



## Information technologies and development disorders

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### РЕЗЮМЕ, ABSTRACT

The field of medical informatics is facing challenges to develop, for special populations, technology solutions that acknowledge the unique needs of these groups: the special information needs of paediatric care and health service research questions related to the use of information technology in children's health care. Technologies that support the care of children must address issues related to growth and development, children's changing physiology, and the unique diseases of children and interventions of paediatric care. Connectivity and data integration are particular concerns for child health care workers. Consumer health information needs for this population extend beyond the needs of one individual to the needs of the family (Ukr.z.telemed.med.telemat.-2012.-Vol.10,№1.-P.58-61).

**Key words:** medical informatics, congenital abnormalities, pediatrics

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### ІНФОРМАЦІЙНІ ТЕХНОЛОГІЇ Й ПОРУШЕННЯ РОЗВИТКУ

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Порівняно новим напрямком розвитку медичної інформатики є розробка рішень для груп населення зі спеціальними потребами, особлива увага повинна бути приділена дитячим контингентам, процесам організації й надання педіатричної допомоги. Інформаційні технології повинні забезпечувати підтримку фізичного й інтелектуального розвитку, урахувати зміни у фізіології, особливості перебігу різних захворювань і надання педіатричної допомоги. При цьому потрібне розширення можливостей технології від потреб індивідуума до потреб родини (Укр.ж.телемед.мед.телемат.-2012.-Т.10,№1.-С.58-61).

**Ключові слова:** медична інформатика, уроджені пороки розвитку, педіатрія

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### ИНФОРМАЦИОННЫЕ ТЕХНОЛОГИИ И НАРУШЕНИЯ РАЗВИТИЯ

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Относительно новым направлением развития медицинской информатики является разработка решений для групп населения со специальными потребностями, особое внимание должно быть уделено детским контингентам, процессам организации и оказания педиатрической помощи. Информационные технологии должны обеспечивать поддержку физического и интеллектуального развития, учитывать изменения в физиологии, особенности течения различных заболеваний и предоставления педиатрической помощи. При этом требуется расширение возможностей технологии от нужд индивидуума к нуждам семьи (Укр.ж.телемед.мед.телемат.-2012.-Т.10,№1.-С.58-61).

**Ключевые слова:** медицинская информатика, врожденные пороки развития, педиатрия

Information systems for paediatric care must take into account three special considerations to meet this population's information needs effectively [3-7]: 1) widely divergent paediatric subpopulations, as well as the unique physiology and diseases of children and special interventions for them; 2)

connectivity and system integration at the community level, since it is imperative for paediatric practices and institutions to be connected closely to the public health authority and the schools; and 3) consumer health information that addresses the needs of the whole family.

#### Telerehabilitation:

- is the delivery of rehabilitation services over telecommunication networks and the internet. Most types of services fall into two categories: clinical assessment (the patient's functional abilities in his or her environment), and clinical therapy.

- can deliver therapy to people who cannot travel to a clinic because the patient has a disability or because of travel time.

- allows experts in rehabilitation to engage in a clinical consultation at a distance.

- is highly visual.

- the most commonly used modalities are via webcams, videoconferencing, phone lines, videophones and webpages containing rich Internet applications.

The choice of activities and exercises, adapted to the level of acquisition and emerging abilities, will depend on the assessment. It is these exercises which will have to be integrated into a computer programme. A great many exercises, which are well adapted to the specificities of the artist's learning difficulties, already exist.

Computerization of some of these exercises could be quite easily undertaken. One could also look at existing educational computer programmes for exercises, which although not specifically developed for autistic people, could very well be of an appropriate level and which do not, above all, present any disconcerting characteristics for autistic people. It is, moreover, in this category that the highest number of computer experiments may be found. Finally, teachers could also invent new exercises which make specific use of the progressive animation and integration capacities of several of the new tool's sensorial modes.

In contrast to this, however, several experiments involving computer aided teaching in the second area would appear to show encouraging results. It is very important to remember the autistic person's difficulties with memorization, sensorial integration, attention span and generalization which have been highlighted by recent research into this disorder. This type of use with non verbal autistic people or those experiencing difficulties in expressing themselves verbally

has been experimented with by various specialists. This may involve pointing systems using drawings or symbols, similar to the communication cards already used by a number of autistic people to communicate with their entourage. By combining the principle of card communication with the possibilities provided by computers, new fields of application will be developed. For instance, voice synthesis which enables easier communication with an interlocutor or the system of unfolding pictures.

On the other hand, telemedicine is used to monitor a wide range of pediatric health conditions from common childhood illnesses, such as strep throat and asthma, to conditions requiring specialty care in such fields as dermatology, endocrinology, emergency and critical care, neurology, gastroenterology, obesity, radiology, pathology, oral health, and psychiatry.

We have developed a model of desktop software solution for the therapeutic centre in our universities that deals with mentally defective children. This telemedical application is used to screen, diagnose, treat, and Telemedicine and telehealth applications help providers and patients manage the patient's health, reducing the need for more complex and costly hospital visits and health treatments later.

The standard medical practice from the time of Hippocrates is based on the face to face contact with suffering patient; the personal experts experience; the approved law and legitimacy in Bulgaria are just some of the advantages and established standards of this kind of performance. On the other hand, paper documentation which is still in the routine practice of our healthcare system, the possibility of intentional or accidental error, lack of practical experience in this case, mark this work as a model of old, unsatisfactory and risking the health of the patient (fig.1). Telemedicine, however, faces many other problems that lead to fear and reluctance of the new consumption. It requires modern standards, guarantees for patient several expertises to prevent and minimize the possibility of errors in setting the final diagnosis, provision of care 7 days a week, 24 hours a day.

Standard medical practice		Telemedicine	
Pros	Cons	Pros	Cons
traditions of medical work - it changes with years and it is the main component of work methods		simultaneous work of more organizations	equipment expencies
Tested through its development fixed and routine		standard simple process	knowledge for electronic data bases and PC literacy
The paper doesn't require technologies	information lost	improvement of health services	new public way of work
face-to-face contact	financial and time expencies for patients family	care at any time, any point, anywhere, to anybody	problems with conviniece and reliability
Subjective	mistakes	transfer of various data and examination results	acceptance from the personal to work with the system
Legislation and law have the evidence power and v alidates the doctor in front of every administrative and accounting issue	speculation with information	different diagnostic schemes and methods at the same time	requirements for more competencies in the speciality
Personal written responsibility - official documentation	time delay	consultations with more than one specialist	competiveness
Ancient rituals in communication with patient	old archives	homecare 24 hours	pressure of work
		long life and home education	who fixes the prices
		interaction human-PC	PC education
		objective opinions	ethical issues
		reduce professional isolation	political will
		reducement of permannet travelling and incresement of professional satisfaction	INSTITUTIONAL will
		ensuring the best specialists	cautiosness from patients
		new standards of work - faster, precise and cheaper	lack of legal issues
		team work principles	

Figure 1. Comparison of telemedicine and non-telemedicine health care systems

Of course, the difficulties and obstacles to this scheme of work related to the medical experts put it in a competitive regime, the lack of ethical and legal frameworks also limit abuses and requirements for skills in information technology are just some of the barriers to implementation and institutionalization of this service model.

TelerehabSoft is a software model for education and therapeutic treatment of children with autism and other mental disorders. It contains animations, voice commands, and stimulation through different animations, randomized pictures and questions (fig.2) [1,2,5].

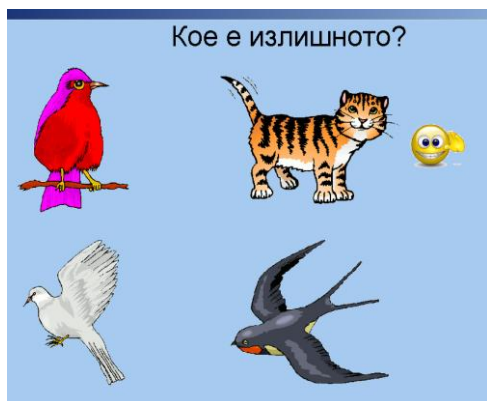


Figure 2. Screenshot of the Telerehabsoft-2011

It is planned to be multilingual solution – English, Norwegian and etc. It is going to be used in medical centers for treatment and rehabilitation of children from distance. Telerehabilitation is the delivery of rehabilitation services over telecommunication networks and the internet. Most types of services fall into two categories: clinical assessment (the patient's functional abilities in his or her environment),

and clinical therapy. Telerehabilitation can deliver therapy to people who cannot travel to a clinic because the patient has a disability or because of travel time. It also allows experts in rehabilitation to engage in a clinical consultation at a distance. The most commonly used modalities are via webcams, videoconferencing, phone lines, videophones and web pages containing rich Internet applications. The first rich internet

applications for neuropsychological rehabilitation (cognitive rehabilitation) of cognitive impairment (from many etiologies) were in 2001. Our project idea is to collect

medical data from children experience with the software, to generate statistics and to assist medical doctors in their treatment and diagnostic schemes.

### Conclusions

Ensuring that information technology better serves the needs of children will require both changes in the way technology is currently used and the acquisition of new knowledge.

The technology industry implements features in health information systems to directly support specialized care and clinical decision support management. What we mostly need is policy-making and standards-setting bodies, who should involve a representative group of stakeholders from the

paediatric health care community to develop child health information technology policies consistent with community health care objectives. There is a lack of educational programs for those providing health care to children should include training in effective uses of information technology.

To prove the benefits of decision support technology in the domain of pediatric medicine and cost-effectiveness of telerehabilitation programs is one of the major general challenges.

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