Health Informatics Society Australia Ltd.
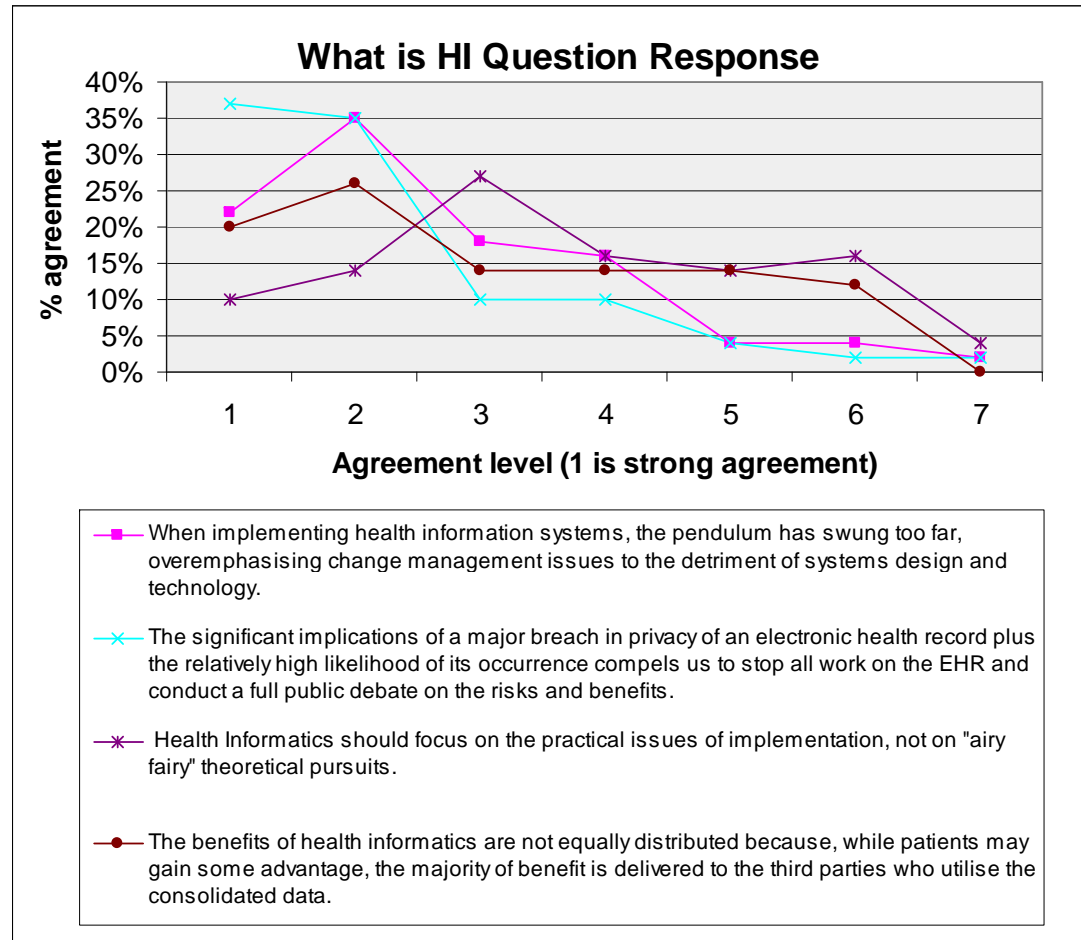
# What is Health Informatics

**Presented to the HISA Board**

**Sydney**

**23rd  November 2007**

# First Survey Results

## What is HI Question Response

% agreement vs. Agreement level (1 is strong agreement)

- When implementing health information systems, the pendulum has swung too far, overemphasising change management issues to the detriment of systems design and technology.
- The significant implications of a major breach in privacy of an electronic health record plus the relatively high likelihood of its occurrence compels us to stop all work on the EHR and conduct a full public debate on the risks and benefits.
- Health Informatics should focus on the practical issues of implementation, not on "airy fairy" theoretical pursuits.
- The benefits of health informatics are not equally distributed because, while patients may gain some advantage, the majority of benefit is delivered to the third parties who utilise the consolidated data.

- Survey intended to develop conversation around topical issues on the definition of Health informatics
- While this gave some interesting response it did not lead to the discussion we had indented

# 2nd Survey on What is Health Informatics

- **Asked very direct questions regarding definitional issues for Health Informatics (34 responses…8.5%: good for text feedback)**

  - Health informatics is anything we want it to be……What do you want health informatics to be?

  - When looking at defining health informatics it depends on which specific bit of health informatics you mean…….What do you think the different 'bits' of health informatics referred to in this comment are?

  - Theory must be sound before proceeding to considerations of implementation…..What do you consider to be the key underlying theories of health informatics?

  - Practical issues of implementation need to be addressed…..What do you think are the most pressing practical implementation issues for health informatics?

  - How would a critical approach to health informatics advance both the discipline of health informatics and our health care systems?

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# Automated analysis

- **Ran data through Copernic Text Analyser, TextXray, TextAnalyst and YALE**

  - The volume of data was borderline for this type of analysis

  - Did not generate a valid semantic map

  - Discussion and interpretation was the only viable route

  - Concepts can aligned themselves under a number of themes

    - Process
      - Workflow
      - Standards
      - Decision theory
      - Organisational design
      - Change management (culture)
      - Innovation

    - Technology
      - Usability
      - Interoperability
      - Human interfaces
      - Information science
      - Communication technology
      - Sensors (RFID etc)

    - Environment
      - Fragmented
      - Interactive
      - Interconnected
      - Important
      - Complex
      - Ethical
      - emotive

  - Insight

    - Discussion looked at the nature of current definitions…..Of which there is a large number

# What is Health Informatics?

Health informatics or medical informatics is the intersection of information science, medicine and health care. It deals with the resources, devices and methods required to optimize the acquisition, storage, retrieval and use of information in health and biomedicine. Health informatics tools include not only computers but also clinical guidelines, formal medical terminologies, and information and communication systems.

- Wikipedia

# Definitions: We have no shortage of them

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Some definitions of health informatics and curriculum purpose statements from various institutions.
Medical informatics is the scientific field that deals with the storage, retrieval, sharing, and optimal use of biomedical information, data, and knowledge for problem solving and decision making. It touches on all basic and applied fields in biomedical science and is closely tied to modern information technologies, notably in the areas of computing and communication.

— Columbia

Medical Informatics (MI) is the study of information processing as it is used in healthcare. It might have been called medical computing, but the French-derived term informatique is more commonly used internationally and probably conveys a broader set of concerns, including the uses and flows of information that may have little to do with computers. Like many engineering fields, MI has scientific aspects that focus on the description, modeling and interpretation of how information is actually generated, disseminated and used, and underlying constraints or natural laws that govern these activities. MI is also deeply concerned with design of appropriate medical information processing systems, with tradeoffs in their implementation, and with ways to evaluate their effectiveness.
Some have suggested health informatics as a better, broader term, meant to encompass aspects of health care that are not traditionally the focus of medicine, such as preventive care, nutrition, patient education, epidemiology, etc. Related terms include bioinformatics, which is the study of information processing in biological sciences. Opinion currently varies on whether bioinformatics is part of medical informatics, or-if it forms a distinct discipline—how it relates. Most expect that progress in understanding the molecular basis of disease will bring these fields closer together, if not to merger. Telemedicine (or the recent European coinage telematique) focuses on one aspect of MI, access to and use of medical information at a distance.
At MIT, in line with our traditions of institutional flexibility, we have no official organization that does medical informatics, but a number of small foci around the research and teaching interests of faculty in different Departments and Laboratories.

—MIT

The Health Informatics Curriculum consists of course work that integrates the development of knowledge and understanding of the health care environment with knowledge and skills in management of health care information resources.

— University of Alabama

The graduate program in Health Informatics trains students in the application of computer and information sciences to the quantitative aspects and decision needs of the health and life sciences. Health Informatics encompasses not only mathematics, statistics and computing, but also includes other engineering, management, and information sciences applied to problems arising in biology, medicine and the delivery of health care.

—University of Minnesota

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# Definitions: We have no shortage of them

This program is designed to produce managers and administrators who can help organizations use information to improve the delivery of health care. Course work combines classes in computer science, health informatics and health management. As a result, students develop technical and management skills that will allow them to serve as an operational link between technology experts and clinicians.
The core curriculum includes courses in health information and health-care systems; information storage, retrieval and management; and research methods and outcomes analysis. Students also complete an informatics internship that combines an intensive three-month field experience with the development of an applied research project.

—University of Missouri, Columbia

Medical information science (MIS)encompasses data, information, and knowledge acquisition, representation, modeling, integration, communication, and interpretation ranging across basic science and engineering through clinical practice and policy. The primary mission of the MISProgram is to train biomedical informatics researchers for academia and industry. The Program's focus is on the scienceof biomedical informatics, with special emphasis on rigorous methodology, innovation, and generalizability of findings, rather than the routine application of technology tobiomedical science and practice. Training spans the full spectrum of biomedical informatics - from bench to bedsideto health system and from bioinformatics to radiologic imaging to decision science. Graduates of the Program willbe well positioned to contribute at the interface of bio- and medical informatics, where future research opportunities are excellent.

—University of California, SF

Health Informatics is the discipline concerned with the systematic processing of data in the health care environment with an emphasis on computer processing. A more elaborate definition of Health Informatics as suggested by Haux is the following:
Health Informatics is concerned with the study of the principles of information processing and with the provision of (general) solutions for information processing problems in the field of health care; uses appropriate (formal) methods and tools, especially from informatics, to model structure and mechanism information processing systems in the field of health care in order to describe or analyze these systems or in order to provide possibilities for their construction or for their evaluation.

—Universiteit Maastricht

Biomedical Informatics is an emerging discipline that has been defined as the study, invention, and implementation of structures and algorithms to improve communication, understanding and management of medical information. The end objective of biomedical informatics is the coalescing of data, knowledge, and the tools necessary to apply that data and knowledge in the decision-making process, at the time and place that a decision needs to be made. The focus on the structures and algorithms necessary to manipulate the information separates Biomedical Informatics from other medical disciplines where information content is the focus.

— Vanderbilt

[Medical Informatics is] the field of information science concerned with the analysis and dissemination of medical data through the application of computers to various aspects of health care and medicine. —Medical Subject Heading (MeSH)

— National Library of Medicine

The terms 'medical informatics' and 'health informatics' have been variously defined, but can be best understood as meaning the understanding, skills and tools that enable the sharing and use of information to deliver healthcare and promote health. 'Health informatics' is now tending to replace the previously commoner term 'medical informatics', reflecting a widespread concern to define an informationagenda for health services which recognises the role of citizens as agents in theirown care, as well as the major information-handling roles of the non-medical healthcare professions....

— British Medical Informatics Society

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# Definition Issues

- **Common issues amongst definitions**

    – They focus on "what health informatics does" by defining applications and technology spaces without clearly answering the question of why health informatics is different from the study of other fields of informatics.

    – They often provide little insight into the paradigms which structure this field of study.

    – Establishing another "structural" definition will not add to the better positioning of HISA or advance the field of health informatics.

# Hypothesis

- **We need to provide a definition which looks at <u>WHY</u> health informatics is different from of other fields of informatics**

- **It needs to have "traction" with a broad set of stakeholders**

  – Consumers, healthcare professionals , Government, vendors, academics.

- **Hypothesis for debate by membership**

  – Health informatics is defined by the characteristics of the information found in the healthcare segment.

    - Healthcare information is:

      – Fragmented, dispersed, interconnected, important, complex, ethical, and emotive

    - These characteristic reflect the structural and social environment found within healthcare as well as the complexity and interconnectedness of biological processes.

    - This unique combination of  information characteristics generates a separate field of study that demands independent principles and laws to characterize it and consequently specialized applications to support it.

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# Informatics Competencies

## Information Structure & Semantic Relationships

➢ Database design

➢ Vocabularies

➢ Knowledge architectures

➢ System architectures

## Workflow Fit & Effectiveness

➢ Organizational development

➢ Functional requirements

➢ Human factors

➢ Operations research

➢ Evaluation

## Algorithms, Models & Systems

➢ Information retrieval

➢ Natural language processing

➢ Data mining

➢ Modeling

➢ Data privacy, de-identification and re-identification

➢ Discovery methods and systems

➢ Scientific visualization/imaging informatics

➢ Decision models & expert systems

## Application Domains

➢ Health Informatics (Medical, Nursing, Public Health, Regional, Consumer...

➢ Educational processes

➢ Biomolecular analysis methods & tools