European Commission
Information Society and Media

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Transatlantic Observatory for Meeting Global Health Policy Challenges through ICT-Enabled Solutions

EU - US Cooperation on e Health: Ongoing and Planned Actions

"ARGOS eHealth Pilot Project results"

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EUROREC

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Objectives and target areas

The overall goal of the ARGOS eHealth project, funded by the EU (EC DG RELEX) is to establish a "Transatlantic Observatory for meeting Global Health Policy Challenges through ICT-enabled Solutions" in order to develop and promote "Common Methods for responding to Global Challenges in the EU and the US".

Topics:

- **Indicators of eHealth adoption, usage and benefits**
- **Semantic Interoperability**
- **Virtual Physiological Human: VPH**
- **EHR Certification**
- **(Health IT Work force)**

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Outputs

- **Comparative analyses** of current US and EU approaches

- **Workshops** in the US and the EU involving the different stakeholder groups

- **Interim reports** and publications

- ARGOS **conferences:**

1. EU-US Conference in Barcelona (March 15 , 2010)
2. EU-US Conference in Washington (November 12, 2010)
3. EU-US Conference in Budapest (May 11, 2011)

- **Policy Briefs:** separate brochures documenting the subprojects' recommendations

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Virtual Physiological Human VPH (1)

The main goal is to coordinate research efforts in order to integrate all electronically captured data, information and knowledge in order to model (at molecular, cellular, organic and body scale) the human physiome in health and disease.

EU and US have already invested large amounts in VPH resource development (i.e. in development of frameworks of tools and techniques), in Europe called VPH Infostructure - in the US called VPH cyberinfrastructure.

Cyberinfrastructure can be described as an environment that support advanced data acquisition, data storage, data management, data integration, data mining and other processing.

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Virtual Physiological Human VPH (2)

<u>The general policy messages:</u>

ARGOS/VPH recommends that EU and US:

-agree on a Common Policy to realign all VPH-type research efforts towards the creation of a global VPH cyberinfrastructure as to ensure that all data repositories and models, as well as all developed tools and techniques are interoperable;
-support the establishment and operations of an international multi stakeholder Advisory Group elaborating a common vision.

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Virtual Physiological Human VPH (3)

Ongoing Research in EU and US:

-FP6: STEP support action (VPH roadmap)
-FP7: VPH NoE, VPH FET, ARGOS, VPH SHARE and P-Medicine
-EU Biomedical e-infrastructures (BBMRI, ELIXIR, ECRIN…)
-National projects (UK, Germany,…)

-NIH Programmes/ Grants on physiome models
-80 investigators funded by ten federal agencies in the Interagency Modeling and Analysis Group's (IMAG) Multi Scale Modeling (MSM)
-NSF Cyber-infrastructure developments

-Estimation: more than 1OO VPH related projects worldwide…

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Virtual Physiological Human VPH (4)

… an ambitious, long term, methodologically challenging effort…

<u>Vision / issues:</u>

-Let's go digital
-Let's go personal (an individual is not an "average" person)
-From evidence based towards explanation based medicine
-From fragmentation to integration (in data collection and knowledge production !)…a more holistic approach

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Virtual Physiological Human VPH (5)

Early results:

VPH is thus a broad initiative targeting all aspects of both the biomedical and the clinical research domains. But already many examples of good results exist:

-Early diagnosis of Alzheimer's disease (imaging and other computer models)

-Prevention of osteoporotic fractures

-Prevention of rupture of cerebral aneurysms

-Cardiac modeling (e.g. based on ECG alterations and genetic disorders), liver modeling, …

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Virtual Physiological Human VPH (6)

Lessons learnt:

-To create a global VPH cyberinfrastructure we need to adopt common standards (incl. de facto standards) to store and communicate
-Importance of community building and social networking
-Find the right balance between an opportunistic governance approach and technological excellence
-Transform prototypes in useful services
-User support and training
-Clever governance needed to give optimal access to a worldwide VPH cyberinfrastructure

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Virtual Physiological Human VPH (7)

Recommendations (a):

-To ensure sustainability of the cyberinfrastructure special service deployment -, maintenance- and dissemination- policies are required

-Develop integrative models to explain complex systemic interactions

-Test and use the models in clinical decision support systems (e.g. via Internet based services) and in clinical trials (to reduce risks and costs)

-Align with standardisation and interoperability efforts in the world of EHRs and PHRs

-Benchmark

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Virtual Physiological Human VPH (8)

Recommendations (b) related to Governance:

-Establish a permanent observatory on eHealth (something like a more permanent ARGOS platform)
-Establish a multi-stakeholder Advisory Group
-Establish a globally distributed Cyber-infrastructure
-Financial commitment

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Semantic Interoperability SI (1)

The adoption, use and interoperability of Electronic Health Records has become a major focus of European and US eHealth policies, strategies and investments. Drivers for integrated EHRs are:

-Manage increasingly complex clinical (multi professional) care
-Let interact multiple locations of care delivery
-Deliver Evidence Based health care
-Improve safety and cost effectiveness of health care
-Enrich population health management and prevention
-Better exploit biomedical research
-Empower and involve citizens
-Protect patient privacy

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Semantic Interoperability SI (2)

New generation personalised medicine underpinned by 'omics sciences and translational research needs to integrate data from multiple EHR systems with data from fundamental biomedical research, clinical and public health research and clinical trials.

Clinical data that are shared, exchanged and linked to new knowledge need to be formally represented to become machine processable. This is more that adopting existing standards or profiles: it is "mapping clinical content to a commonly understood meaning".

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Semantic Interoperability SI (3)

S.I. requires widespread and dependable access to published and maintained collections of coherent and quality assured semantic resources: "the detailed clinical models or clinical archetypes".

Hence the need of archetypes and templates mapped to EHR-interoperability standards and bound to well specified multi-lingual value sets, indexed and associated with each other via ontologies and referenced from modular care pathway components.

(Multilingual to support cross border care and to enable cross border aggregation of research data!)

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Semantic Interoperability SI (4)

Reference models, clinical data formalisms and clinical terminologies are already now international standards. The problem with semantic modelling research is that progress has - to date - been limited by the small scale of the pilot clinical and application areas in which these resources have been authored and validated.

We therefore must undertake at international level initiatives to define, validate and accept high quality semantic resources. The challenge is now to scale up the clinical authorship methodology.

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Semantic Interoperability SI (5)

ARGOS priority activities (1):

1.Establish projects to develop good practice in the definition and validation of clinical data structures, guideline based pathway models, terminologies and ontologies relevant to the management of clinical conditions (! of international priority), i.e. "usable and useful semantic interoperability".
2.Develop a sustainable approach to scaling this development pathway across disease areas and professional stakeholders.
3.Support multiple natural languages.
4.Conduct gap analyses of tools, formalisms and standards to support this scaling up.

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Semantic Interoperability SI (6)

ARGOS priority activities (2):

6. Monitor the evolving capability and potential uses of natural language technologies.

7. A business model to justify strategic investments in this field, including a critical appraisal of the opportunity costs for key stakeholder groups, decision makers, clinicians, EHR system vendors, healthcare provider organisations, health authorities, insurers, researchers, standards developers and citizen representatives.

8. Support an education strategy to enable wider clinical and patient/citizen acceptance and use of knowledge-rich EHRs.

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Semantic Interoperability SI (7)

Longer term:

In the longer term a governance organisation needs to be nominated

- **to support, oversee and quality manage the future development of semantic interoperability resources for health**

- **and to develop an action plan for future research and educational investments.**

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EHR Quality Labelling & Certification

Current status report (cf. ARGOS policy brief in Budapest)

US: ARRA and HITECH act and Meaningful use of Certified EHR technology approach. The current 6 Authorised Testing and Certification bodies have certified (dd 12 April 2011) 393 ambulatory and 182 inpatient EHR products/modules.

Europe: national certification schemes in place in 10 member states and ongoing harmonisation of certification through the EuroRec "Seals 1 and 2" now in 27 countries through the EHR-Q-TN project.

Remark: there is an 85-90 % commonality between the funtional certification criteria of Europe and of the US… but regulations differ.

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Future toward universal integration?

We can anticipate significant changes due to:

Health processes increasingly data intensive and complex (and the community becoming less insular…)

An increasingly globally evolving ecosystem in Life Sciences

Emergence of new environments: telemedicine, embedded technologies, personal health systems, cloud scaled services…

The hidden force: metadata

Warning (for EU and US): our lead could become a handicap! There is too much scepticism and reluctance to innovation induced a.o. by the existence of legacy systems

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Credits:

- **Marco Viceconti (VPH)**
- **Dipak Kalra (Sem. Interop.)**
- **Karl Stroetmann (Metrics)**
- **Jos Devlies (Certification)**

THANK YOU!

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