PETER L. REICHERTZ INSTITUT FÜR MEDIZINISCHE INFORMATIK

Proposal for an IMIA Working Group on Accident & Emergency Informatics

Author: Prof. Dr. Thomas M. Deserno

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1. Executive Summary

Different data sources need to be considered in healthcare informatics to explore knowledge and build evidence for a better health worldwide. This new IMIA Working Group will foster sharing and semantic linkages of health data with environmental sensor data. Starting with vehicles and traffic crash research, other situations in health-enabling technologies, including smart clothes, smart homes, and smart cities will be considered. Having already established a core group of followers, next steps are promoting the ideas and organizing a workshop at the Medical Informatics Europe (MIE) meeting in April 2018 in Gothenburg, Sweden. We then aim at official establishment of our WG during the IMIA General Assembly at APAMI 2018 conference.

2. Introduction

Inspired by many talks and statements at MedInfo 2017, medical informatics is currently turning into a data-driven discipline. For instance, in Germany, the federal government is now spending a certain amount of money to interconnect the *information* that is embedded in the big healthcare databases (e.g., hospital information systems or electronic healthcare records) for improved healthcare outcome and better biomedical research. However, there is need to interconnect not only health records from different medical data repositories but also to connect health data with other data sources, for instance, sensor recordings from vehicles or body monitoring.

3. Definitions

According to the US National Library of Medicine, *health informatics* is the interdisciplinary study of the design, development, adoption and application of IT-based innovations in healthcare services delivery, management and planning.

As a novel sub-discipline, *accident & emergency informatics* is considered as the science of systematically collecting, visualizing, storing, and sharing information in order to avoid accidents or emergency situations and to lower the hazards that are caused by them.

Alternative suggestions for the WG name:
Crash & Incident Informatics
Accident & Emergency Data Sharing
Adverse Event Informatics
Injury informatics
Road Safety Informatics
Traffic Accident Informatics
…

4. WG Proposal – according to the IMIA SOP

4.1. Proposed WG Name

IMIA Working Group on Accident & Emergency Informatics

4.2. Focus Areas or Topics

Interconnecting data sources on a semantic level has often been identified to impact our society. Accordingly, the proposed IMIA Working Group on Accident & Emergency Data Sharing will work towards combining healthcare record data with vehicle, object, or body sensor data to improve transportation systems, provide saver vehicles, and lower the risks of traffic accidents as well as their consequence to people on a global level. Simultaneously, environmental, wellness, and other sensors will be considered to be joined with healthcare data on a semantical level of information.

4.3. Expanded Description of the Content Areas

Content Area 1:

Global mortality rate due to traffic accidents. The darkest color indicates >25 deaths per 100,000 population. Source: WHO 2013.

According to the WHO, there were 1.25 million road traffic deaths globally in 2013. So far, accident research is focused primarily on vehicle-involved **traffic accidents** causing injury to humans. A broad variety of information is collected by the car's board computers. Today, a car knows about seat occupation, weight of passengers, buckle status, position, weather, traffic, speed, acceleration, and other information that is useful to characterize the accident event. The electronic stability program (ESP) anti blocking system (ABS), safety restraint system (SRS, airbag) and other active components are controlled by further sensors. In some countries, emergency calls are sent by the car automatically, if the board computer detects adverse events. Other accident-related information is recorded by the police, rescue services, insurances and other stakeholders. Accident & emergency data sharing aims at semantic linkage and interconnection of all this information.

Content Area 2:

In near future, **health-enabling technologies** will automatically detect and alert adverse events, too. For instance, fall detection of elderly people who are still living autonomously in their private homes or smart clothes that monitor the vital sings of persons during sports or other physical activities will predict adverse events and alert. Smart homes will alert fire, flooding, and other crucial hazards automatically. These all are examples that emphasize the safety side by data collection prior and during the occurrence of the incident. This, combined with other data elements can provide a major safety action.

Content Area 3:

In the mid-term, the **internet of things** will be focused. For instance, smart toilets (as this example have been exposed in the keynotes of MedInfo 2017) will analyze liquid and solid human waste to comprehensively monitor the individual's health status, and may generate alerts when abnormal measures indicate adverse events.

4.4. Proposed Work Plan

General Activities

- Identify international key players (persons and institutions) and establish constant information exchange mechanism

- Provide a web-based platform for members and non-members of the working group
- Organize workshops and special sessions at international and regional conferences
- Foster research on semantic data linkage (semantics and protocols)
- Design interfaces and protocols that can be used to interconnect the different data sets of relevant stakeholders
- Promote linkage and collaborative activities among members
- Promote linkage and collaborative activities with other WGs (see Section 4.7)

Activities in Content Area 1

- Review the state of the art in traffic injury and accident research and distribute results
- Identify and interview key stakeholders
- Discuss the functionalities considered needed and prioritize them based on their value and importance for accident & emergency Informatics
- Extend and harmonize the terminology used to code traffic accidents using experiences from medical terminology development
- Pioneer projects to interconnect sensor-based technical and patient-centered medical databases
- Establish an international standard accident number (ISAN). This will be done in close collaboration with WHO as a standard setting organization.

Activities Content Areas 2-3

- Establish more detailed action plans based on the results obtained in Content Area 1

4.5. Contact Information of the Proposal Co-chairs

- *Chair:* Thomas M. Deserno, Director, Peter L. Reichertz Institute of Medical Informatics at University of Braunschweig – Institute of Technology and Hannover Medical School, Braunschweig, Germany, EFMI Region
- *Co-Chair:* Fernán González Bernando de Quiros, Vice-Director Strategic Planning, Hospital Italiano de Bueno Aires, Argentina, IMIA LAC Region
- *Co-Chair:* Najeeb Al-Shorbaji, Director Knowledge, Ethics and Research (retired), WHO/HQ, Consultant, Amman, Jordan, MEAHI Region

4.6. Review of the Scientific Map and IMIA Knowledge Base

The proposed working group will help to strengthen the following aspects of the IMIA Scientific Map, as described in the IMIA Endorsed Documents:

- *Recommendations of the International Medical Informatics Association (IMIA) on Education in Biomedical and Health Informatics; First Revision (2010):* The proposed WG will not work in direction of education. However, this particular IMIA Endorsed Document lists several core knowledge and skills that are required for Biomedical Health Informatics (BMHI) specialists in comparison to common IT users. We observed a great overlap in all those items

where IT users need just a little but BMHI specialists need particular skills, e.g., No 1.12: Structure, design and analysis principles of the health record including notions of data quality, minimum data sets, architecture and general applications of the electronic patient record/electronic health record.

- *STARE-HI Statement on Reporting of Evaluation Studies in Health Informatics (2008):* This IMIA Endorsed Document list principles on conduct and publication of evaluation studies in medical informatics. The proposed chairs and co-chairs completely agree with these principles and will make sure that all documents produced by this WG are compliant with the STARE-HI paradigms.
- *IMIA Knowledge Base (2009):* The activities of the proposed working group actually are in line with several aspects of IMIA Knowledge Base. The main category that will be strengthen is "10: Technologies for health" with aspects such as: Ambulance systems; Automatic data processing; Care at home; Data communications and messaging; Databases, Home monitoring, Mobile technology, Software engineering and development, Tele-monitoring, and Web technologies.
- Medical Informatics Scientific Content Map (2002 version)

4.7. Potential Overlap with Other IMIA WG/SIGs

We here refer only to those IMIA WGs, where we see relations and potential for cooperation and/or potential overlap.

- *Health Informatics for Development:* This working group aims to identify innovations such as mobile health that makes it possible for low and medium income countries (LMICs) to design and implement health information systems at a cost they can afford – the proposed working group will interact to ensure that the developed technological solutions can be used in LMICs, too.
- *Language and Meaning in Biomedicine:* In our area 1, ontologies and vocabularies that are used by engineers to describe accident and emergency situations, shall be revised. Experiences of decades in medical terminology development will be taken into account in close collaboration with this AMIA WG. In particular, we refer to their goals: (1) reviewing health data nomenclature and classification needs for the world community, and (3) recommending methods for future classification and nomenclature systems.
- *Security in Health Information Systems:* The SHIS WG aims at protecting the personal health information, and simultaneously ensuring fair information processing in national and global digital health systems. Data privacy is an important issue in accident & emergency situations, and hence, the proposed E&A DS WG will closely collaborate in all issues of data privacy.
- *Smart Homes and Ambient Assisted Living:* In particular, our Content Area 2 "health-enabling technologies" refers to residential setting equipped with a set of advanced electronics, sensors and automated devices specifically designed for care delivery, remote monitoring, early detection of problems or emergency cases and promotion of residential safety and quality of life. Therefore, close interaction is planned with this WG.
- *Standards in Health Care Informatics:* The WG itself does not create new standards; rather, it devotes its activity on promotion of mutual identification and coordination by posting and maintaining an inventory of health informatics standard activities. Therefore, the

development of protocols and ontologies in all of our planned activity areas will be coordinated with IMIA WG SHCI.

- *Wearable Sensors in Healthcare:* in the proposed Content Area 2 "health-enabling technologies", there is an overlap with this WG, since WG Wearable Sensors in Healthcare addresses issues such as: sensor application in terms of primary, secondary and tertiary prevention, and integration of sensor data resp. extracted information with health information systems. However, the chair of the WG, Dr. Klaus-Hendrik Wolf, is with the same department as the proposed Chair of the suggested new WG, and the scopes will be rewritten such that they do not overlap: WG Wearable Sensors will focus on methods for sensor data analysis, analysis of multimodal data, decision support systems, and acceptance of wearable sensor technologies for healthcare.

4.8. Constitutional WG Members

APAMI – Asia Pacific Association for Medical Informatics:

1. Michio Kimura, Director, Medical Informatics Department, Hamamatsu University School of Medicine, Handa Hamamatsu, Japan
2. Klaus D. Veil, Vice President, Australian Council of Professions; and Principal Partner, DigitalHealth & HL7 Education Partners, Avalon, Australia
3. Yingjuan (Jenny) Cao, Vice Director, Nursing Dept. of Qilu Hospital of Shandong University, Jinan Shandong, China
4. Liping Jiang, Director, Nursing Department, Xinhua Hospital affiliated to Shanghai Jiaotong University School of Medicine, Shanghai, China

EFMI – European Federation for Medical Informatics:

5. Thomas M. Deserno (Suggested Chair), Germany
6. Reinhold Haux, IMIA Award of Excellence Recipient, Braunschweig, Germany

IMIA LAC – Regional Federation of Health Informatics for Latin America and the Caribbean:

7. Fernán González Bernando de Quiros (Co-Chair), Argentina
8. J. Amado Espinosa Lobato, Director and CEO, Medisist, Guadalajara, Mexico
9. Maria Victoria Guissi, Coordinator IT Healthcare, City of Buenos Aires, Argentina
10. Carlos Otera, Chief Medical Information Offiver, Hospital Italiano, Buenos Aires, Argentina

IMIA North America:

11. Christoph U. Lehmann, IMIA President, Nashville, TN, USA
12. Xinxin (Katie) Zhu, IBM Watson Research, Wellness Management, Yorktown Heights, NY, USA

MEAHI – Middle East Association for Health Informatics:

13. Najeeb Al-Shorbaji (Suggested Co-Chair), Jordan

4.9. Recruitment Strategy of Other WG Members

- *April, 24th to 26th 2018:* A workshop will be organized at Medical Informatics Europe (MIE) in Gothenburg, Sweden, to promote the topic and invite interested colleagues to join the IMIA Working Group.

- *October 9th to 12th 2018:* IMIA General Assembly will finally confirm the new Working Group while meeting at the APAMI conference in Sri Lanka. Thereafter, we can send out scope and invitations letters to all IMIA members.
- *April 6th to 10th 2019:* on final approval by the EFMI council, the EFMI STC will be held by the proposed chair. This STC is focused on "ICT for Health Sciences Research". It will be used for active member recruitment.
- *August 26th to 30th 2019:* A workshop or panel will be organized at MedInfo 2019 in Lyon, Paris. This will not only improve the visibility of the WG, but also allows for further active member recruitment.

5. Contact List

Nr	Name	Email
1	Thomas Deserno	thomas.deserno@plri.de;
2	Michio Kimura	kimura@mi.hama-med.ac.jp;
3	Katie Zhu	zhux@us.ibm.com;
4	Chris Lehmann	christoph.u.lehmann@vanderbilt.edu;
5	Reinhold Haux	reinhold.haux@plri.de;
6	Najeeb Al-Shorbaji	shorbajin@gmail.com;
7	Fernán Quiros	fernan.quiros@hospitalitaliano.org.ar;
8	Amado Espinosa	aespinosa@medisist.com.mx;
9	Victoria Guissi	mgiussibordoni@buenosaires.gob.ar;
10	Klaus D. Veil	k.veil@westernsydney.edu.au;
11	Carlos Otero	carlos.otero@hiba.org.ar;
12	Lipin Jiang	13868311990@163.com;
13	Yingjuan Cao	caoyingjuan@hotmail.com