



"Impact of Emerging Information and Communication Technologies on Patient Safety"

An expert meeting on
Friday, June 30, 16:00-17:30h, in Charlemagne Bldg, Room S4
following the conference "ICT for Biomedical Sciences"

This meeting is about the intersection of patient safety with the topics of the conference "ICT for Biomedical Sciences". Not about patient safety in general and not about the non-technological issues related to this topic. A small group of experts will brainstorm on research challenges worth to pursue regarding the new methods and emerging technologies discussed during the conference, and their applications to increased patient safety across the whole health value system through e.g. developing tools to model, simulate, predict the outcome of interventions, tools for optimising the number, processes and severity of (safer) interventions including surgical procedures, drugs, implants, new diagnostic tests, reducing the number of persons involved and time needed for clinical trials by applying simulation, etc.

The emerging ICT technologies/tools considered are: modelling and simulation, biomedical imaging, visualisation techniques, data mining, grid computing, etc. We will discuss how these ICT applications may provide benefits for healthcare, education/training, clinical research (acceleration of safer and personalised drugs/treatments), etc., in the foreseeable future or the longer-term.



Chair: Gérard Comyn, Head of Unit "ICT for Health", DG Information Society and Media, European Commission

Gérard Comyn is currently head of the "ICT for Health" Unit. He used to be acting Director between February and October 2005. Before joining the "ICT for Health" unit he was head of the IST research strategy unit in DG INFSO, European Commission. He used to be managing director of ECRC (European Computer Industry Research Centre, 1989-1994), an international industry-led research centre in Munich, owned by Bull, ICL and Siemens. He was Professor in the University of Lille between 1972 and 1989.



Moderation: Ilias Iakovidis, Deputy Head of Unit ICT for Health, DG Information Society and Media, European Commission

Ilias Iakovidis received Ph.D. in 1990 (USA) in applied mathematics thesis on inverse problem in electrocardiography. From 1990 to 1993 he was a researcher at University of Montreal and Montreal Heart Institute. In 1993 he joined European Commission where he currently serves duties of deputy Head of ICT for Health, responsible for research activities in eHealth and biomedical informatics as well as contributing to the successful follow up of the eHealth Communication and Action Plan COM (2004) 356 of which he was the main co-author. Beyond the office duties he continues to publish articles and books, teach graduate courses on medical informatics in EU and US, and giving keynote lectures at major international conferences. In 2001 he has been elected fellow of American College of Medical Informatics for his contribution to the field.

Speakers:



Introduction: Octavian Purcarea, Scientific Officer, Unit ICT for Health, DG Information Society and Media, European Commission

Octavian Purcarea is a medical doctor with a post-graduate degree in Health Administration (MBA), a general surgery training and several years of experience in the eHealth area. His experience in the private sector in different domains (Health information networks, telemedicine and research in the ICT for Health area) was followed by more than four years as Scientific Officer at the DG INFSO,

based in Brussels, Belgium, for the Information and Communication Technologies (ICT) for Health Unit. He is now in charge with the Interoperability of eHealth applications aspects of the eHealth Action plan (see COM (2004) 356).

Dr. Purcarea will briefly introduce the European Commission activities in eHealth RTD and Patient Safety.



Peter Hunter, Professor of Engineering Science - Director, Bioengineering Institute, University of Auckland

Prof Hunter holds engineering degrees from Auckland University and a DPhil (PhD) in Physiology from Oxford University. He is currently a Professor of Engineering Science and Director of the Bioengineering Institute at the University of Auckland, and Director of Computational Physiology at Oxford University. As the current co-Chair of the Physiome Committee of the International Union of Physiological Sciences he is helping to lead the international Physiome Project which aims to use computational methods for understanding the integrated physiological function of the body in terms of the structure and function of tissues, cells and proteins. He is on the scientific advisory boards of a number of Research Institutes in Europe, the US and the Asia-Pacific region. He is a Fellow of the Royal Society (NZ & London), the World Council for Biomechanics, the American Institute for Medical and Biological Engineering, and the International Academy of Medical & Biological Engineering.

Prof. Hunter will present: "**Clinical applications of computational physiology**".

Abstract: These include the use of models of the femur to reduce the Xray dosage required for determining bone density, the use of models of the musculo-skeletal system and lymphatics to improve the efficacy of tracking carcinomas in the sentinel lymph nodes, and the use of heart models with MRI data to determine wall kinematics for surgical planning.



Professor Zvia Agur, Optimata Ltd .& President of Institute for Medical BioMathematics (IMBM), Israel

Professor Zvia Agur, is the Chairperson and Chief Scientific Officer of Optimata Ltd. and the president of Institute for Medical BioMathematics (IMBM), Israel. Agur is an international biomathematician, who has made major contributions to the theory of disease dynamics, chemotherapy and vaccination policies optimization. She has served as the president of the Israeli Society of Theoretical and Mathematical Biology and a member of the Board of Directors of the European Society of Mathematical and Theoretical Biology. Her original and innovative research work has won national awards, been published in a long line of leading scientific journals and is recognized by the academic community worldwide. Agur holds a Ph.D. from the Hebrew University in Jerusalem and the Université Libre de Bruxelles.

Prof. Agur will talk about "**Interactive Clinical Trial Design**" - **Optimizing Drug Development from the Pre-clinical Phases through Phase-IV**"

Abstract: Currently pharmaceutical companies investigate various methods for increasing their productivity in drug development, in order to compensate for increasing costs and to avoid regulatory fiascos. Traditionally, clinical trials are carried out in a "trial and error" fashion, which is highly inefficient in measures of human and animal suffering, cost and time to market of the newly discovered compounds. The major drawback of the traditional system lies in the lack of a priori guidance about the potentially successful treatment regimens. As a consequence, treatments are recommended on the basis of trials which tested only a small number of arbitrarily selected schedules. The need for a change in paradigm of clinical trial design has been reiterated, and it has been suggested that the new paradigm should be based on formal methods for predicting disease progression under specific treatment regimens of given drugs or drug combinations. A complex software has been developed for selecting the most efficacious treatments for a given indication/patient/population. This system, denoted Virtual Patient engine, simulates the dynamics of key biological, pathological and pharmacological processes in a patient undergoing drug therapy. The Virtual Patient engine can be employed in drug development by the use of an elaborate algorithm, Interactive Trial Design. Thus, the user is able to fine-tune and test the comprehensive drug/disease/host model, interactively with the pharmaceutical company, so that relatively early during development the model can be employed for checking the most appropriate treatment schedules for the drug and for making an early "No-Go" decision. The Interactive Trial Design algorithm is expected to replace the current drug trial policy by a

new policy of clinical trials, which will be based upon a gradual improvement and zeroing-in on the best prediction-directed treatment schedules.



Antoine Geissbuhler, MD, Professor and Director, Division of Medical Informatics, Geneva University Hospitals and School of Medicine

Antoine Geissbuhler is a Professor of Medical Informatics. His current research focuses on the development of innovative information systems architectures and computer based tools for improving the quality and efficiency of care processes. The Service of Medical Informatics is responsible for the design, development and evaluation of an advanced clinical information system for Geneva University Hospitals (HUG), a group of primary, secondary, and tertiary care facilities. Research activities include medical knowledge representation, distributed knowledge management, data mining and knowledge discovery, natural language processing, advanced medical image processing, information systems architectures, telemedicine, and internet-based learning. Dr. Geissbuhler is the author of over 80 original scientific publications in peer-reviewed scientific journals. He is also on the editorial board of the journals "Methods of Information in Medicine" and the "International Journal of Medical Informatics" as well as being associate editor of "Computers in Biology and Medicine".

Prof. Geissbuhler will talk about "**Knowledge-enabled care processes for better patient safety**"

Abstract: Beyond bringing the right information at the right time to the right person, health information systems can further improve patient safety through innovative, knowledge-based approaches. These include:

- better health promotion through contextualized knowledge provision to citizen, patients and care professionals, and from the large-scale collection and linkage of health indicators,
- better diagnoses through physiopathological modelling, confrontation to large case databases, and knowledge-coupling across knowledge domains,
- better treatment through simulations, minimally-invasive therapies, individualization of treatments based on genomic, proteomic characteristics, or on custom-designed prosthesis, and intelligent drug-delivery mechanisms,
- better monitoring and remote assistance via advanced telemonitoring,
- optimised and safer care processes built on information systems that can learn and facilitate collaboration, enabling normalization, customization and traceability of care production.

The implementation of such approaches requires significant developments in various fields of biomedical informatics, including knowledge representation and coupling across knowledge domains, development of truly connected health information systems up to the individual citizen/patient level, and, last but not least, profound process reengineering in health systems.

Organisation

The meeting is organised by the eHealth for Safety study: www.eHealth-for-Safety.org



Veli Stroetmann, MD, PhD, European *eHealth for Safety* study, *empirica* Communication & Technology Research, Germany

Veli Stroetmann has been principal investigator or senior researcher of studies on policy strategies, market research and validation of applications of ICT in the health sector. Presently, she is involved in a study for the European Commission on the impact of ICT on patient safety and risk management in healthcare, and in two projects to support the implementation of the European eHealth Action Plan and to improve interoperability among Member State health systems.

The economic impact of eHealth, healthgrid applications or semantic interoperability are topics of other work.