healthcare providers and reduce their fear of this technology in practice. Once providers actually practice e-health they realize how it can afford them better tools to care for their patients, save them time and money, and enhance patient satisfaction.

Keywords: e-health, Internet monitoring, provider fears, on-line patient care, Internet medical practice.

Bayes Diagnostic model on the Internet

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Introduction: This paper describes how to create on the Internet a Bayes model, which the final year medical student or doctors (trainee) can use it to assist them in making clinical judgments. Model was built on 6 diseases and 6 symptoms. The system is flexible and allows the user to add more diseases and symptoms. The model was created in Excel application. First the data for the patient was entered in Excel worksheet, Bayes' rule was applied on this data to calculate the predictive value of the disease and display the result on the screen in numeric and graphic format. The graphic display shows the diagnostic performance of the presence or absence of a symptom in a disease. This form of output helps the students or doctors to recognize symptom patterns for the different diseases and assist them in their decision-making.

Materials and methods: Data used in this model was collected from the Galway hospital records of patients who had Jaundice. Used a program written in Basic language to calculate the frequency distribution of the symptoms for all the diseases. From the result, selected the 6 commonest diseases and the best discriminating symptom for each disease. Used Excel application to process the data. Excel spreadsheet was divided in to 5 sections. First section displays a line chart showing the

probability of occurrence of each disease and the diagnostic effect of the presence or absence of the symptoms. Second section allows the student to enter the Patient data for the best six symptoms. Patient case data was entered as '1' if the symptom is positive, or '0' if the symptom is negative. There are only six entries. Students are also allowed to replace the existing symptom names with different set of 6 symptoms. Student enters his/her diagnosis and check with the Computer diagnosis. Third section shows the actual Bayes calculation. A formula was written in the first cell and copied to the rest of the cells to calculate the probability of the occurrence of a disease given the presence or absence of the symptoms.. Result was displayed as percentage to show the probability value for the disease. Using these result, inserted a line diagram on the worksheet to represent the results graphically. Fourth section shows the frequency distribution of all the symptoms for the six diseases. Disease names were entered in each row and the symptom values for the disease was entered in each column. Students are allowed to fill in new symptom names and the frequency distribution. Using Front Page software program created a Home page for the Bayes's diagnostic model. Named this file as INDEX.HTML. Exported the Excel worksheet with the data and the result to the subdirectory, and made a hyperlink from the Home page to the Excel worksheet which was saved

Results: Output of the Bayes diagnostic model shows the patient data followed by the scores obtained for each of the diseases. It also shows the diagnostic effect of the presence or absence of the symptoms for all the diseases.

Discussion: Bayes diagnostic model is easy to build. But the diagnostic accuracy is not more than those of clinicians. It is a useful tool to assist medical student in making clinical judgement, and it can be used to represent clinical data both in numeric and graphic format. Using this model on the Internet makes it easy for the students to access the diagnostic database at any time, and opens up new doors to communicate medical information.

Keywords: Medical Informatics, Expert system, Computer assisted learning, Internet.

Web Pages as Standard Communication System with Medical Students

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Introduction: Numerous utilities of the World Wide Web Internet system are applied in the domain of study and education at the medical universities worldwide. Our effort at the Department of Computer Science (Rijeka University School of Medicine, Croatia) was to maximize students' usage of electronic Web resources, knowing that virtual space of Internet is not a medium of the future, but rather a medium of today. The aim of the study was to test and evaluate how students are using Internet resources.

Materials and methods: Beginning in early 1998 we decided to rebuild our departmental Internet pages (www.medri.hr/informatika). Between all usual services, we approved two distinct parts for the study of Medical Informatics (MI course, 2nd year of the study of medicine): Official student message board and electronic handouts for seminars. E-message board was structured to contain all the information about the study of MI (students' groups with student data, lectures timetable, topics of seminars and exercises, etc.). Hardcopy was posted at the real departmental board. E-handouts were also prepared primarily as HTML-documents and published as Internet pages. Printouts were given to students at the lectures. In 1999, we decided not to make any hardcopies and to promote only electronic forms described. Data on our investigation were collected through written anonymous surveys.

Results: In the survey of 1997/98 class (N=172 students) we found 68.2% students using computers (excluding regular exercises and seminars during the study) and 49.3% surfing through Internet (any content). From the last group, 92.3% (45.5% in total) were using MI e-board and e-handouts. Preliminary data for 1998/99 and 1999/2000 classes (N=102 students, data still in collection for total of 218 students) show that 78.7% of students use computers (p=0.337 compared to 1997/98), but 68.8% of students read Internet pages (p=0.041 compared to 45.5% in 1997/98) with almost all of them (97%) reading e-board and e-handout data. There was no difference in the proportion of students using e-mail as a regular communication tool between two groups compared (20.8% in 1997/98 compared to 27.4% for the other period, p=0.677).

Discussion: We found electronic posting of information for students and e-handouts more comfortable and accurate, as well as cheaper and time-saving, what is general advantage of any informative material published on Internet. As expected, majority of medical students using computers and Internet accepted it, but also an important proportion of others when forced to find a specific information not published elsewhere. This result we found significant for the future directives in organization of study of MI at our University, i.e. how to get more students familiar with Internet tools, what might be very important in later study years. Our intention is also to prepare the similar system for using an e-mail in the following classes.

Keywords: Medical Education, Internet, Medical Informatics, Communication.

Moderating Rhythmologic Topics over the Internet: a First Years Experience at the Heart Center Leipzig

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Introduction: Modern strategies for the diagnosis and treatment of cardiac arrhythmias include besides non-invasive methods an increasing variety of invasive and curative therapeutic strategies. In order to define proper rhythmologic diagnosis and to develop optimal treatment strategies, a high degree of rhythmologic expertise is necessary. Adequate platforms for information exchange, where rhythmologic experts can meet and can exchange information fast, are desirable. Thus, at the Heart Center Leipzig a moderated Listserver regarding the topics "Rhythmology" and "Internet and Medicine" was started.

Materials and methods: The Listserver was started in July 1999 with the purpose to create an international electronic forum for Electrophysiologists. For the Realization the Listbot-System (www.listbot.com) was used. To ensure good quality of the posted messages, the Listserver Postings were cross-checked by a team at the Heart Center Leipzig and the Listserver was "moderated". All messages sent to the list are automatically archived and are searchable per date, title and author. Acquiring the first members was achieved by a serial email invitation to 30 colleagues. Consecutive sign-ups for the list were made easy over a supporting website (www.medkonsult.de/ecglist.html). Eleven consecutive months were chosen for the evaluation of the list. All messages were counted and classified into four categories. Messages concerning announcements for any events concerning the matters of the list, were put in the "announcement" category. Messages concerning general or internet-related topics were put in the "Informative" Category. Messages concerning links to any (web) resources were put in the "Resource" Category and messages concerning the Discussion of Rhythmologic Topics or Cases were put in the "Discussion" Category.

Results: Over the eleven-month period the number of participants grew from 26 to 112 subscribers coming from 14 countries. 27.7% of the subscribers come from an industry background, 44.6% are

clinicians and another 27.7 could not be categorized. Messages in the "Announcement" Category were around 23%, 36% of the messages were in the "Informative" Category, 12% were in the "Resource" Category and 29% were in the "Discussion" Category. Only 4% of the Subscribers made own contributions to the list.

Discussion: The increasing number of subscribers to the List suggests that there is growing interest for mailing lists. The List gives fast and easy access to a specific target group and allows easy information exchange between rhythmologic experts. Overall the list was mostly used for general and informative messages regarding cardiology topics. The majority of the participants did not contribute actively to the list. In our opinion this suggests, that a growing number of clinicians are interested in a web-based discussion but still feel hindered in contributing to the list by themselves.

Keywords: Electronic Mail, Internet, Rhythmology, Medical Informatics.

Attitude towards Gaining Medical Information in Mideuropean Population – First Results

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Introduction: Internet has gained access to everyday-life in many resorts. While in other aspects of society Internet has become an important media, in medicine Internet use is sparely yet. We believe that in the following years this situation will change rapidly. While there are different domains of communication, we focussed on communication PATIENT to PATIENT and PATIENT to CLINICIAN. In order to contribute and guide this development we started a study about informational behavior towards gaining medical information.

Materials and methods: We aim to raise data by a standardized Questionnaire with scaled Multiple-Choice Answers from two Mideuropean rural regions in Germany and Switzerland (Menziken, Vilsbiburg) and two Mideuropean urban centres (Munich and Leipzig). Our population group consists of inclinic patients without any preselection. We intend to compare these data to an U.S. study of Julia Pennbridge. This study showed that in a Californian population 47% had sought health information within one year.

Results: Our Preliminary Data taken in 4 months shows that in our data 95% had yet sought information. In rural population 30.1% think that Internet is a good possibility of gaining medical information. Newspapers are seen as a good source of information in 53%. Information by phone is seen as a good possibility by only 10.9%. Of those who had experience in Internet use, 60% regard Internet as a good source of medical information. In this particular group 55% consider newspapers as a good source of medical information. Phone calls as source for information are seen as a good possibility for healthcare information by 10% in this group. Up to now, the average age of our population was 55.2 years. Average age of those who consider themselves to be experienced in Internet use was 50.3 years, and of those who said that they had only fair experience using the Internet was 57.8 years. Patients overall claimed that they would use a platform to communicate with other patients in 87%.

Discussion: Our data suggest that the ranking of Internet regarding sources of medical information differs by the grade of experience in Internet. Newspapers are considered as a reliable source of information regardless of Internet experience. Medical advice by phone seems not to be considered to be reliable as well independent from Internet experience. The data we rose may be interpreted to design reliable and patient-orientated healthcare information systems which are under construction in our workgroup. Apparently Internet is yet not trusted by everybody for reliable medical information. The actual evolution of so-called label services (PICS, for example) could give solution to this

problem. Our data suggest that by growing experience in Internet in the population it will become more accepted for medical advice.

Keywords: Internet, Health Education, Patient Information, Demographics.

S.O.S. – Sustaining Oncology Studies: a Comprehensive Website in Oncology

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Introduction: Last decade development of online databases, particularly World Wide Web, has made easier and cheaper the distribution of a large amount of scientific information through electronic multimedia. It is still a hard task, however, to locate and retrieve medical or scientific information by using traditional search engines. Even if they are improving their coverage, desired results may not appear at the top of the list. Also, it is important to consider that, while the information in scientific journals has the advantage of having been peer-reviewed, the information published on the Internet is largely unfiltered.

Materials and methods: The SOS Server, conceived as a pilot project in 1993, focused primarily on the diffusion of transnational training measures and opportunities in biomedical sciences. SOS Server, under the aegis of CINRO (Italian Consortium of Universities for Research in Oncology), has progressively evolved into SOS Europe, a service responding to the information needs of students, researchers, cancer specialists, practitioners, industry and general users, while SOS Italia is a focal point for the coordination of WWW-based information and services relevant to the Italian cancer research community.

Results: Training offers information on mobility programs in biomedical sciences with a listing of over 150 internationally oriented schemes offered by more than 80 granting agencies. EU Programs and Appointments offers an SOS edited selection of European Union actions of potential interest for experimental and clinical oncologists. The ViCLib (Virtual Cancer Library) Project offers a guide for the retrieval of information pertinent to oncology and related biomedical disciplines sharing a Union Catalogue of 35 biomedical libraries located throughout the Region of Liguria and on the catalogues of the libraries of 3 Italian Comprehensive Cancer Institutes. BreakIT (Breast Cancer Pathology Information Kit using Off-line and On-line Information Technologies) is a European Union project that, using advanced interactive multimedia assets and features, proposes both a classification taxonomy for malignant lesions and the set up and management of a certified case study repository, thus providing a common reference available throughout the medical community. Telepathology, a web-based project involving telemicroscopy applied to computer-aided diagnostic histopathology. Information technologies can enhance the objectivity of the diagnosis making easier long distance consultations, sharing histological images with a number of cancer experts. The SOS Search engine is based on Glimpse technology, allowing fast search through a large set of files, as well as a good integration of search with browsing. Glimpse supports approximate matching (e.g. finding misspelled words), Boolean queries, and even some limited forms of regular expressions.

Discussion: The SOS project has proposed two main missions: Easy access to a dedicated collection of on-line and locally maintained oncology resources. In 1999, the SOS Server received more than 20,000 requests for information, attesting to the increasing need for cancer information. Quality of information. Aiming to develop a web-based index of valuable and reliable resources in oncology, qualified professionals check information before including it in SOS by applying quality

criteria proposed in the Code of Conduct by Health On the Net, who recognized SOS as a HONoured site, fully accomplishing HON criteria of quality of health information on the Internet.

Keywords: Oncology, Cancer, Portal site, Internet, Information systems.

Internet as a "Transparent" Management Tool. First Experience in a National Institute of Health and Social Services in Argentina

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Introduction: The National Institute of Social Services for Retired and Pensioned (Instituto de Servicios Sociales para Jubilados y Pensionados, in Spanish), was created in 1971 by the 19.032 national laws. The purpose was concentrated the whole passive population under a single universal and obligatory social coverage. The medical chapter of this coverage was formalized by the creation of the Program of Integral Medical Assistance (Programa de Asistencia Médica Integral). At present the PAMI offers its services to approximately 3.376.000 persons (the most extensive public medical coverage in Latin America), with a budget executed in 1999 of $2.845 million. This amount is originated with contributions of the own retired, the active workers and the Argentinean State. After some irregular administrations, the INSSJyP was taken under direct Government control by the president De la Rua's administration and a transparent management policy was determined. The purpose of this paper is to present our experience using the Internet as one of the main tools to perform this project. It was the first time that a national health organization of Argentina uses the Internet to do that.

Materials and methods: The lNSSJyP's population is composed largely by retired and pensioned and their families, in addition to handicapped and veteran of war, among other. The medical system is articulated in 3 attention levels: Level I: radiology, frequent consultant specialists, medical of family and clinical analysis. Level II: internment, specific consultant specialists and median complexity treatments. Level III: high complexity treatments. In addition to these 3 levels, the PAMI offers other medical and social services such as dialysis, renal transplantation, ambulances, optical devices, headphones, movements from the interior of the country to the city of Buenos Aires, burials, foods and medicines.

Results: After successive unfortunate administrations, the INSSJyP was intervened by Presidential edict No. 45/99, with the objective to transform the PAMI into a responsible organization for offering to their beneficiary medical assistance of quality, through a transparent and efficient administration of its resources. As a part of this transformation process, a Diaphanousness Management Program with the Anticorruption Office of the Justice and Human Rights Ministry was signed.

Discussion: A fundamental component of this program was the creation of a communication channel to and for all the people interested in the quality improvement. The Internet was the logical choice to do that and the PAMI's website was created (http://www.pami.org.ar). The website offers the following options: Affiliate consult service Professional consult service Supplier consult service Geographical services guide Monthly statistical report. Public offers and contracts for PAMI's purchases. The last item is perhaps the most important way to allow a real and transparent management be-cause gives all the citizens the opportunity of expressing their suggestions and recommendations about bidding during its elaborative stage, the possibility to know bidding winners, refutes and son on. The future steps will be oriented to offer professional customers useful working tools, such us diagnostic and therapeutic rules to prevalent diseases, telemedicine, continuing medical education, etc.

Keywords: Case Management, PAMI, telemedicine, transparency.

Construction of a Web-Based Knowledge Database for Nuclear Medicine

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Introduction: The fast and efficient accessibility of high-quality topic-dependent Internet information has become an important issue in the medical field. The purpose of the presented web-based knowledge database is to build a dynamic list of nuclear medicine Internet sites, aimed as a quick tutorial and relevant reference platform for the Ghent University Hospital nuclear medicine personnel in the first place and visitors with a particular interest in nuclear medicine in the second place.

Materials and methods: After a training of the entire department by Eng. C Bekaert in knowledge and Internet technology with the emphasis on medical resources, a general knowledge database structure was proposed, based on the four tasks of a nuclear medicine department (technical, administrative, nursing and medical). To improve the general accessibility, English was chosen as the main language, except for a part of the knowledge database related to patient info (in Dutch). Firstly, the web was searched by means of Meta-Meta search engines (Metacrawler, Profusion, Surfwax), keyword search engines (Altavista, Fast Search, Hotbot, Northern Light), search managers (Copernic) and language-specific search engines (all covering about one third of the World Wide Web). This resulted in about 700 nuclear medicine related links. Secondly, broken links, pure commercial sites without scientific value, and irrelevant sites were eliminated, resulting in a shorter list of about 450 sites. Finally, all personnel of the division checked and evaluated the links relevant to their own personal interests or field of experience (rating from + to +++). Everyone was also encouraged to add relevant nuclear medicine links, which were not found with the previously mentioned search engines.

Results: About 350 sites were retained in the final phase. The table of contents, together with the links, was placed on the web site (http://www.uznuclear.rug.ac.be/). After a thorough re-evaluation of all sites and adding some new sites, 325 links considered as valuable. To keep the list actualized, everyone of the department was encouraged to evaluate and update the list on a regular basis.

Discussion: Since this project has been finished only recently, a complete evaluation cannot be made yet. However, it is clear that this can only be a starting point for people aiming at a thorough and in-depth knowledge. Automatically maintaining the knowledge database by dynamically searching the Internet on a regular basis (e.g. monthly), based on predefined keywords, will be added in a later phase. The quality assurance by an automated removal of irrelevant and broken links will be the main challenge since more than 50% of the sites found do not have a high scientific standard. We encourage everyone to evaluate the list and to propose alterations to the knowledge database (i.e. adding, removing or altering links). Comments or suggestions can be submitted by email.

Keywords: Internet, Databases, Radiology information system, Nuclear Medicine, Resources.

Use of an Intranet-based Electronic Patient Record System in Laser Medicine

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Introduction: While the "Electronic Patient Record" (EPR) is a frequently quoted term in many areas of healthcare, only few working EPR-systems are available so far. To justify their use, electronic patient record systems must be able to store and display all kinds of medical information in a reliable,

secure, time-saving, user-friendly way at an affordable price. The hospital intranet is an ideal medium for storing and disseminating information. The intranet-based electronic patient records system MEDOS has taken into account the various demands of the clinical partners from the department of laser medicine in order to guarantee user acceptance. Additional functions for the department of laser medicine and regulatory changes can be integrated within a short time.

Materials and methods: An object-oriented database has been generated for Windows NT. For the implementation of the MEDOS system was used SQL. The database of the department of laser medicine is integrated in the intranet network of the department. The registration has been split into functional units. The following tasks are performed by the medical personal of the department: – patient registration/data transfer (patient personal data) from the HIS; – time scheduling; – parameters of laser treatment; – consultations and management of the follow-up information, generation of medical letters; – productivity and account registration.

Results: The split registration and the use of the database registration services at the Department of Laser Medicine have led to a complete and therapy relevant entry of all patients, a notable relief of routine clinical work and an increasing data quality. The benefits from this system are as follows: co-ordination of care for the patient, availability of core data set about the patient, minimization of duplication of data input, maximization of use of resources. On another hand the need of a specialized staff-medical documentation assistants-as to secure the efficiency and the cost effectiveness in the use of electronic databases, is evident.

Discussion: The necessity for documentation is enforced by legal requirements, e.g., documentation using the ICD10 and the ICPM is requested for reimbursement. Due to these requirements hospital information system (HIS) suppliers offer more and more departmental information system (DIS) modules for medical data processing. Departmental information systems can bring assistance to the hospital staff regarding data collection. Providing the medical and care personnel with new tools to guide the care process and to manage the diverse databases upon which care decisions are based can be very beneficial. A new departmental information system such MEDOS may help the employees in hospital to collect and manipulate data, and to reach a decision more effectively and more accurately. Perspectively we intend to implement a Picture Archiving and Communication System (PACS) for total management of digitally acquired images. Data protection has been ensured through a multi-step security process of access controls. Employees were grouped according to the organizational structure of the hospital. Members of a certain user group, such as surgeons, acquire access to the various modules and masks by logging in and entering a password.

Keywords: Intranet, Electronic Patient Records, Laser Database.

Are we Ready for Internet-Based Teaching of Medicine

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Introduction: Internet-based teaching becomes more prevalent and popular in medicine. We monitored the introduction of Internet-based teaching in our Faculty, and describe the elements of success and failure in such program.

Materials and methods: All lecturers were asked to submit administrative details and content related to their courses. In a second stage, a call from the Dean required these details within two months. Responses were monitored and analyzed.

Results: A general call for administrative data on courses almost never yielded any response. We concluded that administrative data should be obtained from administrative databases in the university.

Course name, credits, locations, teachers, dates and time of lectures were obtained electronically from the undergraduate office. However, detailed schedule and course materials could be obtained only from the teachers. Few responses were obtained even after repeated calls and faculty meetings. The only efficient way of obtaining materials from lecturers was by recruiting students who were assigned to specific courses. Technical conversion of course materials was then performed centrally.

Discussion: Administrative data on courses could regularly be obtained from the undergraduate office and presented in specific course homepages. Specific schedules, topics of lectures, teaching assistants and course materials should be obtained by active participation of the lecturers, with the help of students who served to facilitate the transfer of printed material to the net. Few Internet-based clinically oriented courses or courses in preventive medicine or health promotion were developed. We suggest that a central program that aims at creating Internet-based courses in a medically oriented environment should employ students to get material from lecturers and transfer them to the web.

Keywords: Clinical, Internet, Medicine, Preventive, Teaching.

A Telematic System for Learning

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Introduction: The learning system derives from L.O.T.U.S., a European Union Project, in which Italian Academy of Family Physicians is partner with Sheffield University, K.U. Leuven and EASP Spain. It's an integrated system with two aims: (i) manage courses, (ii) deliver learning materials On Line. The first step was to setup the communications between partners, done with a web site and mail list, and organize the language resources for Family Medicine, Library resources to find topics in General Practice, explaining learning methods with tutorials Since the beginning we experienced that learning process needs a lot of organization, mainly with residential campus. Avoiding wasting of human resources, it was set up an Access Database, on a local PC. Evolving the project we had the need to manage OnLine, and we studied a solution to use the same work to manage both locally than on line. Was set a WEB site, with details about courses, teachers, facilitators, accommodation and materials and deliver information, enabling registrations and people searching. The second step is implementing a telematic system for deliver learning materials, and learning training by means of questionnaires OnLine. Not only manage, but use the same system to deliver contents OnLine.

Materials and methods: The first step was to identify the resources to manage, very different each other. The human resources of a residential Campus are Managers, Teachers, Facilitators, Physicians, Nurses. Materials are Pre test, Post test, Ratings, Statistics, Accommodation, Accounting. Then was set up a Database running on a local PC In Access97 and a telematic system, accessing to the database OnLine. Was set up a WIN NT server, with Sun Java Web Server, and Java servlets accessing to the database, by jdbc-odbc bridge. The second step (deliver learning resources) was made using the same telematic structure. The issues to manage are static and interactive. Static items are texts, plans, pictures, tables and are easily made by simple html pages. Interactive contents, pre-test, post-test, self-training, are more complex and require forms interacting with servlets, that evaluate, store and answer.

Results: Resources for Family Medicine, topics in General Practice, and tutorials are available at http://www.lotusnet.org. The manage system for campus has been realized and tested. It will be applied to the next Italian Campus scheduled for October in Italy. The learning resources and interactive quiz technology are currently working, testing contents.

Discussion: The telematic system is a useful tool developed to manage and deliver educational contents, fit with L.O.T.U.S. learning model, a self learning process without teachers and only with a facilitator, guarantor of the correct process.

Keywords: Medical, Education, OnLine systems.

QuizMaker: a Simple Way to make Online Questionnaires

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Introduction: Educational process often needs self assessments, to allow the students to evaluate the learning level by themselves. Perfoming quizzes are difficult, as often a custom developed program is needed, involving the collaboration between physicians and I.T. managers. The aim of this work is to develop a server running program for the teachers to make quizzes On Line, without write code, simply filling text forms with contents, avoiding organization complexity.

Materials and methods: To implement the system, we have setup a WIN NT server with Java servlet interacting with a database by means of a jdbc-odbc bridge. The only action the physician has to do, is to fill a simple html Form, with text related to question, up to four possible answers, check boxes and a quiz CODE. The first servlet accept the form and stores the Quiz in the database. To execute the stored quiz, a student or trained physician must have the Quiz CODE or access to a page with embedded code. He inserts the code in a Form and a second servlet extract the quiz text from the database. Besides, the java servlet provides to format an html form (with quiz contents extracted) and send it back. The students receive the html form, click on checkbox to answer to the Quiz. A third servlet evaluate if the answer is correct, store it in the database and send back a response.

Results: The system is currently working and under test for further improvements.

Discussion: We think that this tool will be very useful for trainers, performing the quizzes without programming intervention. We plan to use it for an OnLine teaching method, a two level training: -the first, in static courses with prepared assessments, without a teacher and only with facilitators, guarantors of correct process. – a second level with the expert intervention, revising the statistics of the quizzes and performing new customized questionnaires based on under performing issues of the courses, made by the teacher himself simply filling text fields in a Form.

Keywords: Medical, Education, OnLine systems.

Health Care Information Systematization in the Health Secretary of Buenos Aires City Government and Health Information Accessibility Improvement for the Inhabitants by the Application of an Interactive Health Communication (IHC) Program

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Introduction: Buenos Aires, with 33 hospitals and 34 centers of Health, offers attention to their 3 million inhabitants and neighboring towns, totalizing up 9 million annual external consultations. Communicational system analysis: – In a macro level between the system of Health and the community don't exist permanent programs of communication guided to the prevention or attendance. – Between the central administration and the periphery they are statistical data of production picked up in paper, with scarce clinical-epidemic relevance. The data are not opportune, and the information returns belatedly for take clinical decisions. – In the interinstitutional level there is not communication in the entirety of the areas and when it settles down it doesn't based on institutional derivation norms.

– In the intrainstitutional level is difficult to share data of patient. Our hypotheses are: – The IHC produces a systematizing of the institutional assistance information and a better access from the population to this information. – As a consequence of the above-mentioned, they improve the indicators of health. We will analyze the first hypothesis. Leaving for a later communication the analysis of the second. Variables and indicative interveners: Independent variable: HIC Dependent variable: Systematizing of the information Indicators: Generation of consensus norms, Common scientific semantic definition, Common forms, Instructive, Consolidation meetings, Training, Evaluation instruments, Standard of quality in health information (HONcode) Dependent variable: Accessibility to the information Indicators: Phone line installed, ISP Provided, Website accesses, Access frequency, Navigability, Mails (quantity, quality and answer), Diffusion.

Materials and methods: 24 consensus meetings about clinical, epidemic and registration data; Communication via Internet for the levels 1, 2 and 3 previously defined; Distributed information system; Intranet-Internet; 65 web pages; Tools: FrontPage, Access, SQL; Hosting in GCBA servers; Existent hardware in the participant services; Analogical telephony; Diverse ISP.

Results: Norms for the vaccination campaign against the flu; Publication of the same ones in Internet; Epidemiological Registers (prostate cancer and skin cancer); Electronic form (prostate cancer and skin cancer); Instructives; Flujogramas of attention and registration; Guide of Qualification; Publication of the same one in Internet; Hosting in the GCBA site (www.buenosaires.gov.ar); 40000 monthly accesses (measured in external form – Nestadt); Tree of information of 65 pages asp; Recognition of HONcode; E-mail for community use Other specialties and national and international organisms have been added (Secretary of Education, of Culture and UNICEF). The e-mail allowed the public's consultations in general. These products and indicators, before nonexistent, corroborate our first hypothesis.

Discussion: The HIC generate a space, before nonexistent, of exchange of data and information. Their contents, distributed in CDs in community centers and of education areas, ONGs, and available in interactive Kiosks will increase the accessibility. The initial results referred to the consensus of normative and the circulation of information by means of Internet corroborates our initial hypothesis. It is the first enterprise carried out in Spanish by an organism of Public Health in Latin America. We don't have other evaluation models. We hope to have analysis tools soon to validate the second outlined hypothesis.

Keywords: Interactive, Health Communication, Epidemiology, Internet.

The Study of the Net Management of the Computer Digital College and Back-writing CT or MRI Image in the Application of Clinic and Remote Consultation

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Introduction: We here researched the management system that is a computer image net, which can collect the original digital of medical equipment images of CT, MRI etc through the digital interface, and can transmit the digital image and report to make remote consultation with connecting the modem and phone.

Materials and methods: We use the technique of computer net to the management of the medical image in the hospital. The reports, which have been typed in the computer by the doctor of the radio department, and the medical images, are directly sent to the terminal in the clinical departments through the computer net. We can back-write the original data file of the image to the CT or MRI to do

some post handling to change the motionless image information to the active image information according to the demand of the clinic, the teaching and the study. And it makes a big progress in the quality and the quantity of the diagnostic information.

Results: With connecting the modem and telephone, the system can transmit the digital, image and report to remote consultation, then the result can be transmitted back. To fasten the speed of transmission, the system can compress the original digital; image handling; rewriting the original digital of image.

Discussion: With the rapid development of the computer and Internet, now many image equipment have the digitize interface. So it provide a convenient means to connect with the computer net, and realize the whole digitize auto-collection of the image information, and make remote consultation.

Keywords: remote consultation the computer digital collecting and back writing the CT or MRI image.

MyPACS: A Simple Web-based Radiological Image Management System

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Introduction: MyPACS is an implementation of a World Wide Web-based application for the management of image data over the local area network or from the outside using the Internet. The purpose of design of MyPACS was creating a mini-PACS system for archiving selected radiological images comes from modalities, which are not connected, directly to our network.

Materials and methods: MyPACS uses MySQL for the relational database backend and PHP for the server side scripting language. The whole application was written in PHP. Currently tested with the free popular Apache web server running on Linux operating system. We recommend to use Netscape's browser. The system has a cookie-based authentication module, so the users have to identify themselves with username a password. The program allows uploading images and patient data from the browser (JPEG, GIF, PNG and TIFF are the supported image formats). There is an ability to search, view and download images. Images can be viewed in two different sizes of thumbnails. Generating thumbnails and image conversions are made by widely used Unix graphic program: ImageMagick.

Results: The system is written in a platform independent scripting language and uses GNU applications. World Wide Web technology provides a user friendly and easy to use interface. The system originally designed for use as a research and teaching tool, but it can be useful in a daily clinical work too. In our institution we operate an ultrasound mini-PACS system, which uses this software.

Discussion: MyPACS is not compatible with the DICOM standard, but it is useful in many cases when radiological (or other type of medical images) are accessible in an ordinary image file format. There is a possibility to integrate our mini-PACS with a DICOM system, so based on the early success we are planning further developments.

Keywords: Medical Imaging, PACS, Internet, Radiology Information Systems.

Online Questionnaire COUGH

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Introduction: On-line health questionnaires are composed either for the use by private persons or by medical professionals. In the latter case such questionnaires are aimed to: (1) avoid unnecessary visits to doctors office, (2) monitor patient's symptoms and anamnestic data over time, (3) help medical personnel to compose electronic records and databases. If intelligent software is added to such online questionnaires, primary diagnostic unit can be established.

Materials and methods: Initial results using an Internet based questionnaire for cough and related symptoms is being presented and available at – http://www.doctus.ee/artiklid/ – Online questionnaire COUGH. The patient set includes 19 consequent patients with cough and related symptoms who attended family doctor during two months period. The primary complaint was cough. In 6 cases (32%) the patient had visited his family doctor with similar complaint during previous six months. With the assistance from the investigating personnel each patient completed the questionnaire. Data were stored on floppy discs. The original program without knowledge of the patient's medical record/diagnosis evaluated each patient's answers to electronic questionnaire.

Results: Preliminary testing of the online questionnaire COUGH and related software gives us evidence that in most of cases diagnostic software used by our online questionnaire is able to establish the primary diagnostic unit for cough and related symptoms. All the electronic materials are useful for family physician during further clinical investigation.

Discussion: Topics to discuss: (1) Legal aspects of web based medical questionnaires. (2) Clinical diagnosis management and expert systems – only data collection or something more? (3) Cost – effectiveness of patient orientated online-questionnaires.

Keywords: Decision Making, Computer-Assisted, online health questionnaire.

Integrating MedFrame Databases in the MediMedia Medical Image European Network

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Introduction: MediMedia is a research project partially financed by the European Commission to integrate medical images from many specialized databases. The project started in 1998 and ended in 2000 with a validated full-working prototype published on-line at: http://medimedia.gmd.de. Such an umbrella project allows a shared Internet-based access to any kind of medical images (today it integrates 8 specialized databases). LUISS Guido Carli University, Campus Biomedico, Research Center for clinical evaluation of Automated Methods in Hematology of the Catholic University of Sacred Hearth (ReCAMH) and Itaca Software s.p.a. joined the "MedFrame team" to develop and exploit a relevant part of the MediMedia system. The main results obtained by this team are described.

Materials and methods: The main goals the team had were the coordination of the user requirements analysis of the overall system and the development of software to efficiently export data from local proprietary databases to the network. In fact, the Campus Biomedico stores radiological multimedia data in a Patient Folder Manager (the MedFrame Software System) that has been developed in a previous European project. On the other side, ReCAMH has a lot of pathological blood images digitalized even if not organized in a database. Itaca, in collaboration with the other partners, developed a software module ("MMDBWork") to extract data from MedFrame patient folders and to integrate them with specific information needed for publishing in MediMedia network. This software also allows images available from ReCAMH to be organized in a relational database. When contents are complete and ready to be published, this module automatically generates XML files, which are

available to the World Medical User Community (specialists, researcher, students…) by means of the MediMedia network. Publishing steps are computer-driven and easy to be performed by end users.

Results: ReCAMH provided and validated the system by using approximately 200 haematological images from 50 patient cases. Campus Biomedico made available 10 radiological cases (50 images) already running on the MedFrame Prototype. All data were imported, managed and exported to MediMedia by means of the MMDBWork software interface. LUISS chaired and coordinated the overall sub-project development and gave general assistance to both technical and medical partners. MediMedia is now providing a telemedicine service for publishing medical images and/or cases that need to be properly disseminated within the health community for training, scientific and clinical purposes. In the medium term, it will also improve health care processes by supporting diagnostic activities and by giving physicians and medicine students a powerful educational and training tool.

Discussion: The MMDBWork developed by MedFrame team may be easily configured to allow other DBs to connect the MediMedia network. It may become an essential interface between any kind of local DBs and MediMedia, opening the network to a large number of new potential partners. Today, radiologists in Campus Biomedico and hematologists in Gemelli Hospital can efficiently publish data on MediMedia. They can also access via MediMedia medical images from other medical centers associated to the project. In the long run, MediMedia will enable the medical cooperation process by creating a deep collaboration culture, proposing a powerful, standardized communication platform, implementing a large, shared medical data repository.

Keywords: databases integration, portal site, medical images, telemedicine, Internet.

Preventive Medicine / Interactive, Internet-Supported CD-ROM For Non Health Care Professionals (W.I.P.)

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Introduction: Based on international research, over 30 years experience in consumer affairs and 20 years in medical preventive check-up, we plan to create an elegant, informative CD-ROM so that a non-professional operator intelligibly may manage a spectrum of preventive health care advises.

Materials and methods: – Characteristics of the Presented Information: Technical: the CD-ROM will have links with the Internet (expansion of information, updating), will have a search engine to find information, and will present information using multimedia techniques. Content: it will be evidence-based, informative, consumer-friendly, understandable to non-professionals, educational and practical. It will feature graphs, flow-charts, health indices, quizzes, debates etc. – Chosen Topics: useful addresses & links: a database of other websites, health care medicine; societies etc. & health: healthy living (environment/smoking/alcohol consumption/weight control/diet & nutrition/healthy sleep/etc.), pregnancy, illnesses (minor discomforts, heart & vessels, digestive system, respiratory system, allergy, osteoarticular system, skin disorders, nervous system & senses, hormone system, the male & his health, the woman & her health, aging), medical techniques & analyses, dental care, pharmacy, sports & health, first aid in case of accidents-injuries, being healthy on a trip, alternative medicine etc. self-testing: quiz, test your condition/heartbeat/cardiovascular risk health: social, economic profile/ideal weight/alcohol consumption, etc. & legal aspects: care at home, dying & death, organ donation, living wills, autopsies, euthanasia, malpractice, control of websites presenting medical information, etc.

Results: The CD-ROM, with its up to date and reliable information, together with links to internal & external databases, will provide information quickly and in an easy understood format to non-health care professionals and those working in preventative health care management.

Discussion: Medical informatics, integrating concepts of multicentric statistical & epidemiological knowledge, of evidence based medicine and of pharmaco-economics, might be used as an effective and cost-benefit weapon of preventive health care management, particularly in front of the integration of the human genome, so that prevention and therapy of main killers as cardiovascular diseases and cancer may be installed at a potentially curable stage and even before.

Keywords: Internet, CD-ROM, non-professional, preventive, consumer.

Medical Informatics & The Internet/ Viewpoint From An Outpatient Clinical Center

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Introduction: Objectives: To optimise the informatics of an outpatient clinical center (input: 60,000 patient-cases anno 2000; throughput: 5,000 new patient-cases/year), concentrated on medical diagnostics/therapeutics & medical check-ups in which a central medical operator integrates diagnostics, communication (incl. obtaining second opinions), archiving, and tarification functions in a network system where protected communication must be guaranteed while keeping in mind low-budget profile restraints.

Materials and methods: – Diagnostic input: radiology, ultrasound (3D, duplex, power), endoscopy (gastroduodeno-colonoscopy), respiratory exams (spirometry, airway resistance, DLCO, provocation tests), ECG & blood pressure (incl. 24 hours registration), cycloergospirometry, vascular duplex, laboratory & check-up data. – Administrative input: patient demographics (pharmacy/records from previous visits/care guidelines/images/ doctor & insurance reports), tarification & accounting, archiving & mailing (A4, fax, e-mail, CD-ROM) loads. – Educational issues: speech technology, video conferencing, statistical & epidemiological evaluation of data. – Network [star, Windows NT 4.0 server (IBM netfinity 5500 server) & related workstations / multiprocessor, multitasking & multithreading characteristics / wide support for different file systems (file allocation table / new technology file system) & for the network & for the other operating systems / digital ultrasonographic, endoscopic & cycloergospirometric data: linked by means of serial cables to the workstations (Windows NT Compaq professional, Compaq deskpro EP-serie, IBM laptops)]. – Communication modalities: fast Ethernet, ISDN, Internet, medical reports: filmless externally transferred/ DICOM protocols between miniPACS server & the diagnostic sources/ISDN facilities between office & RIS servers and between reporting workstations & the PACS server; Webstandards governed communication between referring physicians PCs & RIS server. – Data security: governed by the redundant array of inexpensive disk (RAID) method (Windows NT server support: RAID levels 0, 1 & 5), login codes of 3 levels.

Results: – The global system of integrated diagnostics, tarification, accounting, archiving, mailing & training proved to be promptly implemented & elegantly linked to similar extern systems. – Medical results proved filmless to be delivered directly and easily statistically & epidemiologically processable.

Discussion: This outpatient clinical model [with its gain in cost of film, chemicals & materials and (also however substantially less) in staff members] functions as a prototype for case studies of implementation of networking.

Keywords: medical, informatics, protected, communication, low budget.

The Production of an On-line Medical Textbook

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Introduction: In early 1999, we embarked on an effort to use the web to disseminate the methods used in the Head and Neck Program at M.D. Anderson Cancer Center. The effort is led by the chairman of the Department of Head and Neck Surgery, Dr. Helmuth Goepfert, and the surgery administrator, James F. Spafford. The primary goal was to provide current, topical information regarding the treatment of head and cancer to physicians and other knowledgeable persons.

Materials and methods: An extensive exploration and discovery process was undertaken. After a review of the technologies, production CDs were removed from consideration, given the need for quick, efficient and affordable data revisions, with all attention focussed on a web-based textbook. A team was assembled, which includes a physician editor-in-chief, a managing editor, technical advisor, a content editor, and a project manager. The following questions were raised: Will the electronic book be used frequently? How should the "return on investment" be measured? What forms of functionality would best serve the audience and the material? Is this project affordable and how will ongoing maintenance be funded? Should there be a charge for use of the electronic book? Can content be managed in-house by non-technical staff? What are the legal implications of producing this material on the web? What design is necessary for optimal readability? What qualifications should the technical staff or contractor possess? What aspects of traditional publishing can be utilized? The team consulted with physicians, Internet service providers (ISPs), technical advisors, traditional publishers and other professionals, as well as numerous web sites.

Results: The team was satisfied that the project was viable. The next step, selecting an ISP, proved challenging because of the uniqueness of the project. Once the ISP was chosen, the design phase was completed in a few months, including a menu-driven content management interface. A content management model was developed, using e-mail, FTP, and the book's interface. Content will include text, tables and an estimated 1,500 images. Concerns about the capabilities of the average user's PC and connection speed, not to mention the cost of producing the book, resulted in emphasis being placed on readability, image integration, and intuitive site links, in addition to a site search engine and "history" feature. The use of streaming media was explored, but deferred for future use.

Discussion: The electronic textbook, The Multidisciplinary Care of Head and Neck Cancer, will be completed in a few months. Many lessons were learned related to budgeting, web site design, understanding learning patterns, and legal issues, as well as publishing issues such as author selection and content management. This electronic book will hopefully be the first in a series of textbooks using this model. The most difficult challenge remains to gather the appropriate cognitive and intellectual information and offer it in a user friendly, practical way to the web student.

Keywords: medical textbooks, education, electronic publishing.

A WEB System Achitecture to Support Medical Teaching at University

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Introduction: With the continued evolution of Internet usage, new paradigms have been developed and new possibilities have motivated educators around the world to rethink Medical education and apprenticeship models. The INTRAMED project initially addressed the need of information

management within UFPE Medical Course and subsequently took part of the Pilot Program within the Ministry of Education and Culture. This program focused on the development of information systems for the Brazilian graduate courses. The INTRAMED was initially conceived as a WEB System that not only dealt with core subjects facilitating student learning but also, helping professors to structure and to control every day issues of their disciplines. Based on the INTRAMED experience, methodologies and tools to support the development of this new kind of environment and necessary functionality to motivate a real utilization of the system by your users were identified.

Materials and methods: At first place, with the objective of identifying the environment functionality, interviews with potential users were done: students, professors and discipline coordinators. Through these interviews, kinds of information and interaction that would be useful to the users were identified. Secondly, others initiatives of health educational support projects that are being developed in Brazil and around the world were studied. Finally, we noticed that in many occasions this kind of environment needs to inter operate with others Information Systems already in use to exchange information. In the INTRAMED case, it must obtain some data from the UFPE Academic Control System. Due to this, the system was analyzed and the INTRAMED was designed to provide transparent interaction with it. Once having defined the functionality, a research achieved at the UFPE Computer Center and the Recife Advanced Studies Center (CESAR) indicated the technologies that could be used to support the established functionality in a secure and efficient way.

Results: A Web Based System architecture to support medical teaching was designed. The system access uses a secure module to avoid no authorized people and it is based on views. Each view corresponds to a user profile and the environment will adapt itself to each profile, providing the users with differentiated functionality and specific data. Besides the capacity to present relevant information and produce follow-up reports, there are modules in the system that facilitates the interaction between students and professors, such as Conversation Rooms and Discussion Forums. The Object Methodology is adopted during all the development phases, going from the system conception to its implementation, aiming a well structured, modular, easy expansion and actualization and interoperable system. The system is composed of HTML pages, dynamically generated trough the Servlets usage. As a storing media, a relational database is adopted. To integrate an Object-oriented System with a relational database, a specific layer architecture is deployed. This architecture permits to isolate the interface objects, the business objects related to the application and the object responsible to obtain data from the storing media. We emphasize the XML use to guaranty the interoperability with other information system and the use of intelligent agents to automated notification services.

Discussion: Nowadays, there is a strong tendency of Health Teaching Institutions to use WEB Based Information Systems to help the educational process. From the advantages that the WEB environments provides we emphasize the high connectivity and range, facility of using several kinds of media in a same environment and platform independence. Although each institution has its own characteristics, the proposed architecture presents a data model, functionality and technologies that could be useful as a base and orientation to these Institutions develop their own information system.

Keywords: Medical Education, System Architecture, WWW.

Clinical Quality Guidelines in a Lotus Notes Based Intranet

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Introduction: There is growing demand for the presentation and retrieval of quality guidelines, which are relevant for the everyday usage of clinicians. An intranet-based solution compares favorably to paperwork, but standard plain HTML-based web pages do not support very well a two-way communication between authors of guidelines and their readers. We have thus implemented an Intranet which is entirely based on Lotus Notes Release 5 (Lotus Domino). The essential advantages to this solution are the integration of powerful email and electronic discussion facilities as well as full-text retrieval and structured documents.

Materials and methods: The Medizinische Kernklinik is a department of Medicine at our University Hospital, serving particularly the specialties Pneumology, Endocrinology and Metabolism, Gastroenterology/Hepatology, Infectiology and Intensive/Emergency Care. The department is responsible for the non-surgical emergency admissions to the University Hospital. There are 137 hospital beds and 12 ICU beds in the Medizinische Kernklinik Department; 51 physicians of all levels of proficiency are employed full-time. In 1998, 4900 patients were treated as inpatients. The central server is a Pentium III PC running Windows NT server version 4 and Lotus Domino Release 5.0.4. Clients are standard Pentium III PC running Windows NT workstation version 4 and a Lotus Domino Client (Rel. 5.0.4). The intranet is currently not connected to the internet in any way.

Results: The relevant information is kept on the server as Lotus Notes Databases. No programming beyond the facilities of Lotus Notes was necessary. Databases include document databases about standard operational procedures and about general quality assurance mechanisms in the hospital. Moreover, local medical "yellow pages" are implemented, directing the user to in-house resources. These include a lab test directory, a directory of in-house non-medical counseling services (such as quality assurance, information technology counseling, ICD-10 help, photo lab), and an information service about invasive procedures. Data pertinent to quality assurance are acquired via a Lotus Notes interface; we are starting this service for the documentation of hospital-acquired infections. The Lotus Notes "discussion" infrastructure is used for asynchronous online discussions about a "paper of the month".

Discussion: While the further development of intranet technology needs to be monitored closely, we have demonstrated the feasibility of constructing a usable intranet with significant medical information at a very low cost. We believe that quality-relevant data should be presented with the best possible interface: This necessitates that the users are viewed as an equally active part as the authors of quality guidelines, because this may be the only way to get clinicians to supply a quality control system with valid data.

Keywords: Information systems, Informatics clinical, Practice Guidelines, Healthcare Quality, Groupware.

Use of the Internet Technologies – Important Tool of Research Work

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Introduction: The high rates of the growth of modern information technologies determine their effective actions on the scientific research activity in the all fields of knowledge. The realization of the biomedical investigations is largely directed on the development of the theoretical basis of medicine, the raise of the evaluation exactitude of the various processes of vital functioning and has the important value for medical practice. Taking into account this, the essential value is added to assimilation and using of the Internet technologies for want of realizations of experimental and clinical researches in Kiev research institute of the otorhynolaryngology of the Ministry of Health of Ukraine.

Besides of usual searches in Internet, the special attention attracts the participation in the work of the specialized groups of arguing on the most priority scientific directions and specialized Mailing List, in particular, cytometry@flowcyt.cyto.purdue.edu, where the problems on flowing cytofluorometry are considered. It enables to consider theoretical and applied, methodological and methodical questions among the narrow experts, to exchange the data of the literature and outcomes of researches, to consider problems of the avoidance of the mistakes and standardization of researches and data processing. It is necessary to say, that the issues of standardization gain the increasing value in connection with perspectives of broader introduction of the telemedicine, that requires increasing use of the interdisciplinar knowledge and growing attention from a leg of scientific community. Thus, the application of information technologies not only ensures comfortable conditions for research process, but also has to assist of integration of scientific reachings, obtained from various sources, and introduction them for practice.

Materials and methods: Scientometric method is used.

Results: essential value is added to assimilation and using of the Internet technologies for want of realizations of experimental and clinical researches in Kiev research institute of the otorhynolaryngology of the Ministry of Health of Ukraine. Besides of usual searches in Internet, the special attention attracts the participation in the work of the specialized groups of arguing on the most priority scientific directions and specialized Mailing List, in particular, cytometry@flowcyt.cyto.purdue.edu, where the problems on flowing cytofluorometry are considered. It enables to consider theoretical and applied, methodological and methodical questions among the narrow experts, to exchange the data of the literature and outcomes of researches, to consider problems of the avoidance of the mistakes and standardization of researches and data processing. It is necessary to say, that the issues of standardization gain the increasing value in connection with perspectives of more broad introduction of the telemedicine, that requires increasing use of the interdisciplinar knowledge and growing attention from a leg of scientific community.

Discussion: application of information technologies not only ensures comfortable conditions for research process, but also has to assist of integration of scientific reachings, obtained from various sources, and introduction them for practice.

Keywords: medical biological information, Internet.

Internet as a Tool for Guideline Development

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Introduction: The programs of the Dutch Institute for Healthcare Improvement are aimed at the improvement of professional quality of the entire care process with the patient as top priority. Multidisciplinary guideline development is an important activity of our organization. Recommendations in these national guidelines are based on evidence-based medicine. In the beginning of 1999 we started an innovative project: the development of a guideline with the use of Internet technology. In short we will give an overview of the results so far and the problems we encountered.

Materials and methods: After the selection of the guideline topic the guideline development group is installed and a systematic literature search is performed to identify the evidence. After critical appraisal of the literature the guideline recommendations are formulated. As an experiment we decided to develop a guideline on the Internet. The subject of this guideline is: "The use of NSAID's and gastro-intestinal adverse effects". For this purpose a homepage was created. A panel of eight

specialists on the subject was formed and started to write and review the concept text for the guideline. Information and comments on the concept guideline were exchanged on the homepage.

Results: The results were rather disappointing in contrast to the expected advantages: saving time and money. There were several starting problems. One major problem was that the website wasn't finished at the start of the project. It was not operational until March 2000, so the first year the panel had to exchange their information by e-mail. A second problem we encountered was that the website design was not structured and user-friendly. This, together with a lack of instruction of the panel members, did not stimulate them to use the website. To get ideas for improvement we asked the panel to fill in a questionnaire to indicate the causes of the problems. With the results of this questionnaire we hope to make changes for improvement in the future.

Discussion: It is very attractive to use the Internet for the development of guidelines, because of the opportunity to save time and money. However, before starting such an innovative project, there must be an extensive thought about the possible difficulties that can occur. The design of the website must be very structured and user-friendly. The participants in the project must have an extensive training in the use of the website. It is very important not to save money and/or time in the starting phase of the project. For a successful course of the project the technical and training facilities must be excellent and the project coordinator must be a professional and stimulating personality.

Keywords: Practice guideline, Evidence based medicine, Internet, Guideline development.