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Analyzing of Functionality of Most Useable Emergency Medical Services Software Products
Introduction

- In the last two (or three) decades national health system is subject to continuous increasing patient number to care and more complex conditions to operate.
- The most serious problem is the uninterruptedly decreasing system resources such as human resources (physicians, nurses and other staff), as well as a numerous infrastructure constraints.
Introduction

- That's why all these years the healthcare managers are looking for a solution that both can facilitate the analysis of the problems and can offer new solutions.
- Many researchers think that such a solution can be found in the increasing share of computer technology in medicine and related to it activities.
- Our presentation explores some results of analyzing basic functionality and characteristics of IT systems oriented to emergency medical services.
Our study approach

- In the first stage of our project we study and analyze characteristics, functionality, constraints, and limitation of over 170 software products on market in last 3 years that can be used in IT infrastructure of ED:
  - 54 general purpose EMS,
  - 21 medical alert systems,
  - 67 medical office systems,
  - over 30 ED-oriented Telemedicine systems and applications.
Our study approach

Key axiom of our study:

- “The Emergency Department is a special and a unique element of healthcare system”

Key characteristics of ED as a system:

- It presents an increasing number of challenges.
- Its tasks are complex.
- Its environment and management are chaotic in many cases.
Our study approach

Why ED is classified as complex and chaotic environment from management point-of-view?

- **limited patient information**: ED’s staff frequently need to make critical decisions without having the minimum necessary information for the patient (patient records/medical history/...)

- **stressing available resources**: many times crucial decisions are made under pressure with limited resources and continual readiness for new arrivals.
Our preliminary results

- We change some of our views on existing patient data and information flows.
  - The result is a clear definition of role of ED systems in healthcare IT architecture
- We create a prototype of the meta-model of data and information flow in a new generation ED services system.
- We identify some mandatory basic functions groups that should have each new generation ED services system.
- We define a set of mandatory computer and communications technologies.
Our meta-model

- We clear our view to the role of ED systems in healthcare IT architecture. This view changes our thinking to quality of ED computer systems:
  - to enhance the quality of ED computer systems we need to think about these systems both as a consumer of available past patient data and as new patient information source.
- This has allowed creating a prototype of the meta-model of data and information flow in a new generation ED services system.
Our basic functions groups

- Monitoring and management patient flow and following-up hospital patient care activities - this includes variety of systems characteristics and functions oriented to:
  - patient tracking,
  - data/information exchange, and
  - seamless communications between hospital departments and laboratories.

- Medical decision support:
  - all types of adverse events and activities that prevents physicians in time-critical decision activities.
Our basic functions groups

- Documentation and archiving of medical/clinical data, information, and knowledge:
  - all emergencies require documentation of the specific details of the visit but this task is a time-consuming and nobody like it.

- Interoperability between ED and other healthcare providers:
  - in this group we select all medical information functions that are used to “ED-patient” and “ED-other health provider” communications and data/information exchange.

- Real-time patient health status monitoring
Our set of mandatory technologies

- Wireless registration, monitoring, and communication.
- Digital audio/video communication:
  - at least host-to-host, but better teleconference.
- Handheld devices and mobile computing
- Telemedicine devices support
- Electronic dashboard:
  - centralized with remote connections
Our set of mandatory technologies

- New generation decision support systems
- Digital image creating and archiving:
  - supporting different standards and devices of digital radiography
- Hi-speed secure and safety pre-hospital data and information transfer
- RFID tracking:
  - at least passive, but better active.
Conclusions

- The Emergency Department is a very spatial and unique location at which patients are guaranteed 24 hours/7 days access to health care.
  - Social changes produce a number of challenges to the provision of high efficient and quality emergency care.

- New challenges set new tasks for modern computer systems to support, to manage and to control the ED medical activities.
Thank you for your attention!