

Combining Medical-Managerial Information and Communications Technology Standards to promote Interoperability in Health-Care: A Status Report

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Background: Contemporary Health-Care in most countries is characterized by isolated and small-scale applications that cannot promote effectively enough, communication and information-sharing among Health-Care Providers, Medical Institutions and Health Insurance Organizations. Therefore, interoperability of Health-Care Information Systems has become one of the most crucial and challenging aspects in National Health Systems and other Health-care Providers.

Objectives: The aim of the presentation is to report on Research and Development activities during the last 15 years, attempting the harmonization of Medical-Managerial and Information-Communications Technology (ICT) Standards, and promoting Interoperability in contemporary Health-Care.

Results: We have developed (like numerous other R&D groups worldwide) during the last decade various systems promoting Interoperability, mostly based on semantically annotated Web-Services, covering important Medical issues such as:

- On-line Medical Education Means based on Patient Records.
- Means supporting the Acquaintance of Health-Care Personnel to Operational-Cost Monitoring.
- Medical Decision-making and Treatment within the emerging Hi-Tec Home-care environment.
- Medical House-Call as an emerging IT-supported Option in contemporary Health-care.
- Digital Blood-Banking and Transfusion Medicine.
- Patient treatment at home and medical data exchange in the emerging networked society.
- Supporting technically the post-discharge Continuity of Medical Care.
- Web-based Systems supporting the Certification of Hospital Departments (Outpatient, Emergency, Surgery etc.) and the Accreditation of in vitro Diagnostics and Transfusion Medicine Services.

However, very few innovations have been adopted, even as pilot-projects both, in the public and the private Health-Care sector, in Greece and elsewhere, due to various reasons presented in Table 1.

Table 1. Important barriers and opportunities concerning Standards' adoption and compliance.

Barriers concerning Standards' adoption	Opportunities concerning Standards' adoption
Different priorities due to Countries' development	The recent Health-Care Internationalization procedure acceleration
Limited understanding of the Standards' necessity	The positive outcomes of a limited number of performed pilot-programs for serious needs
Cost of the adoption process and lack of necessary resources	Miniaturization trends of Biomedical Technology (BMT) & ICT and their strongly falling prices
Personnel qualification level and training and the associated Professional Unions resistance	The merging of BMT Equipment, ICT and Medical Decision Making
Integration of existing BMT & ICT	Pharmaceutical advances and BMT Innovation transform radically Healthcare delivery
No National Health System or Strategic Policies combined with limited International contacts treaties and commitments	Gradual improvement of the International Cooperation and increasing of funds' availability especially for developing Countries

Discussion: Clinical terminologies and vocabularies, such as SNOMED, ICD-9, ICD-10, and LOINC are already in use for several years and they provide a well established description of the Medical-domain knowledge. Furthermore, the HL7-CDA (Health Level 7 - Clinical Document Architecture) is already in use by several countries, providing for a common representation of clinical documents, enabling the clinical document exchange and facilitating document management. It is not realistic to expect that all care-providers will soon agree on adopting a single standard, allowing for the interoperability of different health care information systems. However, semantically annotated Web-Services, delivering Health-Care relevant information, conforming to the most important medical, managerial and ICT Standards, and well-defined machine-interpretable meaning of the exchanged data, appears currently to be the most appealing interim approach, towards optimization of interoperability.