A Review of the Australian Health Informatics Workforce

A Report by the Health Informatics Society of Australia

in association with Michael Legg & Associates

Michael Legg & Associates

To the Australian Department of Health and Ageing

Funding for this Consultancy has been provided by the Commonwealth Department of Health and Ageing. The Commonwealth makes no representation or warranty that the information in the Project Material is correct and accurate.

Melbourne
Sep 2009
V1.1
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1 EXECUTIVE SUMMARY

The Health Informatics Society of Australia (HISA) made a proposal to the E-Health Branch of the Australian Department of Health and Ageing (DoHA) that a review of the health informatics workforce be undertaken and were subsequently contracted to ‘prepare a background discussion paper which sets out the scope and structure of the health informatics workforce and draw together a summary of the key issues, gaps and opportunities for further work to be undertaken on this issue’. This then is a scoping study.

The most respected leaders in health, here and internationally, have made strong statements around the contribution of information to healthcare and the role of health informatics. From the safety and quality arena, Donald Berwick has gone so far as to say ‘information is care’ while Sir Muir Gray advocates that ‘knowledge is the enemy of disease’. The NHHRC in their report, here in Australia, and US President, Barack Obama, in his speech supporting a large expenditure in health informatics, have both argued that significant health reform will not be possible without the application of health informatics.

Health informatics is the science and practice around information in health that leads to informed and assisted healthcare. Information is used across the whole spectrum of healthcare: in prevention; diagnosis; treatment; management; learning; and in research and development. For the purposes of the paper ‘health informatics workforce’ has been taken to mean ‘those who work on information-related activities in healthcare’.

All those consulted believe there is a significant and immediate problem around the size and structure of the Australian health informatics workforce. The main issues are:

1. There are too few health informaticians for the current workload and unless addressed these workforce and skills shortages will be a major barrier to implementing the National E-Health Strategy and likely to health reform more generally
2. Too little is known about the health informatics workforce – we know neither how many we have now, nor how many we need, and there is no indication that it is yet part of any national health workforce strategy or the remit of the National Health Workforce Agency
3. There is a fundamental breakdown in the market between employers, education providers and potential workforce entrants – while there is a strong demand by employers for workers, there has been a failure to attract students leading to the closure of well-regarded university courses
4. Because it is an emerging field, health informatics does not have wide recognition as a discipline in its own right; there is a poor general understanding of the knowledge domain in Australia; and many of the workers in clearly related jobs do not yet self-identify
5. There is no career structure for health informaticians in Australia; there is no standardisation of job names or job descriptions and there is no widely adopted set of competencies
6. There will be a long lag time to produce new health informaticians because of the multi-disciplinary nature of the education and the complexity of the discipline – the workforce we do have must be used optimally
7. A contributing factor to the lack of needed recognition and action on health informatics workforce issues is the fragmented representation of those in the discipline
Direct structured consultations and a survey were undertaken to characterise the health informatics workforce and to identify issues and opportunities. The survey was the first undertaken in Australia aimed at understanding what is done in information-related jobs and what the job titles are. More than a thousand completed the survey. While we do not know the number of health informaticians in Australia, a reasoned estimate is made that there are around 12,000.

From the survey we know most health informaticians¹:

- Are female
- Work in large organisations that provide healthcare
- Are aged 45 or more and expect to work for more than 10 years
- Work broadly across 12 areas of work but are more likely to work full-time in systems, records or improvement related activities
- Have post-graduate qualifications
- Have education and training in two or more distinct domains of knowledge with their first training most likely to be in a health discipline

The categories of information work developed during consultation were divided into two kinds: those that might be considered as working ‘in the system’; and those that might be considered working ‘on the system’. The categories of information-related work analysed in the survey were:

- In the system
  - Records - Capturing information about a consumer and their interactions with the healthcare system and managing that information.
  - Analysis - Information analysis for care, retrieving and analysing information for direct patient care or population health
  - Direct - Direct care using information science and technology for the direct provision of healthcare for example the reconstruction of images, the delivery of psychiatric therapy or the use electronic games for rehabilitation
  - Decision - Decision support gaining access to knowledge, helping with workflow and automating processes such as provision of clinical alerts and warnings
  - Communications - Meaningful exchange of health information between clinicians and clinical systems within a practice or facility and with others outside the facility including consumers and other health services.
  - Training - Direct vocational training for purposes such as changing work practices

- On the system
  - Systems - The development, implementation and management of information and organisational systems
  - Infostructure - Policy development, terminology, structured information, architecture and standards development
  - Improvement - Retrieving and analysing information to improve processes at every level; from care of the individual consumer through to public health and health policy
  - Education - eLearning from knowledge presentation and assessment, through to simulation training for both consumers and workers
  - Research - Including biomedical, informatics and management research
  - Administration - Of the business of healthcare including logistics, human resources, planning and finance

The characteristics of those undertaking each category of work were analysed and the job titles from consultation and the survey listed.

¹ Assuming the survey to be representative
Mitigation of the first of the identified issues, the workforce shortage, is considered in the paper using the following framework:

- Increase the supply of workers by
  - Improving recruitment
  - Increasing the opportunities for education and training
  - Retaining the workforce longer
  - Attracting re-entry of those who have exited
  - Outsource internationally
- Redistribute the workforce from areas of lower to higher priority
- Improve the productivity of the workforce by
  - Standardisation
  - The introduction of new technology including software and knowledge tooling
  - Improved work environment
  - Consolidation
- Reduce the demand by
  - Design

It is clear that it will take more than a single response to address the issues identified in this paper.

It is recommended that a workforce management plan be developed under the stewardship of the Commonwealth and the most representative of the organisations. This plan would prioritise the issues, tease out the opportunities against each issue, draw on international work that is underway and determine the resources required for its implementation so that a business case for funding can be developed if that is necessary.

Given the lag times involved this cannot be delayed or be a prolonged process. It should not prevent aligned initiatives from proceeding if resources are already available, such as those around education which would clearly be a component of any workforce plan.

Developing and implementing Government policy in this area is seen to be of national significance. HISA would be pleased to help further.
## 2 ACRONYMS AND ABBREVIATIONS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>AACB</td>
<td>Australian Association of Clinical Biochemists</td>
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<td>AAPM</td>
<td>Australian Association of Practice Managers</td>
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<td>AAPP</td>
<td>Australian Association of Pathology Practices</td>
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<td>ACAA</td>
<td>Aged Care Association Australia</td>
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<td>ACHI</td>
<td>Australian College of Health Informatics</td>
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<td>ACHS</td>
<td>Australian Council on Healthcare Standards</td>
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<td>ACHSE</td>
<td>Australian College of Health Service Executives</td>
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<td>ACRRM</td>
<td>Australian College of Rural and Remote Medicine</td>
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<td>ACS</td>
<td>Australian Computer Society</td>
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<td>ADIA</td>
<td>Australian Diagnostic Industry Association</td>
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<td>AGPN</td>
<td>Australian General Practice Network</td>
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<td>AHHHA</td>
<td>Australian Healthcare and Hospital Association</td>
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<td>AHML</td>
<td>Australian Healthcare Messaging Laboratory</td>
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<td>AHRDMA</td>
<td>Australasian Health and Research Data Managers Association</td>
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<td>AIIA</td>
<td>Australian Information Industry Association</td>
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<td>AMA</td>
<td>Australian Medical Association</td>
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<td>ANCC EH</td>
<td>Australian National Consultative Committee on eHealth</td>
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<td>APS</td>
<td>Australian Psychology Society</td>
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<td>ASM</td>
<td>Australian Society of Microbiology</td>
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<td>ATHS</td>
<td>Australian TeleHealth Society</td>
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<td>CCA</td>
<td>Cancer Council Australia</td>
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<td>CFA</td>
<td>Consumers’ Health Forum of Australia</td>
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<td>Engineers Australia</td>
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<td>Fitness Australia</td>
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<td>Human Genetics Society of Australasia</td>
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<td>Health Information Managers Association Australia</td>
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<td>HIPS</td>
<td>Health Information Privacy &amp; Security</td>
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<td>HISA</td>
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<td>IHEA</td>
<td>Integrating the Health Enterprise Australia</td>
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<td>LFA</td>
<td>Leukaemia Foundation of Australia</td>
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<td>MSIA</td>
<td>Medical Software Industry Association</td>
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<td>NCCH</td>
<td>National Centre for Classifications in Health</td>
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<td>NCOPP</td>
<td>National Coalition of Public Pathology</td>
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<td>NIA</td>
<td>Nursing Informatics Australia</td>
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<td>RACGP</td>
<td>Royal Australian College of General Practitioners</td>
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<td>RACMA</td>
<td>Royal Australian College of Medical Administrators</td>
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<td>RANZCR</td>
<td>Royal Australian New Zealand College of Radiology</td>
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<td>RCNA</td>
<td>Royal College of Nursing Australia</td>
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<td>RCPA</td>
<td>Royal College of Pathologists of Australasia</td>
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<td>RDAA</td>
<td>Rural Doctors Association of Australia</td>
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<td>SHPA</td>
<td>Society of Hospital Pharmacists of Australia</td>
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<td>SPA</td>
<td>Speech Pathology Australia</td>
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3 BACKGROUND

3.1 What is the scope of the report?

The Health Informatics Society of Australia (HISA) made a proposal to the E-Health Branch of the Australian Department of Health and Ageing (DoHA) that a review of the health informatics workforce be undertaken and were subsequently contracted to ‘prepare a background discussion paper which sets out the scope and structure of the health informatics workforce and draw together a summary of the key issues, gaps and opportunities for further work to be undertaken on this issue’. This then is a scoping study.

For the purposes of the paper ‘health informatics workforce’ has been taken to mean ‘those who work on information-related activities in healthcare’. The emphasis in the report is on those who spend most of their time doing this type of work. Reference, however, is also made to those who have it as a significant minority (but no less important) component of their work at appropriate sections in the report.

3.2 What was done?

3.2.1 Authors and Acknowledgements

This paper was prepared by Michael Legg (President) and Brendan Lovelock (CEO) of HISA. While the authors make no claim to being dispassionate and declare their interests on the subject of the health informatics workforce, every attempt has been made here to faithfully present the views of those consulted in a balanced way and to indicate the level of support for the conclusions drawn. So the reader can be clear on the backgrounds and interests of the authors, their profiles are provided at Appendix E – Profiles of the Authors.

All of those consulted gave generously of their time, experience and knowledge. In particular we would like to acknowledge Professors Anthony Maeder and Peter Croll for the University Inventory.

3.2.2 Consultations

The tight schedule for completion of this report dictated the nature and extent of the consultation. Nevertheless direct consultations were undertaken by interview and in workshops with 26 people including representatives from most of the major organisations with an interest in the area. In addition a discussion draft was developed and distributed to more than 100 colleagues in key organisations. More detail is provided below.

2 With the prior agreement of DoHA and the full support of the HISA Board, a component of the report preparation was sub-contracted to Michael Legg and Associates - a consultancy in information and organisational systems that has provided advice previously to the Department on workforce issues – see: http://www.health.gov.au/internet/main/publishing.nsf/Content/health-patholreport-wforceoct08.htm viewed July 2009

3 A further 35 people were involved in the AIHW ‘Coders and Health Information Workforce Workshop’. Detail of all of the consultations including those attending the AIHW workshop is provided at Appendix A – Consultations undertaken
Workshops and interviews

Two specific workshops were conducted for this project. Workshop invitations were sent (albeit with short notice) to the 56 Coalition for eHealth (CeH) member organisations\(^4\) to attend one of two, half-day workshops – one held in Sydney, the other in Melbourne. These were structured and used mind-mapping\(^5\). A further 5 interviews were conducted using the same structure and mind-mapping process. In total 26 people were involved in the workshops and interviews. The same person facilitated the workshops and conducted the interviews (ML).

During the consultation period the Australian Institute of Health and Welfare convened a ‘Coders and Health Information Workforce Workshop’ in Sydney on behalf of the National Health Information Standards and Statistics Committee (NHISSC)\(^6\). Dr Legg along with 35 others participated. Presentations and discussion from that workshop are drawn on in providing the commentary here.

Survey

A survey of workers was undertaken to help understand what is done in information-related jobs and what the job titles are in Australia now that are associated with the categories of work that were developed as part of the consultation for this project. This is the first Australian survey that has been undertaken of the broader workforce involved in information-work in healthcare.

Discussion Draft

A discussion draft was prepared which included preliminary results from the work-force survey and the notes taken from the workshops and interviews. The discussion draft was sent along with an invitation for comment\(^7\) to: (1) all of those previously involved in consultations directly; (2) to all CeH member organisations; and (3) to DoHA, NEHTA, Deloittes, Booz & Co and the NHHRC. In total more than 100 were sent. 24 responses, some quite detailed, were received.

Detail of the consultations is provided at Appendix A – Consultations undertaken.

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\(^4\) For a full list of CeH members see Section 4.5

\(^5\) Using Mind-Manger by Mindjet software

\(^6\) A separate report from this workshop is being prepared by AIHW for presentation to the October 2009 meeting of NHISSC

\(^7\) The comment period was for 10 days from 3-Jul-09 to 13-Jul-09 although all comments received including those comments received after the close have been considered and included where appropriate.
4 HEALTH INFORMATICS AND ITS WORKERS

Health informatics is a knowledge domain in its own right that sits at the intersection of health and informatics. This is an emerging field in Australia and its participants are in the process of self-identification. This identification is important for any professional discipline, especially for those who are professionals in the field and those studying to enter it. For that reason this is considered in some detail in the following section.

4.1 What is health informatics?

The definition of health informatics is not yet universally agreed and is still evolving. The most contentious area is probably the perception of a difference between ‘health informatics’ and ‘health information management’.

Yet the definitions that have been offered in the past by HISA for ‘health informatics’⁸ and the Health Information Management Association of Australia (HIMAA) for ‘health information management’⁹ are remarkably similar and the perceived difference may well derive more from the history of their Associations than it does with real differences in the knowledge domain as it is now.

HISA has approached the definition of health informatics in three ways. They are:

- By formal definition
- By describing a health system that has best-practice health informatics in place; and
- By what the people in health informatics know and do

These are explored in more detail below.

4.1.1 ‘Health informatics’ defined through formal definition

As a reflection of being in an emergent phase there are many definitions for health informatics¹⁰. HISA has used the following definition since its founding in 1993:

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Health informatics is the scientific discipline dealing with the collection, storage, retrieval, communication and optimal use of health related information, data and knowledge in health.

It utilises the technologies and methodologies of the information sciences for the purpose of problem solving and decision-making to improve clinical practice, health outcomes, and to enhance our understanding of disease related processes.
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This, however, is seen as too restrictive now and is difficult for anyone to remember and recite when asked the inevitable question. So we offer here the following as a definition

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Health informatics is the science and practice around information in health that leads to informed and assisted healthcare
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A health informatician is a specialist worker in this field.

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⁸ Shown in the next Section
⁹ For the HIMAA definition see http://www.himaa.org.au/him.html viewed July 2009
¹⁰ Whetton gives an analysis of these in her paper cited below
In 2005, Sue Whetton led a HISA Project on the subject ‘What is health informatics?’ and presented a paper on the subject at the HISA National Conference\(^1\). It reads in part:

*The development of these guidelines might be taken to indicate that the questions ‘what are the skills we need?’ and ‘how do we get them?’ have already been answered. Yet this paper argues that currently accepted competencies and core skills reflect particular views of health informatics, while other views are relatively neglected.*

As a result additional or alternative understandings and competencies which might legitimately be considered as core skills may have been overlooked.

‘What we understand about informatics will influence the teaching of it, and what we teach will influence what informatics becomes’.

While newcomers to the field might assume that health informatics operates within a single paradigm, we know that this is not the case. There have been, and continue to be, different views about what health informatics is and does. These different views shape our perceptions about what the core knowledge and competencies of the health informatics professional should be.

*Thus a view of health informatics as the use of information technology (IT) to bring strategic goals from theory into practice, may produce a different set of core skills and competencies than would a view that ‘the social, professional and cultural context of health care is a major factor that dominates health informatics’.*

Another member, Enrico Coiera, in his popular text book\(^1\) defines *medical informatics*\(^1\) this way:

*If physiology literally means ‘the logic of life’, and pathology is ‘the logic of disease’, then medical informatics is the logic of healthcare. It is the rational study of the way we think about patients, and the way that treatments are defined, selected and evolved. It is the study of how medical knowledge is created, shaped, shared and applied. Ultimately, it is the study of how we organise ourselves to create and run healthcare organisations.*

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3. ‘Medical informatics’ is a term that has been used interchangeably with ‘health informatics’ but also as a label for a sub-discipline of health informatics focusing on the work done by medical practitioners
4.1.2 ‘Health informatics’ defined by describing a health system that has best-practice health informatics in place

In 2007, HISA published ‘A Vision for an Australian Healthcare System Transformed by Health Informatics’\(^{14}\) describing the consensus view of more than 200 respondents on what the characteristics would be of the Australian health system if health informatics was put to best use. Those characteristics are:

- **Engaging Consumers** - Patients will be fully engaged in their own healthcare, supported by information and tools that enable informed consumer action and decision making, working hand-in-hand with healthcare providers. Tools that support consumer engagement are well designed and customized to the diversity of consumers. These tools are integrated into the delivery of care, and are conveniently available outside healthcare settings as well.

- **Transforming Care Delivery at the Point of Care** - Australian patient care is high quality, patient centred, for a lifetime, and reflects a coordinated and collaborative approach. Complete, timely and relevant patient-focused information and clinical decision support tools are available as part of the provider’s workflow at the point of care. High quality and efficient patient care is supported by the deployment and use of interoperable health IT and secure data exchange between and across all relevant stakeholders.

- **Improving Population Health** - Electronic healthcare data and secure health information exchange are utilised to facilitate the flow of reliable health information among population health and clinical care systems to improve the health status of populations as a whole. Information is utilised to enhance healthcare experiences for individuals, eliminate health disparities, measure and improve healthcare quality and value, expand knowledge about effective improvements in care delivery and access, support public health surveillance, and assist researchers in developing evidence-based advances in areas such as diagnostic testing, illness and injury treatment, and disease prevention.

- **Aligning Financial and Other Incentives** - Healthcare providers are rewarded appropriately for managing the health of patients in a holistic manner. Meaningful incentives help accelerate improvements in quality, safety, efficiency and effectiveness. Quality of care delivery and outcomes are the engines that power the payment of providers.

- **Managing Privacy, Security and Confidentiality** - In Australia’s fully-enabled electronic information environment designed to engage consumers, transform care delivery and improve population health, consumers have confidence that their personal health information is private, secure and used with their consent in appropriate, beneficial ways. Technological developments have been adopted in harmony with policies and business rules that foster trust and transparency. Organisations that store, transmit or use personal health information have internal policies and procedures in place that protect the integrity, security and confidentiality of personal health information. Policies and procedures are monitored for compliance, and consumers are informed of existing remedies available to them if they are adversely affected by a breach of security. Consumers trust and rely upon the secure sharing of healthcare information as a critical component of high quality, safe and efficient healthcare.

- **Policy and Implementation** - Policy development and implementation bodies, both government and private deliver clear and insightful leadership of eHealth programs within the health sector. They have a deep understanding of the cultural and operational complexities of the area and ensure that programs are appropriately structured and funded to be successful.

Following this approach then, the definition of ‘health informatics’ becomes ‘that which needs to be done to achieve each of the elements of the vision statement’ and its practitioners are ‘those you need to do it’.

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4.1.3 ‘Health informatics’ defined by what the people in health informatics know and do

In 2003, HISA and the Commonwealth Department of Health and Ageing published the paper ‘Health Informatics Education’\(^\text{15}\) providing suggestions for curriculum guidelines. This view was developed from a survey of health informatics educators and industry representatives which identified ten health informatics topics. They were:

- Clinical Decision Making and Decision Support
  - Decision making in the Health Sciences
  - Reasons for the necessity of systematically processing data, information and knowledge in medicine and healthcare
  - Benefits and constraints of using information and communication technology in medicine and healthcare
  - Evaluation methods in health informatics

- Health Informatics, Health Information Systems
  - Computer concepts for health informatics
  - Health information systems management
  - Electronic Health record developments in Australia

- Health Information Systems and Data
  - Electronic medical records - structure, design and analysis principles of the health record including notions of data quality, minimum data sets and general applications of the electronic health record
  - Standards in health and health informatics

- Security, Privacy, Ethics and other issues
  - Confidentiality, security, legal and ethical issues with healthcare data

Elsewhere competencies have been defined. Those by HIMAA and the American Medical Informatics Association (AMIA) with the American Health Information Managers Association (AHIMA) are shown in Appendix C – Competencies.

While there has been a significant amount of work done studying the health information manager workforce (especially coders)\(^\text{16}\) and work has been done on the competencies perceived by health professionals as required for roles in health informatics\(^\text{17}\) in Australia, the survey reported here is the first to be done covering the broad range of workers with information-related roles in the Australian health sector which is aimed at understanding what they do and what their positions are now called.

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\(^{16}\) Described in detail in the presentation by Sue Walker (NCCH) at the AIHW Coders and Health Information Workforce Workshop – Surveys were conducted in 1994, 2002 and 2006.

The sub-disciplines of health informatics

Health Informatics has a number of sub-disciplines. Those most readily identifiable are:

- 'Clinical' informatics
  - Bioinformatics (cellular and molecular)
  - {Clinical field} Informatics (patient records) eg
    - Medical
    - Nursing
    - Pathology
  - Public Health Informatics (population)
- Consumer health informatics
- Multi-modal informatics
  - Imaging
  - Medical device signals
  - Audio/video
  - Telemedicine or telehealth
- Research informatics
  - eResearch
  - Exploratory data analysis

The definition adopted here for health informatics however also completely encompasses the knowledge domain of ‘health information management’ and so that might also be considered a sub-discipline of ‘health informatics’. HIMAA and others however see ‘health informatics’ and ‘health information management’ as two overlapping disciplines with health informatics tending to technology and health information management tending more to management.

Similarly ‘e-health’ defined by the WHO as ‘the combined use of electronic communication and information technology in the health sector’ is also a sub-discipline of health informatics.

The health informatics domain of knowledge

There is wider consensus when one approaches the definition of the field from the perspective of what constitutes the body of knowledge. Hersh\(^\text{18}\) and the International Medical Informatics Association\(^\text{19}\) have previously described this using diagrams that attempt to show relationships between the elements. Some of those consulted suggested that this style of presentation led to difficulties in accepting the model.

As part of the consultation exercise, the work of Hersh and others was represented in the form of a mind-map, and subsequently expanded on, and validated for the Australian context. The result is shown in Figure 1 - A Map of the Health Informatics Knowledge Domain.

The competencies defined by HIMAA and by AMIA-AHIMA and shown in Appendix C – Competencies, have significant gaps when compared with the domain of knowledge as it is described here.

\(^\text{19}\) Working Group 1 - IMIA Health and Medical Informatics Education – See: http://www.imia.org/working_groups/WG_Profile.lasso?Search=Action&Table=CGI&MaxRecords=1&SkipRecords=3&Database=organizations&KeyField=Org_ID&SortField=workgroup_sig&SortOrder=ascending&type=wgsig
Figure 1 - A Map of the Health Informatics Knowledge Domain
**What’s in a name?**

The definition used for ‘health informatics’ in this paper (i.e. ‘the science and practice around information in health that leads to informed and assisted healthcare’) we take to be broad enough to embrace the body of knowledge described above and to be inclusive of all those who work on information-related activities in healthcare.

This, however, is not a universally held view. It is an issue that the lack of agreement on the words that should be used leads to confusion and misunderstanding and is likely to present difficulties in any attempts to develop the associated workforce.

The relative positioning of workers by their representative organisations is explored further in Section 4.5 below. The findings from the survey on the difference in emphasis in activities undertaken by those who identify with the title ‘health informatician’ and ‘health information manager’ is described in Section 4.3.5.

The analysis so far has focused on those that work full-time in information-related work and who might be considered (and called) specialists in health informatics.

**What about when health informatics is a minority component of the work?**

For many, especially clinicians, health informatics is a minor but essential component of the work and is included among their competencies. The following has been used for general health informatics competencies for clinicians:\(^{20}\):

- Understand the dynamic and uncertain nature of medical knowledge, and be able to keep personal knowledge and skills up-to-date
- Know how to search for and assess knowledge according to the statistical basis of scientific evidence
- Understand some of the logical and statistical models of the diagnostic process
- Interpret uncertain clinical data and deal with artefact and error
- Structure and analyse clinical decisions in terms of risks and benefits
- Apply and adapt clinical knowledge to the individual circumstances of patients
- Access, assess, select and apply a treatment guideline, adapt it to local circumstances, and communicate and record variations in treatment plan and outcome
- Structure and record clinical data in a form appropriate for the immediate clinical task, for communication with colleagues, or for epidemiological purposes
- Select and operate the most appropriate communication method for a given task (eg, face-to-face conversation, telephone, e-mail, video, voice-mail, letter)
- Structure and communicate messages in a manner most suited to the recipient, task and chosen communication medium

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\(^{20}\) This set of competencies has been used by the RCPA in their general competency development
4.2 What is the role of information in health and what is its importance?

4.2.1 The role of information in health

Information is used across the whole spectrum of healthcare: in prevention; diagnosis; treatment; management; learning; and in research and development.

It is used for: records and communications; decision support; directly in care; for analysis; research and discovery; education and training; and administration.

Some areas of healthcare are particularly information intensive (although there is also a good argument that there is no area of healthcare that would be excluded from such a list). Those areas identified in consultation are:

- Public health
  - Epidemiology
  - Wellness
- Translational medicine
- Computational biology
- Pathology\(^{21}\)
- Diagnostic Imaging
- Radiotherapy
- Intensive Care
- Psychiatry
- Tele-medicine - including online delivery of programs in mental health
- Pharmacy
- Nursing
- Clinical administration
  - Clinical process engineering
  - Pathways for individual patients

The demand for better information is coming from: consumers; researchers; public health and wellness practitioners; and healthcare providers.

4.2.2 Its importance

The most respected leaders in health, here and internationally, have made strong statements around the contribution of information to healthcare and the role of health informatics.

From the safety and quality arena, Donald Berwick, the President and CEO of the Institute for Healthcare Improvement (US) has gone so far as to say ‘information is care’\(^{22}\)

Sir Muir Gray, the Chief Knowledge Officer of the NHS (UK) advocates that ‘knowledge is the enemy of disease’. He goes on ‘the application of what we know already will have a bigger impact on health and disease than any drug or technology likely to be introduced in the next decade’ and ‘a common core of quality assured knowledge must be delivered to professionals and patients; clean clear knowledge is as important as clean clear water’\(^{23}\). He sees this as the third revolution in healthcare and the only way of addressing the issues that remain after the previous two i.e.:

\(^{21}\) In a recent submission to the Senate Committee on Registration in Healthcare, the President of the National Coalition of Public Pathology described pathology as ‘a clinical knowledge service’


\(^{23}\) Gray M - Keynote address at MedInfo, hosted by HISA in Brisbane 2007
• Errors and mistakes
• Poor quality healthcare
• Waste
• Unknowing variations in policy and practice
• Poor patient experience
• Overenthusiastic adoption of interventions of low value
• Failure to get new evidence into practice
• Failure to manage uncertainty

HISA in its ‘Vision for an Australian Healthcare System Transformed by Health Informatics Report’\textsuperscript{24} put the view that:

\begin{quote}
There is a looming crisis in the healthcare system from an unprecedented simultaneous bulging in demand and reduction in workforce. Ten-fold improvements in productivity will soon be required and this can only happen if the work of those in healthcare is leveraged and healthcare consumers become more engaged in the process. Health informatics is critical to both strategies.

The need for eHealth is more than for efficiency alone however, health informatics is now seen as an increasingly important weapon against disease in its own right and there is mounting evidence that, when used properly, both health outcomes and consumer satisfaction can be improved.
\end{quote}

The NHHRC in their report\textsuperscript{25} here in Australia and US President, Barack Obama in his speech\textsuperscript{26} supporting a large expenditure in health informatics as part of a stimulus package, have both argued that significant health reform will not be possible without the application of health informatics.

\begin{footnotes}
\end{footnotes}
4.3 Who works in health informatics and what do they do?

In the consultations undertaken prior to the survey, the categories of information work were explored and the titles of known jobs collected. These were used in developing the survey and especially in framing the questions in terms that workers might relate to.

4.3.1 Survey design

In the survey, subjects were asked about where they work, their age, their training, how much longer they intend working, what title they identify with, their actual job title, how much of their time was spent doing various information related activities, how important these were to their job and whether or not they saw themselves as a health informatician.

The survey design was drawn from the consultations. Existing frameworks for the health informatics and health information management knowledge domain were not used because of the concern that these constructs may have unduly influenced who responded and how they responded. Instead we asked those consulted prior to the survey to provide categories of activities that people who worked in information-related work actually do in Australia currently and what some of the job titles that those people might now have.

The resulting categories of information work used in the survey are shown in Table 1 - Categories of information-related work in healthcare. The categories of information work are divided into two kinds those that might be considered as working ‘in the system’ and those jobs that might be considered working ‘on the system’.

Demographic questions similar to those from previous surveys were used. The time available for the project precluded testing of the survey instrument.

The survey questions are shown at Appendix B – Survey Questions and Results.

---

The categories of information work are divided into two kinds:

- those that might be considered as working ‘in the system’ and
- those that might be considered working ‘on the system’.

### In the system

- **Records** - Capturing information about a consumer and their interactions with the healthcare system and managing that information.
- **Analysis** - Information analysis for care, retrieving and analysing information for direct patient care or population health.
- **Direct** - Direct care using information science and technology for the direct provision of healthcare for example the reconstruction of images, the delivery of psychiatric therapy or the use electronic games for rehabilitation.
- **Decision** - Decision support gaining access to knowledge, helping with workflow and automating processes such as provision of clinical alerts and warnings.
- **Communications** - Meaningful exchange of health information between clinicians and clinical systems within a practice or facility and with others outside the facility including consumers and other health services.
- **Training** - Direct vocational training for purposes such as changing work practices.

### On the system

- **Systems** - The development, implementation and management of information and organisational systems.
- **Infostructure** - Policy development, terminology, structured information, architecture and standards development.
- **Improvement** - Retrieving and analysing information to improve processes at every level; from care of the individual consumer through to public health and health policy.
- **Education** - eLearning from knowledge presentation and assessment, through to simulation training for both consumers and workers.
- **Research** - Including biomedical, informatics and management research.
- **Administration** - Of the business of healthcare including logistics, human resources, planning and finance.
4.3.2 Survey results

Response

The electronic survey was conducted over a 10 day period from the 15th to the 25th of June 2009. An invitation to participate was sent to an email list of 6,434 HISA members and others who have participated in HISA activities and events. 1,954 recipients opened the email and 1,082 clicked through to the survey website. The email included a request to share the invitation with colleagues. This resulted in a wide and extended distribution of the email outside the original email list.28

A total of 2,515 participants accessed the survey site. At the close of the survey period 1,452 responses had been received of which 1,279 were complete. Only completed surveys received within the 10 day period were analysed.

Of the 1,279 people who completed surveys, 866 (67%) worked three quarters or more of their time in one of the 12 work categories i.e. these people clicked the top or second top radio button of eleven options for ‘time spent’.

Of the remainder, a further 261 (20%) recorded that they worked in more than one area but in total that they worked three quarters or more of their time on information related work.

That is to say 1,127 (88%) of those completing the survey indicated they were involved for three quarters or more of their time in information-related work. 93% of the respondents indicated the majority of their time was spent in these jobs (i.e. 50% or more of their time). This is shown graphically in Figure 2 – Number of respondents categorised by % of their time spent on information-related activities.

![Pie chart showing distribution of time spent on information-related activities](chart.png)

Figure 2 – Number of respondents categorised by % of their time spent on information-related activities

75% of ‘time spent’ was used as a definition threshold for those fully employed doing what we have defined here as health informatics work. A total of 88% of the respondents fit this definition.

28 We know that the request email was distributed by HIMAA, AACB, NCOPP and RCPA to their members and NCCH via the newsletter Coding Matters
‘Time spent’ vs ‘importance to the job’

The average scores for ‘time spent’ and ‘importance to the job’ and corresponding standard deviations are shown in Table 2 - Average scores and standard deviation for ‘time spent’ and ‘importance to the job’ for information-related activities (all respondents, n=1,279). The key to the activities is provided in Table 1 above.

Table 2 - Average scores and standard deviation for ‘time spent’ and ‘importance to the job’ for information-related activities (all respondents, n=1,279). The key to the activities is provided in Table 1 above.

<table>
<thead>
<tr>
<th>Information-related activities</th>
<th>Time spent (Mean)</th>
<th>Importance (Mean)</th>
<th>Time spent (Std Dev)</th>
<th>Importance (Std Dev)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q 18: Records</td>
<td>3.9</td>
<td>5.7</td>
<td>3.2</td>
<td>3.5</td>
</tr>
<tr>
<td>Q 19: Analysis</td>
<td>3.3</td>
<td>5.0</td>
<td>2.6</td>
<td>3.3</td>
</tr>
<tr>
<td>Q 20: Direct</td>
<td>2.2</td>
<td>3.3</td>
<td>2.2</td>
<td>3.2</td>
</tr>
<tr>
<td>Q 21: Decision</td>
<td>3.5</td>
<td>5.1</td>
<td>2.6</td>
<td>3.2</td>
</tr>
<tr>
<td>Q 22: Communications</td>
<td>3.4</td>
<td>5.0</td>
<td>2.6</td>
<td>3.3</td>
</tr>
<tr>
<td>Q 23: Training</td>
<td>3.1</td>
<td>4.7</td>
<td>2.5</td>
<td>3.2</td>
</tr>
<tr>
<td>Q 24: Systems</td>
<td>4.4</td>
<td>6.0</td>
<td>2.9</td>
<td>3.2</td>
</tr>
<tr>
<td>Q 25: Infrastructure</td>
<td>3.1</td>
<td>4.9</td>
<td>2.5</td>
<td>3.2</td>
</tr>
<tr>
<td>Q 26: Improvement</td>
<td>3.6</td>
<td>5.3</td>
<td>2.8</td>
<td>3.3</td>
</tr>
<tr>
<td>Q 27: Education</td>
<td>2.6</td>
<td>4.0</td>
<td>2.4</td>
<td>3.1</td>
</tr>
<tr>
<td>Q 28: Research</td>
<td>3.1</td>
<td>4.7</td>
<td>2.7</td>
<td>3.4</td>
</tr>
<tr>
<td>Q 29: Administration</td>
<td>3.1</td>
<td>4.4</td>
<td>2.5</td>
<td>3.1</td>
</tr>
</tbody>
</table>

These averaged scores were used to rank the ‘time spent’ and ‘importance to the job’ for the categories of information-related work. The plot of ranks of time spent versus perceived importance is shown in Figure 3.
There was discussion during the consultations as to whether ‘time spent’ alone could be used to categorise workers. It was felt by some that a ‘time spent-importance’ measure would be better. The argument goes that ‘while half of the time might be spent on information-related activities this might represent more than three quarters of the value of the job and so this role should be considered that of a full-time health informatician.

The plot in Figure 3 shows a good correlation between time worked and the perceived importance of that work. For simplicity we have therefore restricted ourselves to ‘time spent’ in the analyses that follow.

4.3.3 Survey results overview - ALL Respondents

Results for all respondents are provided in this section.

The archetypical health informatician

Assuming that those completing the survey are representative of the broader population and using the definition of a health informatician described earlier then:

**Most health informaticians:**
- Are female
- Work in large organisations that provide healthcare
- Are aged 45 or more and expect to work for more than 10 years
- Work broadly across 12 areas of work but are more likely to work full-time in systems, records or improvement related activities
- Have post-graduate qualifications
- Have education and training in two or more distinct domains of knowledge with their first training most likely to be in a health discipline

**Title identification**

Most respondents (317, 25%) identified with the title ‘health information manager’ when asked to choose from a list of 10 options but 207 (86%) of the health information managers also answered ‘yes’ to the question ‘Do you consider yourself a health informatician?’

While 93% of all respondents are involved for most of their time and 88% are full-time doing health informatics work only 59% of the respondents see themselves as ‘health informaticians’.

There is an issue with self-identification.

**Detailed results**

The results from all respondents for identity, first training, organisation type, organisation size, age, expected years of work, gender and whether considered a health informatician or not is shown graphically in Figure 4 - Survey results overview - ALL respondents

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29 Garde et al have previously shown a difference between results from surveys when in electronic and paper forms. This may have the effect of biasing the HIM identification as a health informatician but nevertheless the effect here is a strong one. - Garde S, Harrison D, Huque M, and Hovenga EJS, 2006, Building health informatics skills for health professionals: results from the Australian Health Informatics Skill Needs Survey, Australian Health Review February 2006 Vol 30 No 1, 34-45
Figure 4 - Survey results overview - ALL respondents (n=1,279)
The proportion of time spent in each of the work categories described in Table 1 - Categories of information-related work in healthcare for all respondents is shown graphically in Figure 5 - % number of respondents by % ‘time spent’ for each work category for ALL respondents (n=1,279). The darker the bar in the graph the more time spent by respondents working on that category of work.

This shows that respondents work across all categories.

Figure 5 - % number of respondents by % ‘time spent’ for each work category for ALL respondents (n=1,279)

The number of full-time workers30 by work category is shown in Figure 6 – Number of respondents working full-time by work category

Figure 6 – Number of respondents working full-time by work category (n=866)

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30 Defined as those spending 75% or more of their time
4.3.4 Detailed results by work category

The results by each work category for identity, first training, organisation type, organisation size, age, expected years of work, gender and whether considered a health informatician or not are shown graphically in the following sections.

Also shown are the job titles that relate to the work category derived from the consultation and from the survey.

Records

This work category includes tasks like capturing information about a consumer and their interactions with the healthcare system and managing that information

Job titles for this work category from consultation:

- Clerks
- Clinical data manager
- Data and information co-ordinator
- Data manager
- Health information manager
- Health records officer
- Practice managers
- Registrar

Job titles for this work category from the survey:

- Administration Manager
- ADON, Nursing Informatics & Management support
- Analyst
- Assistant Health Information Manager
- Auditor
- Cancer Information Manager
- Casemix Coder
- Chief Health Information Manager
- Clinical Coder
- Clinical Coder and Client Services Administration
- Clinical Coder/Health Information Manager
- Clinical Coding Manager
- Clinical Data Services Officer
- Clinical Nurse Specialist / Health Adviser
- Clinical Transcriptionist
- Coding Manager
- Coordinator Clinical Coding
- Data Manager
- Doctor
- Gynaecologist
- Health Information Manager

                 Clinical coders
                 Clinical Trials
                 Data entry clerk
                 FOI officer
                 Health records manager
                 Medical record administrator
                 Privacy officer

                 Administration Officer
                 Advanced Clinical Coder
                 Assistant Data manager
                 Assistant Manager Clinical Coding & Casemix
                 Business Analyst
                 Cancer Registry Data Manager
                 Certified coder
                 Clinical Audit Coordinator
                 Clinical coder - health information manager
                 Clinical Coder
                 Clinical Coding
                 Clinical Data Coordinator
                 Clinical Information Coder
                 Clinical Research Coordinator
                 Clinical Trial Coordinator/HIM
                 Consultant
                 Data Management Analyst
                 Data Manager/Clinical Trial Coordinator
                 General Practitioner
                 Health Adviser
                 Health Information Manager - Clinical Coder
<table>
<thead>
<tr>
<th>Position</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Information Manager - HBCIS &amp; medico-legal</td>
<td>Health Information Officer</td>
</tr>
<tr>
<td>Health Information Release Manager</td>
<td>Health Information Services Training Coordinator</td>
</tr>
<tr>
<td>Health Information Manager</td>
<td>HIE Data Manager</td>
</tr>
<tr>
<td>Information Manager</td>
<td>Joint Records Centre Deputy Manager</td>
</tr>
<tr>
<td>Lecturer</td>
<td>Manager - Clinical Information</td>
</tr>
<tr>
<td>Health Systems Business Analyst</td>
<td>Manager Coding Services</td>
</tr>
<tr>
<td>Medical Record Services Manager</td>
<td>Medical Laboratory Scientist</td>
</tr>
<tr>
<td>Health Information Services Coordinator</td>
<td>Professional Officer</td>
</tr>
<tr>
<td>Project Manager</td>
<td>Project Officer</td>
</tr>
<tr>
<td>Psychiatric Nurse</td>
<td>Reconciliation Officer</td>
</tr>
<tr>
<td>Research Manager</td>
<td>Senior Analyst</td>
</tr>
<tr>
<td>Senior Business Analyst Clinical Systems</td>
<td>Senior Clinical Coder</td>
</tr>
<tr>
<td>Senior Clinical Systems Analyst</td>
<td>Senior Health Information Manager</td>
</tr>
<tr>
<td>Senior Health Information Officer</td>
<td>Senior Health Records Officer</td>
</tr>
<tr>
<td>Senior Laboratory Information Technology Officer</td>
<td>Senior Medical Receptionist</td>
</tr>
<tr>
<td>Technology Officer</td>
<td>Supervisor, Pathology IT</td>
</tr>
<tr>
<td>Software Engineer</td>
<td></td>
</tr>
<tr>
<td>Unique Patient Identifier (UPI) Systems Manager</td>
<td></td>
</tr>
</tbody>
</table>

The characteristics of respondents working full-time in this work category are presented graphically below.
Figure 7 - Survey results overview for full-timers – Records (n=130)
Analysis
This work category includes tasks like information analysis for care, retrieving and analysing information for direct patient care or population health.

Job titles for this work category from consultation:
- Data manager
- Pharmacist undertaking medication review

Job titles for this work category from the survey:
- Administration Officer
- Associate Professor
- Cancer Information Manager
- Clinical Audit Coordinator
- Clinical Information Coder
- Clinical Research Coordinator
- Data Analyst
- Data Manager
- Director of Nursing
- Epidemiologist
- Health Information Manager
- Hospital Data Analyst
- Implementation Manager
- Librarian
- Manager, Practice Information Services
- Medical scientist
- Practice Principal
- Professor
- Project Officer
- Reconciliation Officer
- Senior Analyst
- Senior Clinical Coder
- Senior Health Information Manager
- System Administrator
- Team Leader - PAS Support and Data Quality

Associate Genetic Counsellor
Auditor
Chief Health Information Manager
Clinical Coder
Clinical Nurse
Clinical Trial Coordinator/HIM
Data Management Analyst
Data Manager/Clinical Trial Coordinator
E-health Programme Officer
General Practitioner
Health Information Systems Consultant
Hospital Scientist
Lecturer
Manager
Medical Informatics
Oncology Pharmacist
Product Subject Matter Expert
Project Manager
Psychiatric Nurse
Research Assistant Professor
Senior Business Analyst Clinical Systems
Senior Clinical Systems Analyst
Senior Software Engineer
Team Leader - Clinical Costing & Analysis Unit
Terminology Analyst

The characteristics of respondents working full-time in this work category are presented graphically below.
Figure 8 - Survey results overview for full-timers – Analysis (n=65)
**Direct**

This work category includes tasks like direct care using information science and technology for the direct provision of healthcare for example the reconstruction of images, the delivery of psychiatric therapy or the use electronic games for rehabilitation.

Job titles for this work category from consultation:
- Allied health professional
- Biomedical engineer
- Infection control officer
- Pathologists
- Psychologists
- Rehabilitation

Job titles for this work category from the survey:
- Administration Officer
- Associate Professor
- Clinical Educator
- Clinical Nurse Specialist
- Clinical Nurse Specialist / Health Adviser
- General Practitioner
- Lecturer
- Nurse Manager Business & Informatics
- PhD student
- Psychiatric Nurse
- Senior Business Analyst Clinical Systems
- Software Engineer
- Supervisor of Immunoassay Laboratory

- Anaesthetists
- Dieticians
- Occupational health
- Pharmacist undertaking medication review
- Radiation oncologists
- Surgeons

The characteristics of respondents working full-time in this work category are presented graphically below.
Figure 9 - Survey results overview for full-timers – Direct (n=27)
Decision

This work category includes tasks like decision support gaining access to knowledge, helping with workflow and automating processes such as provision of clinical alerts and warnings.

Job titles for this work category from consultation:
- Librarian
- Knowledge manager
- Clinical process improver

Job titles for this work category from the survey:
- Administration Officer
- Assistant Librarian
- Auditor
- Biomedical information specialist
- Business Analyst HIM
- Chief Medical Information Officer
- Clinical Coder
- Clinical Director
- Consultant
- Digital Strategy Consultant
- Director - Nursing Informatics
- District Coordinator Electronic Discharge
- Project
- Doctor
- eMR Application Manager
- Expert Medical Records
- Health Informatician
- Health Information Systems Consultant
- Lecturer
- Library Manager
- Manager
- Medical Laboratory Scientist
- Metadata manager
- Product Subject Matter Expert
- Project Consultant
- Research Fellow
- Senior Analyst
- Senior Business Analyst Clinical Systems
- Senior Laboratory Information Technology Officer
- Senior Solutions Analyst
- Trauma Program Manager

- Application Specialist
- Associate Professor
- Biochemist
- Business Analyst
- Business Development Manager
- Clinical Audit Coordinator
- Clinical Costing Manager
- Clinical Trial Coordinator
- Data Management Analyst
- Director
- Director of Nursing
- District Librarian
- Electronic Services Librarian
- eMR Clinical Change Manager
- General and projects librarian
- Health Informatics Manager
- Hospital Librarian
- Librarian
- Library Manager
- Manager, Health Information and Record Service
- Medical Librarian
- Operations Manager
- Professor
- Rehabilitation Services Development Officer
- Research Manager
- Senior Business Analyst
- Senior Clinical Business Analyst
- Senior Medical Scientist
- Software engineer

The characteristics of respondents working full-time in this work category are presented graphically below.
Figure 10 - Survey results overview for full-timers – Decision (n=69)
Communications

This work category includes tasks like meaningful exchange of health information between clinicians and clinical systems within a practice or facility and with others outside the facility including consumers and other health services.

Job titles for this work category from consultation:
- Interpreters
- Clinical liaison officers

Job titles for this work category from the survey:
- Administration Officer
- Assistant Professor
- Chief Information Officer
- Clinical Coder
- Clinical Nurse
- Consultant
- Consultant Medical Informatics
- Data Analyst
- Director of Nursing
- District Coordinator Electronic Discharge Project
- Expert Medical Records
- Health Informatics Manager
- Health Information Release Manager
- Health Services Manager
- Implementation Manager
- Lecturer
- Manager Application Systems
- Manager Primary and Community Health Development
- Medical Records Supervisor
- Nurse Manager Nursing Clinical Support Systems
- PhD Candidate Biomedical Informatics
- Professor
- Project Manager
- Rehabilitation Services Development Officer
- Senior Analyst
- Senior Business Analyst Clinical Systems
- Senior Software Engineer
- Solution and Database Architect

- Application Specialist
- Case-mix Clinical Coder
- Child Protection Information Manager (IVPRS)
- Clinical Costing Manager
- Clinical Transcriptionist
- Consultant Applications Administrator
- Customer Support Manager
- Digital Strategy Consultant
- Director, (lower level management DOHA)
- eMR Application Manager
- General Practitioner
- Health Information Management Consultant
- Health Information Services Training Coordinator
- Information Management Consultant
- Manager
- Manager for Clinical Forms and Discharge Summary
- Medical Equipment Manager Home Health Care Service
- Nurse Educator
- Nurse Practitioner / Lecturer
- Product Subject Matter Expert
- Project Analyst
- Project Officer
- Research Fellow
- Senior Business Analyst
- Senior Medical Scientist
- Software Engineer
- Speechwriter

The characteristics of respondents working full-time in this work category are presented graphically below.
Figure 11 - Survey results overview for full-timers – Communications (n=67)
Training

This work category includes tasks like direct vocational training for purposes such as changing work practices.

Job titles for this work category from consultation:

- Trainers
- In-service educators
- Program educators
- Marketing for behaviour change

Job titles for this work category from the survey:

- Application specialist
- Chief Health Information Manager
- Clinical Coder
- Consultant Family Physician
- Director of Nursing
- Doctor
- eMR Application Manager
- eMR Clinical support and training
- Health Information Manager

- Health information Systems Consultant
- Implementation Manager
- Lecturer
- Librarian
- Manager Program Implementation
- Medical Laboratory Scientist
- Nurse Manager Business & Informatics
- Patient Health Information Services
- Coordinator
- Product Specialist
- Program Co-ordinator - Health, Nursing & Aged Care
- Project Consultant
- Speechwriter
- Trainer

- Associate professor
- Chief Medical Information Officer
- Consultant
- Digital Strategy Consultant
- Director, National Telehealth Centre
- Education Manager
- eMR Clinical Change Manager
- eMR Learning Coordinator
- Health Information Services Training Coordinator
- Health Systems Business Analyst
- Information Management Educator
- Lecturer
- Manager Primary and Community Health Development
- Manager, Clinical and Client Services
- Nurse Educator
- Nurse Practitioner
- Practice Manager
- Professor
- Project Analyst
- Service Coordination Program Manager
- Staff Development Educator

The characteristics of respondents working full-time in this work category are presented graphically below.
Figure 12 - Survey results overview for full-timers – Training (n=56)
**Systems**

This work category includes tasks like systems development and management - the development, implementation and management of information and organisational systems.

Job titles for this work category from consultation:

<table>
<thead>
<tr>
<th>Biomedical engineers</th>
<th>Business process engineers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change managers</td>
<td>Chief Information Officer</td>
</tr>
<tr>
<td>Clinical liaison officers</td>
<td>Data managers</td>
</tr>
<tr>
<td>Data standards developer</td>
<td>Health information managers</td>
</tr>
<tr>
<td>Implementers</td>
<td>Information analysts</td>
</tr>
<tr>
<td>Information Architects</td>
<td>Medical systems analyst</td>
</tr>
<tr>
<td>Programmer</td>
<td>Project managers for implementation</td>
</tr>
<tr>
<td>Quality managers</td>
<td>Systems analysts</td>
</tr>
<tr>
<td>Systems support</td>
<td>Terminology analysts</td>
</tr>
<tr>
<td>Web developers</td>
<td>Web editors</td>
</tr>
</tbody>
</table>

Job titles for this work category from the survey:

<table>
<thead>
<tr>
<th>Account Executive</th>
<th>Administration Officer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Manager</td>
<td>Assistant Director of Nursing - Nursing Informatics &amp; Management support</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>Business Analyst</td>
</tr>
<tr>
<td>Business Development Manager</td>
<td>Business Solutions Manager</td>
</tr>
<tr>
<td>Chief Executive Officer</td>
<td>Chief Operations Officer</td>
</tr>
<tr>
<td>Chief Technology Officer</td>
<td>Chief, Laboratory for Informatics Development</td>
</tr>
<tr>
<td>Clinical Coder</td>
<td>Clinical Director</td>
</tr>
<tr>
<td>Clinical Software Developer</td>
<td>Clinical Trial Coordinator</td>
</tr>
<tr>
<td>Computer Applications Nurse</td>
<td>Computer Scientist in Pathology</td>
</tr>
<tr>
<td>Consultant</td>
<td>Consultant Applications Administrator</td>
</tr>
<tr>
<td>Data and Systems Manager</td>
<td>Data Management Analyst</td>
</tr>
<tr>
<td>Data Manager/Clinical Trial Coordinator</td>
<td>Development Implementation, Support</td>
</tr>
<tr>
<td>Development Manager and Architect</td>
<td>Digital Strategy Consultant</td>
</tr>
<tr>
<td>Director of Residential Aged Care</td>
<td>Director of Sales</td>
</tr>
<tr>
<td>Doctor</td>
<td>EDP Analyst</td>
</tr>
<tr>
<td>E-health Programme Officer</td>
<td>eMR Application Manager</td>
</tr>
<tr>
<td>eMR Learning Coordinator</td>
<td>Expert in Medical Records</td>
</tr>
<tr>
<td>Head of Primary, Aged and Community Care Sector</td>
<td>Health Informatician</td>
</tr>
<tr>
<td>Health Informatics Manager</td>
<td>Health Information Manager</td>
</tr>
<tr>
<td>Health information Systems Consultant</td>
<td>HIE Data Manager</td>
</tr>
<tr>
<td>Implementation Manager</td>
<td>Information and Communication Technology Manager</td>
</tr>
<tr>
<td>Integration Specialist and Client Implementation</td>
<td>Intellectual Property Strategist</td>
</tr>
<tr>
<td>IT Manager</td>
<td>IT Project Officer</td>
</tr>
<tr>
<td>Lecturer</td>
<td>Manager</td>
</tr>
<tr>
<td>Manager Application Systems</td>
<td>Manager Information Systems</td>
</tr>
<tr>
<td>Manager Of Data Collection</td>
<td>Manager Primary and Community Health Development</td>
</tr>
</tbody>
</table>
Manager Program Implementation
Managing Director
Medical Scientist
Principal Consultant
Principal Technical Consultant
Product Manager
Professor
Program Manager, Organisational Change
Management
Programmer
Project Consultant
Project Director
Project Manager - Health Information System
Project Officer
QA Assistant
Report Writer
Research Fellow
Senior Analyst
Senior Business Analyst Clinical Systems
Senior Developer and Technology Specialist
Senior Manager IM & IT Strategic Planning

Senior Project Officer
Senior Solutions Analyst
Service Coordination Program Manager
Software Engineer
Solutions Architect
Support Manager
Systems Administrator Senior
Systems Integration Specialist
Systems Specialist
Team Leader - PAS Support and Data Quality
Unique Patient Identifier (UPI) Systems Manager

Manager, Business Support and Innovation
Medical Informatics
Medical Systems Analyst
Principal Systems Integrator
Principal Test Consultant
Product Subject Matter Expert
Program Analyst
Programme Manager
Project Analyst
Project Development Manager
Project Manager
Project Manager Health Informatics
Projects Coordinator
Rehabilitation Services Development Officer
Research Assistant
Senior Account Manager
Senior Business Analyst
Senior Business Systems Analyst
Senior Health Information Manager
Senior Project Manager Clinical Information System
Senior Software Engineer
Senior Systems Specialist
Software Developer
Solution and Database Architect
Speechwriter
Surgical Data Manager
Systems Architect
Systems Manager
Team Leader - Application Support Team
Test Analyst
Web developer

The characteristics of respondents working full-time in this work category are presented graphically below.
Figure 13 - Survey results overview for full-timers – Systems (n=145)
**Infostructure**

This work category includes tasks like infostructure development, policy development, terminology, structured information, architecture and standards development.

Job titles for this work category from consultation:

- Clinical researchers
- Health informaticians
- Nosologists
- Standards developers
- Systems architects

Job titles for this work category from the survey:

- Account Executive
- Associate Director
- Business Analyst
- Chief, Laboratory for Informatics
- Consultant
- Development, Implementation, Support
- EHealth Architect
- Health Information Manager
- IT Manager
- Manager of Data Collection
- Managing Director
- Metadata Manager
- Program Analyst
- Rehabilitation Services Development Officer
- Senior Advisor - Strategy and Planning
- Senior Business Analyst Clinical Systems
- Senior Solutions Analyst
- Service Coordination Program Manager
- Systems Administrator Senior
- Systems Manager
- Terminology Analyst

Data managers
Lawyers
Policy officer
Systems analysts
Terminologists

The characteristics of respondents working full-time in this work category are presented graphically below.
Figure 14 - Survey results overview for full-timers – Infostructure (n=51)
**Improvement**

This work category includes tasks like information analysis for process improvement retrieving and analysing information to improve processes at every level; from care of the individual consumer through to public health and health policy.

Job titles for this work category from consultation:

- Casemix manager
- Clinical auditor
- Clinical Trials Data Manager
- Data entry clerks
- Epidemiologist
- Infection control officer
- Information strategist
- Optimiser of the system
- Practice nurses
- Quality manager
- Statistician
- Claims review
- Clinical coders
- Coding manager
- Data manager
- Funding contracts
- Information auditor
- Occupational health and safety officers
- Practice managers
- Public health officer
- Research Officer

Job titles for this work category from the survey:

- Administration Officer
- Assistant Manager Clinical Coding & Casemix Auditor
- Certified Coder
- Clinical Coder
- Clinical Coding & Casemix Manager
- Clinical Costing Manager
- Clinical Projects and Audit Facilitator
- Clinical Trial Coordinator
- Consultant
- Data Analyst
- Data Manager
- Director
- Epidemiologist
- Health Information Manager
- Health Information Systems Specialist
- Implementation Manager
- Manager Coding Services
- Manager Program Implementation
- National Health Information Manager
- Product Manager
- Professor
- Project Analyst
- Project Manager
- Public Servant
- Rehabilitation Services Development Officer
- Research Co-ordinator
- Senior Advisor - Strategy and Planning
- Senior Business Analyst

- Application specialist
- Associate Genetic Counsellor
- Business System Support Officer
- Clinical Audit Coordinator
- Clinical Coder and Client Services Administration
- Clinical Coordinator
- Clinical Information Coder
- Clinical Service Coordinator - Medical Services
- Coding Manager
- Coordinator Clinical Coding
- Data Management Analyst
- Development, Implementation, Support
- Director of Residential Aged Care
- Health Information Management Consultant
- Health information Systems Consultant
- Health Systems Business Analyst
- Lecturer
- Manager Of Data Collection
- Manager, Business Support and Innovation
- PhD candidate
- Product Subject Matter Expert
- Program Analyst
- Project Consultant
- Project Officer
- Reconciliation officer
- Research Assistant
- Research Fellow
- Senior Analyst
- Senior Business Analyst Clinical Systems
Senior Business Systems Analyst  Senior Clinical Coder
Senior Clinical Systems Analyst  Senior Health Information Manager
Senior Health Information Manager  Senior Project Officer
Senior Research Fellow  Senior Solutions Analyst
Service Coordination Program Manager  Solution and Database Architect
Team Leader - PAS Support and Data Quality  Terminology Analyst
Trauma Program Manager

The characteristics of respondents working full-time in this work category are presented graphically below.
Figure 15 - Survey results overview for full-timers – Improvement (n=99)
**Education**

This work category includes tasks like education and training systems development eLearning from knowledge presentation and assessment, through to simulation training for both consumers and workers.

Job titles for this work category from consultation:
- Audio-visual creators
- Clinical content editor
- Health promotions officer
- Knowledge workers
- Marketer
- Web developers
- Change managers
- Educators
- HR Officer
- Librarian
- On-line content developer

Job titles for this work category from the survey:
- Account Executive
- Associate Professor
- Consultant
- eMR Application Manager
- Health Information Manager
- Health Information Systems Consultant;
- Health Systems Business Analyst
- Lecturer
- Manager Maternal and Child Health
- Professor
- Project Manager
- Rehabilitation Services Development Officer
- Senior Lecturer
- Service Coordination Program Manager
- Trainer
- Assistant Professor
- Business Development Manager
- Doctor
- eMR Learning Coordinator
- Health Information Services Training Coordinator
- Health Promotion Worker
- Information Management Educator
- Librarian
- Manager Program Implementation
- Project Analyst
- Regional Administration Manager
- Senior Business Analyst Clinical Systems
- Senior Software Engineer
- Staff Development Educator

The characteristics of respondents working full-time in this work category are presented graphically below.
Figure 16 - Survey results overview for full-timers – Education (n=38)
Research

This work category includes tasks like biomedical, informatics and management research.

Job titles for this work category from consultation:

- Clinical Auditor
- Clinician
- Data Manager
- Ethics Co-Ordinator
- Information Strategist
- Occupational Health And Safety Officers
- Practice Nurse
- Quality Manager
- Statistician
- Clinical Trials Data Manager
- Data Entry Clerks
- Epidemiologist
- Infection Control Officer
- Librarian
- Practice Manager
- Public Health Officer
- Research Officer

Job titles for this work category from the survey:

- Application specialist
- Associate professor
- Library Manager
- Clinical Research Associate
- Clinical Trial Co-ordinator
- Data Manager
- Director of the Academic Unit of General Practice
- Epidemiologist
- Health Information Manager
- Lecturer
- Information Management Educator
- Librarian
- Director of Nursing
- Professor
- Research Assistant
- Research Co-ordinator
- Research Manager
- Research Officer
- Researcher
- Senior Advisor - Strategy and Planning
- Senior Lecturer
- Senior Research Officer
- Senior Software Engineer
- Speechwriter
- Study Coordinator
- Team/Project Leader
- Assistant Professor
- Biomedical information specialist
- Biostatistician
- Clinical Research Co-ordinator
- Consultant
- Clinical Trial Coordinator
- Director, Centre for Health Informatics
- Expert in Medical Records
- Health information Systems Consultant
- Implementation Manager
- Lecturer
- Manager
- PhD Candidate
- Project manager
- Research Chair, Health Informatics
- Research Fellow
- Research Nurse
- Research Scientist
- Senior Account Manager
- Senior Analyst
- Senior Research Fellow
- Senior Researcher
- Solution and Database Architect
- Student
- Systems Administrator

The characteristics of respondents working full-time in this work category are presented graphically below.
Figure 17 - Survey results overview for full-timers – Research (n=70)
**Administration**

This work category includes tasks like administration of the business of healthcare including logistics, human resources, planning and finance.

Job titles for this work category from consultation:

- Billing manager
- Business managers
- Claims review
- Clinical directors
- Consumer advocate
- FOI Officer
- HR Officer
- KPI reporters
- Performance reporters
- Privacy officer
- Program managers
- Records managers

Job titles for this work category from the survey:

- Application Specialist
- Assistant Professor
- Associate Head, (Academic Programs)
- Chief Financial Officer
- Clinical Coder
- Consultant
- Director of Residential Aged Care
- Financial And Administrative Manager
- Health Information Manager
- Implementation Manager
- Manager Pathology lab
- Manager, Health Data Acquisition
- Medical Informatics
- National Business Manager
- Professional Officer
- Program Manager - Electronic Medical Record
- Psychiatric Nurse
- Research Officer
- Scientist in Charge
- Senior Project Officer
- Unique Patient Identifier (UPI) Systems Manager
- Ward clerk

- Business analysts
- Casemix manager
- Clinical costing analysts
- Complaints officer
- Facilities manager
- Funding contracts
- Information auditor
- Optimiser of the system
- Practice managers
- Procurement managers
- Purchasing officer
- Assistant Director of Nursing - Nursing Informatics & Management support
- Associate Director
- CEO
- Chief Health Information Manager
- Clinical Coding Manager
- Data and Systems Manager
- Director of Surgical and Acute Care (Nursing)
- General Manager
- Health information Systems Consultant;
- Lecturer
- Laboratory Information Systems Manager
- Manager Program Implementation
- Manager, Health Information & Record Service
- Medical Records Supervisor
- Practice Manager
- Program Analyst
- Project Manager
- Public Health Manager
- Scientific Supervisor
- Senior Health Information Manager
- Strategic Project Manager
- Unit Operations Manager

The characteristics of respondents working full-time in this work category are presented graphically below.
Figure 18 - Survey results overview for full-timers – Administration (n=49)
4.3.5 Detailed results by title identification

The relative ‘time spent’ in each work category by the title that the respondents identified with are shown graphically below.

**Health Information Manager**

![Figure 19](image1.png)

Figure 19 – Relative time spent doing each type of information work for those who identify with the title ‘health Information Manager’ (n=317, 25%)

**Health Informatician**

![Figure 20](image2.png)

Figure 20 – Relative time spent doing each type of information work – those who identify with the title ‘health informatician’ (n=225, 18%)

This shows that those that identify with the title ‘Health Information Manager’ are more likely to be working in ‘Records’ or ‘Administration’ and those that identify with the title ‘Health Informatician’ are more likely to be working in ‘Systems’ or ‘Research’ but both work across all categories.
**Medical Practitioner**

![Bar chart showing relative time spent doing each type of information work for Medical Practitioner.](chart)

Figure 21 – Relative time spent doing each type of information work for those who identify with the title 'Medical Practitioner' (n=76, 6%)

**Nurse**

![Bar chart showing relative time spent doing each type of information work for Nurse.](chart)

Figure 22 – Relative time spent doing each type of information work for those who identify with the title 'Nurse' (n=83, 7%)
**Pharmacist**

Figure 23 – Relative time spent doing each type of information work for those who identify with the title 'Pharmacist' (n=17, 1%)

**Allied Health Professional**

Figure 24 - Relative time spent doing each type of information work for those who identify with the title 'Allied Health Professional' (n=61, 5%)
Other Healthcare Provider

Figure 25 – Relative time spent doing each type of information work for those who identify with the title 'Other Healthcare Provider' (n=14, 1%)

IT, Engineering or Science Professional

Figure 26 – Relative time spent doing each type of information work for those who identify with the title 'IT, Engineering or Science Professional' (n=236, 19%)
Support Worker

Figure 27 – Relative time spent doing each type of information work for those who identify with the title 'Support Worker' (n=19, 2%)

Manager

Figure 28 – Relative time spent doing each type of information work for those who identify with the title 'Manager' (n=221, 17%)
4.4 How many health informaticians are there in Australia?

The answer is not known and this is an issue. The ANZSCO codes required to answer the question from census data do not exist to answer the question in any useful way.

ANZSCO codes for ‘coding clerk’ and ‘health information manager’ do exist however. They are:

- 599911 CODING CLERK Translates narrative descriptions and numeric information into classification or record systems. Specialisations: Clinical Coder, Medical Record Clerk
- 224213 HEALTH INFORMATION MANAGER Plans, develops, implements and manages health information services, such as patient information systems, and clinical and administrative data, to meet the medical, legal, ethical and administrative requirements of health care delivery.

Data for these from the 2006 census is shown in Table 3.

Table 3 - Workforce numbers from 2006 census for ‘coding clerks’ and ‘health information managers’

<table>
<thead>
<tr>
<th>Title</th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>599911 Coding Clerk</td>
<td>261 (12%)</td>
<td>1,917 (88%)</td>
<td>2,178 (100%)</td>
</tr>
<tr>
<td>224213 HIM</td>
<td>168 (13%)</td>
<td>1,088 (87%)</td>
<td>1,256 (100%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,434</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This data however is only for a subsection of the health informatics workforce and even then its reliability was questioned during consultation.

Data on workforce is also available for the information and communications technology (ICT) sector following analysis by the Australian Computer Society (ACS)\(^31\). There are 532,564 ICT workers in Australia\(^32\) – 9,554 of those are employed in the ‘Health Care and Social Assistance’ Sector – of these 3,198 are in the ‘ICT Technical and Professional’ worker category.

**Estimate based on survey extrapolation**

If you assume that: (1) the respondents to this HISA workforce survey are a representative sample of the population of health informaticians; (2) that the ‘coding clerks’ and ‘health information managers’ identified with the title ‘health information manager’ in their response to that survey question (which is not unreasonable given the choices); (3) that the data from the 2006 census is accurate and unchanged since;

Then you can apply the ‘health information manager’ proportion of responses from the survey to the census data and calculate that there are:

\[
3,434^{(33)} / 372^{(34)} \times 1,279^{(35)} = 11,806 \text{ health informaticians in Australia}
\]

---


\(^{32}\) ACS analysis in their compendium based on the ABS Labour Market Survey, Feb 2009

\(^{33}\) The total number of coding clerks plus HIMs from the 2006 census

\(^{34}\) The number of complete respondents identifying with ‘health information manager’ in the survey

\(^{35}\) The total number of complete respondents to the survey
Using the same logic but with ICT workers. If you assume that: (1) the respondents to this HISA workforce survey are a representative sample of the population of health informaticians; (2) that the ‘ICT technical and professional’ workers identified with the title ‘IT, engineering or science professional’ in their response to that survey question (which is not unreasonable given the choices although this will include natural scientists which will have the effect of underestimating the number of health informaticians); (3) that the proportion of ‘ICT technical and professional’ workers from ‘Health Care and Social Assistance’ who are in health are the same as for the whole workforce;

Then you can apply the ‘IT, engineering or science professional’ proportion of responses from the survey to the ACS data and calculate that there are:

\[
3,198^{(36)} \times 0.63^{(37)} / 236^{(38)} \times 1,279^{(39)} = 10,919 \text{ health informaticians in Australia}
\]

*Estimate based on overseas data extrapolation*

In the UK, the National Health Service (NHS) has counted their health informatics workforce\(^{40}\) which they define broadly as we have here. The report states that of the 1.3M employees in the NHS, about 25,000 work in health informatics or a ratio of 1 health informatician per 52 workers.

This compares with 1:48 in a Gartner report of US integrated delivery networks and 1:60 based on the HIMSS Analytics Database\(^{41}\).

From the AIHW analysis of the 2006 census in Australia\(^{42}\) there are 477,800 employed persons in health (e.g. doctors, nurses, dentists, allied health workers, ambulance officers, social workers) and another 276,000 persons employed in other occupations in health services industries (e.g. clerical workers, service workers, welfare professionals) ie a total of 753,800

Assume then a ratio in Australia of 1:50 (slightly less than UK but a bit more than Gartner in the US) and apply the workforce numbers.

Using this approach and the whole health workforce as the comparator you get

\[
753,800 / 50 = 15,076 \text{ health informaticians in Australia}
\]

Or restricting it to health workers as the comparator

\[
447,800 / 50 = 8,956 \text{ health informaticians in Australia}
\]

*Best estimate*

Although the assumptions made in the calculations above can be readily challenged they point from a number of angles at an estimate of between 9,000 and 15,000 health informaticians in Australia.

The best estimate we have is that there are around 12,000 health informaticians in Australia now.

---

36 The total number of ICT technical and professional workers in the Health Care and Social Assistance Sector
37 That is similar to total employment 477,800 / 753800 = 0.63 (from AIHW data)
38 The number of complete respondents identifying with ‘IT, engineering or science professional’ in the survey
39 The total number of complete respondents to the survey
41 Bill Hersh – ACMI discussion group
4.5 How are they represented?

Given the diversity of activities, background and training, it is hardly surprising that there is a large number of organisations where health informaticians gather.

The Coalition for eHealth\textsuperscript{43} is a loose coalition of organisations with an interest in eHealth brought together by HISA to improve co-ordination and coherence in the sector. The principle activity has been around a national strategy for e-Health but it has also been used as a window to the broader health informatics community for considerations such as education and workforce.

There are currently 56 organisations who are members and who support the consensus statement on a national plan for eHealth. Those organisations are:

- Consumers, Patients & Carers
  - Cancer Voices Australia
  - Choice - Australian Consumers Association
  - CFA - Consumers’ Health Forum of Australia
  - LFA - Leukaemia Foundation of Australia
  - CCA - Cancer Council Australia
- Health and Aged Care Colleges, Societies & Associations
  - AAPP - Australian Association of Pathology Practices
  - AACB - Australian Association of Clinical Biochemists
  - ACAAA - Aged Care Association Australia
  - ACHI - Australian College of Health Informatics
  - ACHSE - Australian College of Health Service Executives
  - ACRRM - Australian College of Rural and Remote Medicine
  - ADIA - Australian Diagnostic Industry Association
  - AGPN - Australian General Practice Network
  - Australian General Practice Accreditation Limited
  - AHHA - Australian Healthcare and Hospital Association
  - AHRDMA - Australasian Health and Research Data Managers Association
  - AMA - Australian Medical Association
  - ASM - Australian Society of Microbiology
  - APS - Australian Psychology Society
  - Australian Association of Practice Managers
  - Fitness Australia
  - HIMAA - Health Information Managers Association Australia
  - HGSA - Human Genetics Society of Australasia
  - NCOPP - National Coalition of Public Pathology
  - OT Australia
  - Pharmacy Guild of Australia
  - RACGP - Royal Australian College of General Practitioners
  - RACMA - Royal Australian College of Medical Administrators
  - RANZCR - Royal Australian New Zealand College of Radiology
  - RCNA - Royal College of Nursing Australia
  - RCPA - Royal College of Pathologists of Australasia
  - RDAA - Rural Doctors Association of Australia
  - SHPA - Society of Hospital Pharmacists of Australia
  - SPA - Speech Pathology Australia

\textsuperscript{43} See \url{www.ceh.net.au}
The organisations representing health informatics workers are mapped in Figure 29 - Organisations that represent health informaticians in Australia - showing positioning, relative size, overlap and membership growth. The map was developed by us but tested in consultation.

The circles are placed in two dimensional space against the axes ‘theory↔practice’ and ‘health↔informatics’. The sizes of the circles show the relative membership of the organisations. Overlaps of circles are intended to give a picture of the common memberships and their quantum, however a small number of people are members of many of these organisations and it was impossible to show all overlaps. The colour coding is used to aid identification and where possible the principal colours that are used by the organisation in their own identification are the ones selected here. The key to the diagram which expands the acronyms is provided in Table 4 - The main organisations representing health informaticians on the pages following the figure.
Figure 29 - Organisations that represent health informaticians in Australia - showing positioning, relative size, overlap and membership growth
## Table 4 - The main organisations representing health informaticians (and providing a key to the map of organisations shown on the previous page)

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Name</th>
<th>Description</th>
<th>Members</th>
<th>Contacts</th>
<th>Works with</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACHI</td>
<td>Australian College of Health Informatics</td>
<td>‘Peak health informatics professional body’ <a href="http://www.achi.org.au">www.achi.org.au</a></td>
<td>Fellows = 36 Mmbrs = 14 Total = 50&lt;sup&gt;44&lt;/sup&gt;</td>
<td>Terry Hannan – President Heather Grain - Secretary</td>
<td>HISA, HIMAA, HL7 Australia, Coalition for eHealth</td>
<td>eJHI AHIEC</td>
</tr>
<tr>
<td>HISA</td>
<td>Health Informatics Society of Australia</td>
<td>Provides a national focus for health informatics, its practitioners, industry and users; advocates on behalf of its members and; provides opportunities for learning and professional development in health informatics <a href="http://www.hisa.org.au">www.hisa.org.au</a></td>
<td>Mmbrs = 600&lt;sup&gt;45&lt;/sup&gt; plus those associated through SIG activity = ~500 Total =~1,100</td>
<td>Michael Legg – President Brendan Lovelock - CEO</td>
<td>National rep IMIA National rep APAMI Convener- Coalition for eHealth (CeH) NEHTA SRF HIMAA AHHA</td>
<td>Conferences Special Interest Groups Lobbying AusCHIP eJHI AHIEC</td>
</tr>
<tr>
<td>NIA</td>
<td>Nursing Informatics Australia</td>
<td>Nursing Informatics Australia (NIA) is a special interest group of HISA and is the pre-eminent group of nursing informaticians in Australia <a href="http://www.hisa.org.au/nursing">http://www.hisa.org.au/nursing</a></td>
<td>HISA = 72 Others = 0 Total =72&lt;sup&gt;46&lt;/sup&gt;</td>
<td>Paul Donaldson – Chair Jo Foster-Secretary Robyn Cook- IMIA Nursing Representative</td>
<td>CoNNA Coalition of National Nursing Organisations Royal College of Nursing ANF IMIA – Nursing NEHTA</td>
<td>Annual conference IMIA Nursing Education</td>
</tr>
<tr>
<td>P</td>
<td>Pathology and Bioinformatics SIG</td>
<td>Pathology and Bioinformatics is a special interest group of HISA dedicated to those disciplines. Membership is not limited to HISA members although only a HISA member can lead the SIG <a href="http://www.hisa.org.au/pathology">http://www.hisa.org.au/pathology</a></td>
<td>HISA = 10 Others =20 Total =30&lt;sup&gt;47&lt;/sup&gt;</td>
<td>Michael Legg – SIG Leader Vitali Sintchenko</td>
<td>Royal College of Pathologists of Australasia Australian Association of Clinical Biochemists Standards Australia Association of Pathology Informatics</td>
<td>Host First World Congress of Pathology Informatics and on OC of next Active involvement in sector quality and safety initiatives Membership of steering committees for national projects</td>
</tr>
</tbody>
</table>

---

<sup>44</sup> Source: Website membership list as at 01/07/09  
<sup>45</sup> Source: Membership database as at 3/09/09  
<sup>46</sup> Source: Secretary  
<sup>47</sup> Source: SIG Leader – Michael Legg
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Name</th>
<th>Description</th>
<th>Members</th>
<th>Contacts</th>
<th>Works with</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACI</td>
<td>Aged Care Informatics</td>
<td>Aged Care Informatics (ACI) is a special interest group of HISA and is the pre-eminent group of aged care informaticians in Australia. Membership is not limited to HISA members although only a HISA member can lead the SIG. <a href="http://www.hisa.org.au/agedcare">www.hisa.org.au/agedcare</a></td>
<td>HISA = 20 Others =30 Total =50&lt;sup&gt;48&lt;/sup&gt;</td>
<td>Jeffrey Soar- SIG Leader</td>
<td>Aged and Community Services Australia (ACSA) Aged Care Association Australia (ACAA)</td>
<td>Annual HISA symposium Industry conference - ITAC (managed by HISA) Annual HIC workshop</td>
</tr>
<tr>
<td>A</td>
<td>Allied Health SIG</td>
<td>Allied Health is a special interest group of HISA and is the only group of those interested in allied health in Australia (or the world currently). Membership is not limited to HISA members although only a HISA member can lead the SIG. <a href="http://www.hisa.org.au/alliedhealth">www.hisa.org.au/alliedhealth</a></td>
<td>HISA = 10 Others =40 Total =50&lt;sup&gt;49&lt;/sup&gt;</td>
<td>Louise Schaper SIG Leader</td>
<td>Allied Health Alliance</td>
<td>Active email list</td>
</tr>
<tr>
<td>HIPS</td>
<td>Health Information Privacy and Security Group</td>
<td>Health Information Privacy and Security Group (HIPS) is the special interest group of HISA and is the pre-eminent group of health privacy and security informaticians in Australia. Membership is not limited to HISA members although only a HISA member can lead the SIG. <a href="http://www.hisa.org.au/hips">www.hisa.org.au/hips</a></td>
<td>HISA = 50 Others =70 Total =120&lt;sup&gt;50&lt;/sup&gt;</td>
<td>Peter Croll SIG Leader</td>
<td>Australian Law Reform Commission Federal Privacy Commission NEHTA Privacy Foundation Consumer Forum International Association of Privacy Professionals (Malcolm Crompton, President)</td>
<td>Annual Conference Health Privacy Futures Advice to the Australian Law Reform Commission Advice to NEHTA</td>
</tr>
</tbody>
</table>

<sup>48</sup> Source: SIG Leader  
<sup>49</sup> Source: Guesswork!  
<sup>50</sup> Source: SIG Leader
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Name</th>
<th>Description</th>
<th>Members</th>
<th>Contacts</th>
<th>Works with</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>health-mic</td>
<td>health-mic.org</td>
<td>Health-mic is a special interest group of HISA dedicated to healthcare management informatics and computing. Membership is not limited to HISA members although only a HISA member can lead the SIG <a href="http://www.hisa.org.au/health-mic">www.hisa.org.au/health-mic</a></td>
<td>HISA = ?</td>
<td>Chris Bain</td>
<td>Australian College of Health Service Executives (ACHSE)</td>
<td>Active Google group</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Others =?</td>
<td>SIG Leader</td>
<td>Royal Australian College of Medical Administrators (RACMA)</td>
<td>First meeting to be held at HIC'09</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total =75(^{51})</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consumer</td>
<td>HealthBeyond</td>
<td>HealthBeyond is a special interest group of HISA dedicated to consumer eHealth. Membership is not limited to HISA members although only a HISA member can lead the SIG <a href="http://www.healthbeyond.org.au/">www.healthbeyond.org.au/</a></td>
<td>HISA = 20</td>
<td>Brendan Lovelock</td>
<td>Consumer Health Forum</td>
<td>HealthBeyond Conferences</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Others =80</td>
<td>SIG Leader</td>
<td>Chronic Care Alliance</td>
<td>Social Networking</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total =100(^{52})</td>
<td></td>
<td>Interactive Entertainment Association of Australia</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Game Developer Association</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Centre for Health Innovation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NEHTA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Allied Health Alliance</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Australian Psychological Society</td>
<td></td>
</tr>
<tr>
<td>GfH</td>
<td>Games for Health</td>
<td>Games for Health is a special interest group of HISA looking at the application of electronic games in health. Membership is not limited to HISA members although only a HISA member can lead the SIG <a href="http://www.hisa.org.au/games4health">www.hisa.org.au/games4health</a></td>
<td>HISA = 10</td>
<td>Stuart Smith</td>
<td>Interactive Entertainment Association of Australia</td>
<td>HealthBeyond Conferences</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Others =40</td>
<td>SIG Leader</td>
<td>Game Developer Association</td>
<td>Industry development</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total =50(^{53})</td>
<td></td>
<td>Centre for Health Innovation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NEHTA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Allied Health Alliance</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Australian Psychological Society</td>
<td></td>
</tr>
<tr>
<td>IHE</td>
<td>Integrating the Health Enterprise (IHE)</td>
<td>IHE is a special interest group of HISA that acts as a National IHE Deployment Committee. Membership is not limited to HISA members although only a HISA member can lead the SIG <a href="http://www.ihe.net.au">www.ihe.net.au</a></td>
<td>HISA = 10</td>
<td>Vincent McCauley</td>
<td>MSIA, HL7au, RANZCR, ADIA, NEHTA, Standards Australia, AHML, IHE International</td>
<td>Profile development</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Others =20</td>
<td>Chair of IHE</td>
<td>Interoperability showcases</td>
<td>Connectathon</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total =30(^{54})</td>
<td>Jon Hilton – Deputy Chair Peter MacIsaac</td>
<td>Australia, AHML, IHE</td>
<td>Interoperability showcases</td>
</tr>
</tbody>
</table>

\(^{51}\) Source: SIG Leader – Chris Bain
\(^{52}\) Source: SIG Leader – Brendan Lovelock
\(^{53}\) Source: HISA CEO – Brendan Lovelock
\(^{54}\) Source: Deputy Chair – Jon Hilton
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Name</th>
<th>Description</th>
<th>Members</th>
<th>Contacts</th>
<th>Works with</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>HLA</td>
<td>Health Libraries Australia Group of the Australian Library &amp; Information Association</td>
<td>The national peak body for health librarians under the umbrella of the Australian Library and Information Association <a href="http://www.aila.org.au/groups/healthnat/">www.aila.org.au/groups/healthnat/</a></td>
<td>~400 members in 446 libraries (^{55})</td>
<td>Mary Peterson Secretary Cheryl Hamill Committee Member</td>
<td>Australian Library and Information Association</td>
<td>Annual conference</td>
</tr>
<tr>
<td>ATHS</td>
<td>Australasian Tele-Health Society (ATHS)</td>
<td>ATHS has been formed to provide a forum for information sharing, investigation and promotion of TeleHealth for everyone involved in providing healthcare over a distance in Australia and New Zealand. Membership for individuals and organisations is by application but not qualification <a href="http://www.aths.org.au">www.aths.org.au</a></td>
<td>50 (^{56})</td>
<td>K Yogan, President Laurie Wilson, Hon Sec</td>
<td>IsfTeH Standards Australia IT-14-12</td>
<td>Annual conference: Successes and Failures in Telehealth Bidding for 2010 International Telehealth Conf in Perth</td>
</tr>
<tr>
<td>AHRDMA</td>
<td>Australasian Health and Research Data Managers Association</td>
<td>An association of health researchers, research nurses, study coordinators and data managers representing a diverse range of professional backgrounds, working across the spectrum of medical research disciplines in Australia, New Zealand and Asia [<a href="http://www.ahr">www.ahr</a> dma.com.au](<a href="http://www.ahr">http://www.ahr</a> dma.com.au)</td>
<td>340 (^{57})</td>
<td>Susan Smith Adam Stonely</td>
<td></td>
<td>Annual Scientific Meeting</td>
</tr>
<tr>
<td>HIMAA</td>
<td>Health Information Management Association of Australia</td>
<td>The peak association for health information managers in Australia <a href="http://www.himaa.org.au">www.himaa.org.au</a></td>
<td>~400 (^{58})</td>
<td>Vicki Bennett – President Bob Blue - CEO</td>
<td>HISA</td>
<td>Annual Conference Training Accreditation AHIEC</td>
</tr>
</tbody>
</table>

\(^{55}\) Source: Secretary – Cheryl Hamill  
\(^{56}\) Source: Executive Member – Anthony Maeder  
\(^{57}\) Source: Susan Smith – AHRDMA 15/09/09  
\(^{58}\) Source: HIMAA CEO as at 25/08/09
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Name</th>
<th>Description</th>
<th>Members</th>
<th>Contacts</th>
<th>Works with</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSIA</td>
<td>Medical Software Industry Association</td>
<td>The recognised official ‘voice’ of the healthcare software industry</td>
<td>59</td>
<td>Vincent McCauley – President</td>
<td>AIIA HL7au</td>
<td>Industry projects</td>
</tr>
<tr>
<td>HL7au</td>
<td>HL7 Australia</td>
<td>HL7 Australia is an open, volunteer-based, not-for-profit organisation that supports the needs of HL7 users in Australia. HL7 Australia is the local HL7 user group and the accredited national affiliate of HL7 Inc. (USA). <a href="http://www.hl7.org.au">www.hl7.org.au</a></td>
<td>127</td>
<td>Klaus Veil – Chairman</td>
<td>IHE MSIA</td>
<td>Standards Development</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Chris Lynton-Moll – Hon Secretary</td>
<td></td>
<td>Education</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Connectathons</td>
</tr>
<tr>
<td>ACS</td>
<td>Australian Computer Society</td>
<td>The recognised association for IT Professionals</td>
<td>Health group has low activity</td>
<td>Richard Dixon-Hughes</td>
<td>Standards Australia</td>
<td>Standards development</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Course accreditation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Recognition of Practicing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Computer Professional</td>
</tr>
<tr>
<td>EA</td>
<td>Engineers Australia</td>
<td>Engineers Australia is the national peak body for all engineering disciplines</td>
<td>Small group</td>
<td>Michael Hedley George Margelis MSIA</td>
<td></td>
<td>lobbying</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="http://www.engineersaustralia.org.au">www.engineersaustralia.org.au</a></td>
<td></td>
<td></td>
<td></td>
<td>Seminars</td>
</tr>
<tr>
<td>AIIA</td>
<td>Australian Information Industry Association</td>
<td>The Australian Information Industry Association is the national organisation representing the information technology and telecommunications industry <a href="http://www.aiia.com.au">www.aiia.com.au</a></td>
<td>Has an active health group</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIG</td>
<td>Australian Industry Group</td>
<td>Created to help Australian Industry to be more competitive</td>
<td>AIG eHealth cluster group is active</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="http://www.aigroup.com.au">www.aigroup.com.au</a></td>
<td></td>
<td>Lorraine Lilly Angus Robinson</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: MSIA CEO – Bridget Kirkham

Source: President’s presentation to AGM December 2008 – Klaus Veil
4.6 What education and training do they have?

The vast majority (79%) of health informaticians are educated in multiple disciplines to the degree level or higher. For 18% this includes a specific health informatics qualification. 11% have four or more areas of training and for 19 (1.5%) of the cohort this amounts to 4 or more qualifications at the postgraduate level. This is a highly trained workforce! The issue then is the inevitable lag time before the availability of workers even if there was a marked increase in training.

Figure 30 shows the number of respondents with 1, 2, 3, and 4 or more qualifications. Figure 31 shows the distribution of training by knowledge domain. The data is shown in Table 5.

Figure 30 – The number of respondents with 1, 2, 3, and 4 or more qualifications

Figure 31 – The number of qualifications by knowledge domain held by the cohort

The training is evenly spread across health, health informatics, management, and informatics and engineering with a significant ‘other’ component and a smaller humanities component.
Table 5 - Training of health informaticians

<table>
<thead>
<tr>
<th>Training Domain</th>
<th>First</th>
<th>Second</th>
<th>Third</th>
<th>Fourth</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informatics - e.g. mathematics, statistics, information science, library science, computer science...</td>
<td>147</td>
<td>189</td>
<td>61</td>
<td>17</td>
<td>414</td>
</tr>
<tr>
<td>Science and Engineering (non-biology) - e.g. software, biomedical, electrical, communications, process, physics...</td>
<td>123</td>
<td>39</td>
<td>29</td>
<td>9</td>
<td>200</td>
</tr>
<tr>
<td>Management - e.g. organisational change, contract management, risk, health administration, project management...</td>
<td>56</td>
<td>300</td>
<td>127</td>
<td>26</td>
<td>509</td>
</tr>
<tr>
<td>Humanities - e.g. psychology, sociology, law...</td>
<td>58</td>
<td>35</td>
<td>28</td>
<td>6</td>
<td>127</td>
</tr>
<tr>
<td>Health - Medicine - e.g. GP, specialist</td>
<td>119</td>
<td>23</td>
<td>7</td>
<td>3</td>
<td>152</td>
</tr>
<tr>
<td>Health - Nursing - e.g. midwifery, theatre, occupational, psychiatric...</td>
<td>212</td>
<td>29</td>
<td>20</td>
<td>6</td>
<td>267</td>
</tr>
<tr>
<td>Health - Other - e.g. dentistry, science, pharmacy, allied health...</td>
<td>153</td>
<td>31</td>
<td>13</td>
<td>6</td>
<td>203</td>
</tr>
<tr>
<td>Health informatics - Health information management, library science...</td>
<td>290</td>
<td>153</td>
<td>54</td>
<td>15</td>
<td>512</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>117</td>
<td>211</td>
<td>129</td>
<td>54</td>
<td>511</td>
</tr>
<tr>
<td>Total</td>
<td>1275</td>
<td>1010</td>
<td>468</td>
<td>142</td>
<td>2,895</td>
</tr>
<tr>
<td>% of cohort</td>
<td>100%</td>
<td>79%</td>
<td>37%</td>
<td>11%</td>
<td></td>
</tr>
<tr>
<td>Certificate or diploma</td>
<td>217</td>
<td>351</td>
<td>218</td>
<td>62</td>
<td>848</td>
</tr>
<tr>
<td>Bachelors degree</td>
<td>625</td>
<td>201</td>
<td>70</td>
<td>20</td>
<td>916</td>
</tr>
<tr>
<td>Post-graduate degree including masterate, specialist fellowships &amp; doctorate</td>
<td>423</td>
<td>407</td>
<td>137</td>
<td>42</td>
<td>1,009</td>
</tr>
<tr>
<td>Total</td>
<td>1265</td>
<td>959</td>
<td>425</td>
<td>124</td>
<td>2,773</td>
</tr>
<tr>
<td>Average number of qualifications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.2</td>
</tr>
</tbody>
</table>

Figure 32 below shows the numbers of respondents with training by type showing the order of attainment.
Figure 32 - Numbers with education and training by type showing the order of attainment
4.7 Where do they get the education and training?

Education and training in health informatics is provided as both a course component and as courses in their own right.

Types of education include:
- Post Graduate
  - Medical Colleges
  - University
- Undergraduate
- TAFE
- In-house
- Vendor
- Continuing professional education

Most universities in Australia have some kind of offering in the health informatics field. Supply exceeds demand however in almost every institution.

For Health Information Managers in particular\(^\text{61}\):
- Professional association since 1940s
- Education at tertiary level since mid-1970s
- Previously four undergraduate programs but now
  - University of Sydney - Master of Health Informatics
  - La Trobe - Bachelor of Health Science/Master of HIM
  - QUT - Grad Cert Health Science (Clinical Coding)
  - Curtin - Bachelor of Health Science (HIM major)

In terms of the education sector market:
- Computing, informatics and IT faculties see health as a new opportunity
- Business management and economics faculties see health as an important area where money will be spent and so they have an interest
- Health informatics is here to stay but is struggling for students and for time in courses where it is a component.

There has been no shortage in education offerings, many of them meeting best-practice standards and well-rated by their participants. The problem has been in attracting students. This is an issue that is taken up in Section 5 Workforce issues.

An inventory of health informatics courses is provided at Appendix D – University Course Inventory.

\(^{61}\) From a presentation by Sue Walker at the AIHW workshop
4.8 What is going on in other countries?

The need to address health informatics workforce supply is widely recognised around the world. In some countries there are programs already underway.

4.8.1 UK

The UK is further progressed with its national e-health program than Australia. It has a single dominant employer and is well advanced in its definition of the health informatics workforce and its workforce development activities. They have developed a human resources strategy and three education, training and development programmes. Its work serves as a good model for what might be done in Australia (including their 2006 workforce study).

The Welsh NHS program (Figure 33) has developed a sophisticated health informatics career framework based on 9 levels in the following 7 disciplines:

1. Clinical Informatics Staff
2. Health Records and Patient Administration
3. HI Educators and Trainers
4. ICT Staff
5. Information Management
6. Knowledge Management
7. Project and Programme Management

The English NHS Connecting for Health as part of its Capability & Capacity Programme has an initiative called Professionalising Health Informatics (PHI) with a portal designed to support personal and professional development in Health Informatics and providing information and links to health informatics professional, personal, educational, leadership and managerial development opportunities.

Part of the PHI initiative developed in association with the British Computer Society (BCS) Health Special Interest Group (the UK HISA equivalent) is UKchip, a registration scheme for health informaticians. The primary objectives being:

- To be the registration and certification body for individuals practicing in all branches of Health Informatics in the United Kingdom;
- To promote, advance and encourage the study and practice of the application of Informatics in the promotion of health, well being and dying with dignity;
- To establish, uphold and improve the standards of qualification, training, competence and conduct of Health Informatics professionals in the United Kingdom;
- To establish mechanisms for the benefit and protection of the public;
- To collaborate with official bodies, societies and professional associations on matters relating to the profession of Health Informatics.

The voluntary and open Public Register of Health Informatics Professionals is for those who meet clearly defined standards of competence and agree to work to a common code of conduct.

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Figure 33 - Health informatics career framework from the Welsh NHS
4.8.2 Canada

COACH (the HISA equivalent in Canada) earlier this year, following a project that analysed job descriptions and mapped them to the Canadian health informatics professional core competencies, developed a similar but different health informatics career matrix. This appears in Figure 34 - Health informatics professional career matrix developed by COACH Canada's health informatics association.

COACH is now conducting a national study of health informatics and health information management professionals. Instead of going to individuals directly, Canada is going to employers and having them count the number of employees in specific roles.

Canada is studying the people on the Matrix, as well as some HIM professionals and IT people that are not on the matrix. There is an undertaking from COACH to share the outcomes with HISA.
**Health Informatics Professional Career Matrix**

<table>
<thead>
<tr>
<th>Level</th>
<th>Clinical &amp; Health Sciences</th>
<th>Canadian Health System</th>
<th>Project Management</th>
<th>Organizational &amp; Behavioural Management</th>
<th>Analysis &amp; Evaluation</th>
<th>Information Management</th>
<th>Information Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Master</td>
<td>Chief Medical Informatics Officer</td>
<td>Chief Information Officer</td>
<td>Practice Director</td>
<td>Research &amp; Analysis Vice President</td>
<td>Chief Privacy Officer</td>
<td>Chief Technology Officer</td>
<td></td>
</tr>
<tr>
<td>4 Expert</td>
<td>Clinical Informatics Director</td>
<td>Senior Policy Analyst</td>
<td>Program Management Office Director</td>
<td>Change &amp; Evaluation Services Director</td>
<td>Senior Methodologist</td>
<td>Chief Quality Officer</td>
<td>Information Technology Director</td>
</tr>
<tr>
<td>3 Proficient</td>
<td>Clinical Informatics Manager Outcomes Specialist</td>
<td>Business Development Analyst Risk Manager Senior Business Analyst Project Director</td>
<td>Program Management Office Manager Engagement Manager Program Manager Service Manager</td>
<td>Senior Researcher</td>
<td>Privacy Specialist Registry Manager Standards Manager</td>
<td>Data Architect Security Specialist Solution Architecture Lead</td>
<td></td>
</tr>
<tr>
<td>1 Emerging Professional</td>
<td>Clinical Coordinator Junior Business Analyst Project Coordinator Program Coordinator</td>
<td>Product Support Analyst Training Coordinator</td>
<td>Research Analyst</td>
<td>Operations Assistant Privacy Analyst Standards Analyst</td>
<td>Help Desk Coordinator Testing Analyst</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Figure 34 - Health informatics professional career matrix developed by COACH Canada's health informatics association*
4.8.3 US

The American Recovery and Reinvestment Act of 2009, which provided US$19 billion for updating health information technology in the US, specifically provides for workforce development in Section 3016\(^68\).

AMIA, the HISA equivalent in the US, lists the following activities in 2008\(^69\)

1. AMIA believes that certification of physician clinical informaticians will support the professional needs of individuals in this role. AMIA is developing certification to be coordinated with formal training programs for clinical informaticians as part of the domain of biomedical and health informatics. This is being pursued by seeking a medical specialty to sponsor informatics to the American Board of Medical Specialties using materials developed by AMIA.

2. As soon as this initiative shows progress, AMIA will adapt, if needed, the core content prepared for physician informaticians for doctoral or master’s prepared (non-MDs) clinicians to pursue advanced training in clinical informatics. We anticipate that this will include candidates for a Ph.D. in medical informatics, doctor of nursing practice, doctor of pharmacy, etc.

3. AMIA created the Academic Forum as a membership unit dedicated to serving the needs of post-baccalaureate biomedical and health informatics training programs. The Academic Forum was conceived by recognized leaders to establish a professional home for academic informatics. The mission of the AMIA Academic Forum is to promote the development of biomedical and health informatics as an academic discipline. The Forum provides a vehicle for surveying and analyzing activities in academic units dedicated to biomedical and health informatics and for recommending best practices related to education, scholarship, faculty development, and faculty retention. The Forum provides a locus for discussion of national research initiatives in informatics and a round table that facilitates collaboration among different academic units to further their objectives for education and research.

4. AMIA, working through its Academic Forum, is also identifying a common set of biomedical and health informatics competencies for members, current and prospective member institutions, and the greater health information technology community. Formal and comprehensive biomedical and health informatics competencies will provide a foundation and framework for the discipline and provide guidance to educators and educational administrators for the advancement of new and existing informatics training programs, as well as for faculty recruitment and development. The scope of the effort includes the domains of translational bioinformatics, clinical healthcare and research informatics, and public health/population informatics.

5. AMIA formed the Academic Strategic Leadership Council as a body to assure that a leadership base develops within the academic health sciences. The essential mission of the Academic Strategic Leadership Council is to act as a catalyst of change to enable academic health science institutions to lead the way to improvements in health and health care through biomedical/health informatics. This leadership will be reflected in work force development, research, demonstration of effectiveness and policy. If successful, academic health science institutions will evolve into environments that

\(^{68}\) See [http://www.opencongress.org/bill/111-h1/show](http://www.opencongress.org/bill/111-h1/show) viewed Aug 2009

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develop and demonstrate informatics enabled improvements in public health, care
delivery, biomedical research and health professions education.

6. Further work is underway to delineate what informatics content and skills are needed in
the education of other clinicians and information managers. To this end, AMIA’s
Academic Strategic Leadership Council (ASLC) is beginning an initiative in concert
with the Association of Academic Health Centers (AAHC) and a few other national
educational organizations relating to health. AHIMA is an invited participant to that
initiative.

7. Additionally, AMIA has actively participated in the Technology Informatics Guiding
Educational Reform (TIGER) Initiative. The TIGER Initiative aims to enable practicing
nurses and nursing students to fully engage in the unfolding digital era of
healthcare.(www.tigersummit.com)

8. AMIA’s 10x10 program is teaching basic knowledge and skills in informatics at the
graduate course level (see http://www.amia.org/10x10)

9. AMIA is conducting public health informatics training for qualified participants under a
cooperative agreement with the Centers for Disease Control and Prevention (CDC).

10. An emerging AMIA initiative referred to as “20/20 Bits and Bytes” will consist of
carefully defined and focused biomedical and health informatics knowledge or skills
sets, tools, and content useful and applicable worldwide.

AHIMA, the HIMAA equivalent in the US, lists the following activities in 2008:

1. Creation of the Action Community for e-HIM® Excellence (ACE), composed of HIM
professionals who are leading, influencing and making a difference in the healthcare
work force. See www.ahima.org

2. The Foundation of Research and Education (FORE) supports an HIM Faculty
Development Stipend program to assist HIM educators with professional development
funding, offers the FORE Research Institute in its second year of operation, and
supports educators and practitioners seeking advanced education or research seed
monies. See http://www.ahima.org/fore/about/

3. FORE supports the design and delivery of the Virtual Electronic Health Record
Laboratory project which provides web-based, vendor-supported information
management technology applications for student hands-on practice serving over 125
HIM college programs at the associate, baccalaureate and graduate levels to prepare
graduates for the electronic work force challenges.

4. Launch of Courseshare, a new service for HIM educators as a member benefit giving
educators access to peer-reviewed, downloadable content for use in academic settings
with cutting edge content contributions from educators and professionals in HIM and
related fields.

5. The Assembly on Education (AOE) Summer Symposium and Faculty Development
Institute annually provides a forum for educators to share, learn and update their
teaching skills to address work force needs

6. AHIMA is a sponsor of the Commission on Accreditation for Health Informatics and
Information Management Education (CAHIIM) which recognizes through accreditation

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AHIMA- AMIA, 2008 Joint Work Force Task Force - Health Information Management and Informatics
Core Competencies for Individuals Working With Electronic Health Records See:
over 250 academic programs in health information management and health informatics at the associate, baccalaureate and graduate levels. See www.cahiim.org

7. AHIMA offers advanced mastery certifications such as Certified Healthcare Privacy and Security (CHPS) and the new Certified in Health Data Analytics credential.


9. Work has begun on an International core curriculum model for HIM in countries embracing EHRs.

10. AHIMA continues to align with AMIA, HIMSS, TIGER and numerous other initiatives to build and strengthen the healthcare workforce for the future.

4.8.4 Others
There are many other initiatives in other countries but there is neither the time nor space to document them here.

4.9 What else is going on here?

4.9.1 NHISSC and AIHW
The National Health Information Standards and Statistical Committee (NHISSC) concerned by the capacity to produce measures required for the Commonwealth-States health funding agreements asked the Australian Institute of Health and Welfare to report on the current position in respect of workforce especially coders. AIHW facilitated a workshop on this topic. Although the focus was on meeting this immediate need, the group agreed to review a wider range of workforce issues. Participants are shown in Appendix A – Consultations undertaken.

4.9.2 AHIEC
With assistance from the Australian Department of Health and Ageing, the Australian Health Informatics Education Council71 is in the process of forming although its governance and scope are still under discussion. A strategic work plan has been developed with the facilitation of ACHI.

4.9.3 AUSchip
HISA, with the full support of British Computer Society (BCS) Health Special Interest Group (the UK HISA equivalent), has initiated an Australian version of UKchip72 called AUSchip73 with the same purpose as in the UK; to professionalise health informatics. A professional is an individual:

- who takes responsibility for their own actions
- who adheres to good governance that directs behaviour
- who meets entry and ongoing competence standards
- who abides by ethical and moral principles and
- whose practices contribute to leadership in their profession.

71 See www.ahiec.org.au
5 WORKFORCE ISSUES

5.1 What are the issues?

All those consulted believe there is a significant and immediate problem around the size and structure of the Australian health informatics workforce.

The main issues are:

1. There are too few health informaticians for the current workload and unless addressed these workforce and skills shortages will be a major barrier to implementing the National E-Health Strategy and likely to health reform more generally

2. Too little is known about the health informatics workforce – we know neither how many we have now, nor how many we need, and there is no indication that it is yet part of any national health workforce strategy or the remit of the National Health Workforce Agency

3. There is a fundamental breakdown in the market between employers, education providers and potential workforce entrants – while there is a strong demand by employers for workers, there has been a failure to attract students leading to the closure of well-regarded university courses

4. Because it is an emerging field, health informatics does not have wide recognition as a discipline in its own right; there is a poor general understanding of the knowledge domain in Australia; and many of the workers in clearly related jobs do not yet self-identify

5. There is no career structure for health informaticians in Australia; there is no standardisation of job names or job descriptions and there is no widely adopted set of competencies

6. There will be a long lag time to produce new health informaticians because of the multi-disciplinary nature of the education and the complexity of the discipline – the workforce we do have must be used optimally

7. A contributing factor to the lack of needed recognition and action on health informatics workforce issues is the fragmented representation of those in the discipline
5.2 What is the evidence?

It has been recognised for some time that there are issues around workforce in health informatics.

In November 2003, under the auspices of the first Australian Health Information Council and their National Statement on Health Workforce, a Health Informatics Capacity Building Report was developed\(^\text{74}\).

Rob Wooding (FAS Information and Communications Section of DoHA) in April 2004 identified the key barriers to progress in e-health as:

- Technical complexity alienates key stakeholders and decision-makers
- Inadequate business analysis/vendor products
- **Skills shortages/insufficient training of clinicians**
- Competition and conflict among government-sponsored e-Health projects and processes

In more recent times it has been drawn to the attention of:

- National Health and Hospital Reform Commission by
  - Health Libraries Australia
  - HIMAA
  - HISA
- Treasury budget submissions by
  - HISA
- The Senate Enquiry on Health Workforce by
  - HISA
- National E-Health & Information Principle Committee (NEHIPC)
  - HIMAA

The 2007 Boston Consulting Group Review of the National E-Health Transition Authority (NEHTA) identified one of the barriers to its slow progress as a shortage of suitably qualified staff resulting in their Recommendation 4: Accelerate resourcing through outsourcing, offshore recruiting and more creative contractual arrangements. NEHTA’s response to the report included the following statement:

> NEHTA’s organisational development to date has been characterised by intense recruitment activity and a rapid build-up of staff numbers. Despite this growth, recruitment difficulties reflect capacity constraints in the Australian market. NEHTA has responded by establishing major offices in Sydney and Brisbane, with staff located in smaller numbers in Adelaide, Canberra and Melbourne. The availability of alternative cities in which staff can be based has ameliorated some of the impact of a tight labour market with low unemployment and in the midst of a national IT skills shortage. The constraints have inevitably driven up salaries and made it harder to attract suitable candidates. Recruitment agencies report that there are more jobs than there are candidates in the market.

The National E-Health Strategy\(^\text{75}\) prepared by Deloittes and with a summary published in December 2008 identified a shortage of ‘eHealth practitioners’ as a real barrier for progress and recommended this be addressed as part of the strategy.

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The First National Workshop on Quality and Safety in Pathology in 2007 (and confirmed in 2008\textsuperscript{76}) identified with strong consensus 5 top priority issues for quality and safety in pathology. In order of priority they were:

1. Workforce
2. Smart Requesting
3. Positive Identification
4. Testing Outside the Current Quality Framework
5. Smart Reporting

Informaticians, although a small proportion of the total pathology workforce, were specifically identified as a part of the identified critical workforce shortage.

In February 2009, Professor Gwynyth Llewellyn, Dean of the Faculty of Health Sciences at the University of Sydney, wrote to Minister Roxon on behalf of a group of universities, HIMAA and HISA. In part the letter states:

\textit{Numerous reports, studies and submissions over recent years have correctly identified the national benefits of Australia's health information system and the further benefits to be gained from the implementation of a national eHealth infrastructure. However, almost without exception, a critical component of the eHealth strategy has been ignored, namely, the HIM & HI workforce required to implement, operate and maintain a national eHealth system. The health system requires professionals conversant in the classification systems, data management, health languages and terminologies that are the basis of electronic health records, health statistics and casemix based funding systems. Without an adequate supply of qualified HIM & HI professionals, State and Federal Government eHealth initiatives will fail and other health information applications will come under increasing threat.}

Already there is high, and unsatisfied, demand for HIM & HI professionals nationwide and this is forecast to increase with the wider introduction of casemix funding and eHealth initiatives. La Trobe University and Curtin University of Technology continue to offer HIM courses, while The University of Sydney and QUT HIM courses have been terminated in response to falling student demand. Alternative health information related courses have been instituted at The University of Sydney (postgraduate health informatics) and QUT (Graduate Certificate in Health Science - Clinical Coding). Existing arrangements cannot satisfy the current, let alone future, demand for professionally qualified HIM and HI professionals at a national level. The low student demand for HIM courses is anomalous in that the HIM & HI professions are rewarding, well remunerated and relatively secure professions that are in high demand in the healthcare industry.

\textit{In recognition of the problem confronting the healthcare industry, a stakeholders' meeting was convened by The University of Sydney. The meeting was held on the 21st November, 2008 and was initially convened by myself. The following organizations were represented at the meeting:}

- The University of Sydney,
- La Trobe University,
- Queensland University of Technology,
- The National Centre for Classification in Health,
- The Health Information Management Association of Australia, and
- The Health Informatics Society of Australia.

Curtin University of Technology was unable to attend on the occasion of this meeting. Those present at the meeting were unanimous in the view that:

- The shortfall in the HIM & HI workforce represents a critical weakness in the national healthcare system, now and into the future, and
- The relevant universities and professional associations need assistance to actively promote the professions to health care professionals and potential students and thus raise demand for tertiary programmes.

5.2.1 Issues as identified in the consultations

Issue identified during the consultations were:

- **Workshop 1**
  - Salary does not match the competency required
    - In one case it took 13 months to find a staff member
  - There is a problem with poaching of staff by vendors from the health system
  - Senior staff appointed without competency to do jobs and fail
    - Need to know enough to evaluate advice
    - Repeat mistakes of the past because of lack of knowledge of history
    - Not invented here problem
  - There is a lack of respect for the domain of knowledge
  - Little understanding of the business
  - Mismatched staff to roles
    - Making people unhappy

- **Workshop 2**
  - HealthSmart has had a problem with recruitment of staff plus poaching from other roles
    - Loss of people on secondment
    - Leaves gaps
      - Nursing coders
      - But nurse are also in short supply
  - 21 vacancies in Victoria for HIM or coder
    - to 12 months to fill a position
  - Alignment between role and personal characteristic
  - Clinicians moving so potential leakage from clinical disciplines
  - Reduction in competence with less trained/skilled people leading to errors
  - Lack of buy-in because too little knowledge of the business
    - Leads to bad-name
    - Causes barrier to change
  - Lack of understanding by clinicians of leads to over expectation of what can be done
  - Lack of recognition of change management and induction, training as a major component to implementation
    - Evaluation
    - Ongoing it has be owned by the clinician workers
  - Budget stress has impacted on HI staff because it is not understood - people taken out of budget
  - Problem with SMEs not having what is needed in terms of security, privacy etc
  - No plan for health or ehealth
  - Sustainability
  - Small market few players - avoidance by new students
Government reporting dominates IT budget
Preponderance of admin data for budget - none left for clinical work
Over-budget projects - time and money of a PACs system
No understanding of the business by either purchaser or provider
  - Poor contracting
  - Governance of IT projects
You only need to look in the papers for examples of failed projects
  - Children’s hospital Melbourne - tandem computing
  - Trakhealth in Qld and Tasmania
  - Auditor general's report into Healthsmart
Time taken to decide and implement
  - Means that out of date
  - Not fit for purpose
Vendors can't find workers with skills
Public hospitals have information services outsourced at very high cost
Themes are
  - Not enough people
  - Those people that are there are not well enough trained
  - Those making funding decisions do not understand enough to provide the associated support
  - No commitment to maintenance of knowledge
  - There is a record of project failures
    - Although publication bias the other way
    - And Inadequate evaluation
  - Toxic work environment

- Librarians
  - Evidence based practice requirement
    - Skills not there to do the job
  - Funding unavailable for employment
  - Wrong perception as repository of books rather than electronic knowledge management but this is not the current and future work of real librarians
  - Rochester study
    - Proving that you get better outcomes if you provide the evidence for EBM

- NEHTA
  - Many positions vacant
  - Difficult to find key people
  - Small pool to choose from
  - Not because of lack of funding
  - Mismatching to roles
  - Delay in project delivery

- MSIA
  - Cost for competent people has doubled in the last three years
    - Medicare on-line jobs now$150k to $200k
  - Too expensive for SMEs to have the range of appropriate skills to compete in the marketplace
  - Hard to find adequate staff
    - One real-world example 12 month search with fall back to general programmer and in-house training for 18 months
    - Took 4 times the time that it would be to train a health informatician
• AIHW workshop
  o Reviews have shown big losses to hospitals - $500,000 forgone activity at one hospital in 9 months
  o Demonstrated improvements in throughput with good understanding of information in hospitals - shorter waiting lists

• HIMAA
  o HIMs don't want to change or think they need to
  o No recognition of competencies required and so inappropriate grading by HR
    ▪ Have to describe the whole knowledge domain in an ad
  o No career progression
    ▪ True of HIMs and librarians esp
  o Information is power so problems with sharing
  o Understanding of health system required to evaluate overseas offerings
    ▪ Specific Australian requirements
  o Can't attract new students
    ▪ common problem to science but worse here
    ▪ No vocational draw card
  o Health is different
    ▪ Engagement is an imperative
  o Best systems have people that know them part of the business
    ▪ Clinical champions
    ▪ Time quarantined
    ▪ Understanding of the domain
  o Lack of recognition of the consequences of failure
  o Continuing professional education not adequate
  o Compliance and conformance
  o Medical devices safety
  o Lack of control of large systems
  o Poaching of staff
  o Mismatch of training with jobs
  o Cannibalising other health workers
    ▪ Eg Nurses
  o Meat in the sandwich between clinical and business
5.3 What are the drivers?

There is a general problem with health workforce and especially in the more technical areas. The health informatics workforce is faced with these general challenges as well as those more specific that have been identified:

- The Demographic Change - Succinctly put:
  - Healthcare workforce supply is going down\(^{77}\) because
    - workforce entry is going down because
      - there is a reduced birth rate which is below replacement
      - generation Y (now 16-31 years old) are uncommitted to the same construct of career as previous generations and will inherit baby boomer wealth
      - there is a reduction in the understanding and prestige of science
      - there is competition for workers especially from boom sectors outside health
    - workforce exit is going up because
      - the workforce is ageing and large numbers are due for retirement in the near future
      - there is a feminisation of the workforce with more time taken out for a range of reasons (often family-related)
      - there is an increasing reduction in commitment to full-time work (and particularly long hours of work) by both men and women
      - there is competition for workers
  - BUT the workforce is also mal-distributed because
    - professionals want to live in the affluent parts of cities
    - healthcare training has been done in the cities and trainees remain there
    - specialists are well settled and committed by the time they qualify at around 41 years of age
  - healthcare demand is up because
    - people are living longer\(^{78}\) leading to
      - more disease prevalence
      - proportionately more complex diseases like cancers and dementia
      - more co-morbidities
    - more can be done in health care
      - with advances in diagnostic and therapeutic technologies such as better prostheses and surgical interventions
      - an explosion in the understanding of molecular pathology and the potential for personalised medicine
    - consumer expectations have increased
      - healthcare rationing is not considered acceptable – “no expense will be spared on the care of my loved ones”
      - service expectation is higher on the part of “baby boomers”
  - BUT the capacity of government to pay is going to reduce because
    - there are fewer workers to pay tax and drive gross domestic product.

\(^{77}\) It was reported that the workforce 15-64 years will halve in 10 years

\(^{78}\) It was reported that those over 65 will double in 10 years
• Technology And Medical Advances
  o There has been a marked change but there exist islands of unrelated systems of heterogeneous quality
• Quality and Safety
  o Information is on the Australian Council for Safety and Quality in Healthcare list of high priority improvement opportunities.
• Efficiency
  o Pay for performance relies on data which relies on systems and knowledge workers
• Partisan Mutual Adjustment
  o In health there is always competition among the workforce for attention and money – health informaticians are not high in the pecking order
5.4 What if nothing were done about the health informatics workforce?

During the consultations the question was asked ‘What would happen if there was no improvement in shortages in the near future?’.

The following were offered as likely outcomes:

- Performance Reporting
  - Failure to meet September deadline for reporting relating to the new national healthcare agreements
- Other Commonwealth projects held up
- State-wide projects may not be able to be rolled out
- National projects held up
  - NEHTA
- Poor quality implementation of clinical software
- Australia will continue as a net exporter of HI workers
  - Other countries will attract our best
  - e.g. $US34 billion investment in US in health informatics
  - Singapore are getting them now
- Outsourcing required
  - Top dollar paid
- Genomics research limited by lack of bioinformaticians
  - Those that are here are having to be generalists and it is much more inefficient
  - NHMRC have recognised
- Vendors won’t be able to find staff at a fair price to meet contractual requirements leading to
  - More poaching
  - Project failure
  - Business failure
- More errors and poorer quality
  - Lost improvement opportunity - Rochester study
  - Missed information
  - Dead people
- Poor policy
  - Poor use of public funds
  - With the general workforce crisis in health the system may fail
  - Life expectancy falls
  - Increased risk of failure of the health system
- Impact on current employees - toxic environment leading to a vicious cycle
- Incapacity to respond to change for existing products
- Will make Australian health products less competitive internationally
6 WHAT CAN BE DONE?

The ways to address the problems with the workforce shortage is considered under the following framework (the elements of which are not mutually exclusive):

- **Increase the supply of workers by**
  - Improving recruitment
  - Increasing the opportunities for education and training
  - Retaining the workforce longer
  - Attracting re-entry of those who have exited
  - Outsource internationally

- **Redistribute the workforce from areas of lower to higher priority**

- **Improve the productivity of the workforce by**
  - Standardisation
  - The introduction of new technology including software and knowledge tooling
  - Improved work environment
  - Consolidation

- **Reduce the demand by**
  - Design

A number of innovations and activities were identified during the consultation phase. These and other suggestions are described in the sections that follow.

6.1 Increase the supply of workers

6.1.1 Improving recruitment

- Name the jobs so that vocational training and career path is clear
  - Job labelling

- Cadetships
  - Government are used to it
  - Done for engineering

- Make it more attractive
  - Realistic salaries
  - Celebration of success

- Recognition by others in health
  - Seen in the plan

- Career path

- Support professional societies

- Market oriented education

- Expose good projects that demonstrate success

- Apprenticeship approach
  - Australian apprenticeship scheme

- Deferring choice of profession means need to go to post-graduate training
  - Decisions around HSC choices

- Marketing to undergraduates
  - Charles Sturt multiple entry and exit points for health worker

- Attract the disgruntled from other health disciplines
  - e.g. Nurses to become coders

- Aptitude testing appropriate to discipline so there is a better match between person and their job at education entry
• More GenY friendly approach
  o Multiple entry and exit points
• Increase recognition of support for clinicians as a way of addressing the more general health workforce
• Marketing
  o Innovation funding
  o U-tube
    ▪ e.g. WA training program
• Business case from the Alfred available
• OS recruitment
  o Visa problem with entry from OS needs to be on the list of needed jobs

6.1.2 Increasing the opportunities for education and training
• Formal Mentoring
  o ACS
• Make the training free
  o Internships
  o Scholarships
• Professional exchange
• Prestigious affiliations
  o Institution to institution
• TAFE training
  o TAFE entry for Gen Y so that can choose to do a bachelor so that there are some workers at the lower level
• Short courses not requiring multi year commitment
• On-line
• Fix the lingo
• Double majors
  o Conjoint degree
• Consortium multi-university education program
  o Consider multi institution programs as for statisticians
  o As done in public health
  o and statistics
• Good postgrad projects with meaningful outcomes
• Paid training after successful completion
• Separation of vocational training vs higher education sectors
  o Bradley review of higher education
• Broader issues with skills development across health
• There is demand for students but they don't start the courses
• SU guarantee if you get a credit you can choose
  o Graduate recruitment program
  o Emphasis shifting to the undergraduate market
• Summer schools
• Reciprocity for HIMAA

6.1.3 Retaining the workforce longer
• Exchange
• Part-time & flexible
• Make it more prestigious
- Improve profile
- Improve workplace culture
  - reduce bullying
  - Highly politicised environment with too few resources
  - see Garling
- Time flexibility
- Career path
- Mentoring
- Baby boomer issues
- Pay parity
- Aptitude testing
  - Better match of job and personality

6.1.4 Attracting re-entry of those who have exited
- esp Coders and HIMS
- Specific refresher
- Part-time & flexible
- Home based
- Money

6.1.5 Outsource internationally
- India as a source of knowledge workers
  - Done now for programming and data entry
  - Done by the US for clinical coding to ICD 9

6.2 Redistribute The Existing Workforce
- Virtual knowledge working
  - Video, telepresence
  - Virtual teams
- Increase component education
  - Upskill of others who are not principal HI workers
  - Multi-skilling
- Tiger teams
  - Coding
- Fast-track career for IT competent workers

6.3 Improve The Productivity of the Workforce
- Improving work design
- The introduction of new technology
  - Voice recognition
  - Touch screens
  - Better usability of software
  - Natural language processing
- For developers
  - Standardisation
  - Software tooling
  - CUI screen design
  - Object libraries
o Archetypes
  o Computable guidelines

- Further consolidation
  o Data centres
  o Outsourcing
  o Shareable electronic record
  o Cloud computing
  o Centralising medical records
  o BUT communication and team building with people is key
  o Facilitated teamwork

- Standardisation
- Improve funding system to reduce cost shifting
  o A lot of work done to optimise funding arrangements

- Sharing of information and people
  o Facilitated by a formal exchange

- Automated mapping of terminology used in clinical work to classifications
- Tiger teams
- Better tools for information workers e.g. automated coding
- Stream-lining tasks
- Physical environment improvement

### 6.4 Reduce The Demand

- Rationing
  o No fat left
  o No capacity to ration

- Make sure that information is valuable
  o Remove waste in data collection

- Consolidation
- Trade off with time
- Good design reduces system maintenance requirements
- Individual empowerment to do there own
- Reduce revision cycle of ICD10-AM may reduce work-load of coders
- Use clinical studies to answer questions rather than always collect data
- Get the data for management of the system from a different place
- Clinical redesign
- Redesign the process so information doesn't have to go so far
- Coalescence of services
- Coding by doc at sign-off of electronic discharge summary
RECOMMENDATIONS

It is clear that it will take more than a single response to address the issues identified in this paper.

It is recommended that a workforce management plan be developed under the stewardship of the Commonwealth and the most representative of the organisations. This plan would prioritise the issues, tease out the opportunities against each issue, draw on international work that is underway and determine the resources required for its implementation so that a business case for funding can be developed if that is necessary.

Given the lag times involved this cannot be delayed or be a prolonged process. It should not prevent aligned initiatives from proceeding if resources are already available, such as those around education which would clearly be a component of any workforce plan.

Developing and implementing Government policy in this area is seen to be of national significance. HISA would be pleased to help further.
APPENDIX A – CONSULTATIONS UNDERTAKEN

Figure 35 - Mindmap used in consultations

Consultations
Workshop – Sydney 9/06/2009
RACMA
Royal Australian College of Medical Administrators
Tony Sara
NCOPP
National Coalition of Public Pathology
PaLMS
Alan McLeod
HIMAA
Health Information Management Association of Australia
Sallyanne Wissmanne
HGSA
Human Genetics Society of Australia
Veronica Wiley
AIIA
George Margelis
Intel
Engineers Australia
Richard Dixon-Hughes
Standards Australia
Richard Dixon-Hughes
HISA
Michael Legg
Brendan Lovelock

Workshop - Melbourne 11/06/2009
Victorian Health CIOs
Katerina Andronis
Director Information Management, Peter MacCallum Cancer Centre
RACS
Royal Australian College of Surgeons
Mary Jane Bious
CHOICE
Ken Harvey
La Trobe University
Ken Harvey
AHML
Australian Healthcare Messaging Laboratory
Ballarat University
Priscilla Clark
HIMAA
Claire Pierce
NCOPP
John Hamblin
Scott Janson
Women's & Children's Health Care Network
Josephine Raw
Coordinator, Health Information and Patient Services
Southern Health
Claire Pierce
John Hamblin
Precedence Healthcare
Jon Hilton
Melbourne Health
Scott Janson
HISA
Michael Legg
Brendan Lovelock
Joan Edgecumbe

Additional consultations

HIMAA - 28/05/2009
Vicki Bennett - President
Louise Edmonds - Director
Natalie Sims - Director

ACHI - 28/05/2009
Heather Grain - Secretary

Health Libraries Australia - 15/05/2009
Mary Peterson - Secretary of Health Libraries Australia

NEHTA - 16/06/2009
Paul Williams – Head of Solution Development

MSIA - 17/06/2009
Vincent McCauley – President

HISA - Education / AHIEC - 22/06/2009
Anthony Maeder – Professor UWS
Peter Croll – Professor SCU
AIHW Workforce workshop - 18/06/2009
Dr Penny Allbon, Director, Australian Institute of Health & Welfare
Mr Scott Avery, Executive Director, Faculty of Health Sciences, University of Sydney
Ms Vicki Bennett, President, Health Information Association of Australia
Mr Bob Blue, Executive Officer, Health Information Management Association of Australia
Mr George Bodilsen, Head, Hospitals Unit, Australian Institute of Health and Welfare
Ms Michelle Bramley, Health Information Manager, National E-Health Transition Authority
Ms Jill Burgoyne, Health Information Manager, Alice Springs Hospital
Ms Rhonda Carroll, Manager Coding and Casemix Services, Alfred Health
Ms Amelia Chee, Clinical Information Specialist, Data Collections and Quality Unit, Demand and Performance Evaluation Branch, NSW Health Department
Ms Susan Claessen, Area Clinical Coding Manager, Sydney West Area Health Service
Ms Jane Dimond, Area Advisor Health Information Management, & Manager, Patient Information & Medical Record Service, Royal Prince Alfred Hospital
Ms Louise Edmonds, Senior Manager, Information Management Section, ACT Health
Mr Stephen Flanagan, Senior Policy Officer, Education and Training Section, Workforce Development and Leadership Branch, NSW Health
Associate Professor Mary Lou Fleming, Head of School of Public Health, Faculty of Health, Queensland University of Technology
Mr Robin Flynn, Research and Policy Manager, Community Services and Health Industry Skills Council Ltd
Ms Karen Gibson, National E-Health Transition Authority
Ms Kerry Innes, Manager, Australian Centre for Clinical Terminology and Information, University of Wollongong
Mr Andrew Goodall, Healthcare Services Information Branch, Acute Care Division, Australian Department of Health and Ageing
Ms Anita Jacobson, Senior Consultant – Research, Development and Policy, Community Services and Health Industry Skills Council Ltd
Mr Kelvin King, Healthcare Services Information Branch, Acute Care Division, Australian Department of Health and Ageing
Dr Michael Legg, President, Health Informatics Society of Australia
Professor Sandra Leggat, Head of School of Public Health, La Trobe University
Mr Allan McLean, Statistical Coordination NSW, Australian Bureau of Statistics
Professor Richard Madden, Director, National Centre for Classification in Health, University of Sydney
Ms Sandra Martyn, Director, Statistical Standards, Health Statistics Centre, Queensland Health
Louise Matthews, Victorian Representative, Clinical Coders Society of Australia
Mr Stefan Perkovic, Patient Services & Information Manager, Sydney South West Area Health Service
Ms Narelle Portakiewicz, Manager, Medical Records Advisory Unit, SA Health
Ms Julie Roediger, Group Head, Information and Strategy Group, Australian Institute of Health and Welfare
Ms Kerin Robinson, La Trobe University,
Mr Brian Stanley, Lecturer in clinical classification, Curtin University
Professor Robert Steele, Chair, Head of Discipline of Health Informatics, University of Sydney
Mr Gordon Tomes, Head, Metadata Infrastructure Services Unit, Australian Institute of Health and Welfare
Ms Sue Walker, Associate Director, National Centre for Classification in Health, School of Public Health, Queensland University of Technology
Ms Lyn Williams, Team Leader, Education Services, HIMAA
Ms Deborah Yagmich, Principal Coding Trainer, WA Health
APPENDIX B – SURVEY QUESTIONS AND RESULTS
About the Survey

HISA is working with the Australian Department of Health and Ageing to get a better understanding of the health informatics workforce in Australia. While there has been previous work on education in health informatics, this is the first time we are aware of a study has been undertaken to characterise the jobs of those who work in the field. We hope that you will see this as important enough to take the time to answer this short survey and so ensure we have a balanced and comprehensive view. The survey is divided into two segments, the first asks a few questions about you and the second asks you to give estimates of the time you spend doing information related activities in your current job and how important you see these activities to your job. The survey consists of 31 multiple choice questions and should take you less than 15 minutes to complete.

Section 1: Tell us about yourself

In this section we will ask you a series of questions that will allow us to understand the career paths for health informaticians and better aggregate and analyse the information you provide. You will be asked what you first trained in and then have 3 other opportunities to describe training in other domains most relevant to your current role. All identifying information will be removed in the analysis of this data.

Section 1(A): Your Training

1. In what domain was your first training?

<table>
<thead>
<tr>
<th>Domain</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informatics - e.g. mathematics, statistics,</td>
<td>147</td>
<td>12%</td>
</tr>
<tr>
<td>information science, library science, computer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>science...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science and Engineering (non-biology) - e.g.</td>
<td>123</td>
<td>10%</td>
</tr>
<tr>
<td>software, biomedical, electrical, communications,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>process, physics...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management - e.g. organisational change, contract</td>
<td>56</td>
<td>4%</td>
</tr>
<tr>
<td>management, risk, health administration, project</td>
<td></td>
<td></td>
</tr>
<tr>
<td>management...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humanities - e.g. psychology, sociology, law...</td>
<td>58</td>
<td>5%</td>
</tr>
<tr>
<td>Health - Medicine - e.g. GP, specialist</td>
<td>119</td>
<td>9%</td>
</tr>
<tr>
<td>Health - Nursing - e.g. midwifery, theatre,</td>
<td>212</td>
<td>17%</td>
</tr>
<tr>
<td>occupational, psychiatric...</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 2. What was the highest level of education you achieved in this?

<table>
<thead>
<tr>
<th>Level of Education</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certificate or diploma</td>
<td>217</td>
<td>17%</td>
</tr>
<tr>
<td>Bachelors degree</td>
<td>625</td>
<td>49%</td>
</tr>
<tr>
<td>Post-graduate degree including maste rate, specialist fellowships &amp; doctorate</td>
<td>423</td>
<td>33%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1265</td>
<td>100%</td>
</tr>
</tbody>
</table>

### 3. What other domain do you have training in? (1)

<table>
<thead>
<tr>
<th>Domain</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informatics - e.g. mathematics, statistics, information science, library science, computer science...</td>
<td>189</td>
<td>19%</td>
</tr>
<tr>
<td>Science and Engineering (non-biology) - e.g. software, biomedical, electrical, communications, process, physics...</td>
<td>39</td>
<td>4%</td>
</tr>
<tr>
<td>Management - e.g. organisational change, contract management, risk, health administration, project management...</td>
<td>300</td>
<td>30%</td>
</tr>
<tr>
<td>Humanities - e.g. psychology, sociology, law...</td>
<td>35</td>
<td>3%</td>
</tr>
<tr>
<td>Health - Medicine - e.g. GP, specialist</td>
<td>23</td>
<td>2%</td>
</tr>
<tr>
<td>Health - Nursing - e.g. midwifery, theatre, occupational,</td>
<td>29</td>
<td>3%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>
### What was the highest level of education you achieved in this?

<table>
<thead>
<tr>
<th>Education Level</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certificate or diploma</td>
<td>351</td>
<td>37%</td>
</tr>
<tr>
<td>Bachelors degree</td>
<td>201</td>
<td>21%</td>
</tr>
<tr>
<td>Post-graduate degree including masterate, specialist fellowships &amp; doctorate</td>
<td>407</td>
<td>42%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>959</td>
<td>100%</td>
</tr>
</tbody>
</table>

### What other domain do you have training in? (2)

<table>
<thead>
<tr>
<th>Domain</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informatics - e.g. mathematics, statistics, information science, library science, computer science...</td>
<td>61</td>
<td>13%</td>
</tr>
<tr>
<td>Science and Engineering (non-biology) - e.g. software, biomedical, electrical, communications, process, physics...</td>
<td>29</td>
<td>6%</td>
</tr>
<tr>
<td>Management - e.g. organisational change, contract management, risk, health administration, project management...</td>
<td>127</td>
<td>27%</td>
</tr>
<tr>
<td>Humanities - e.g. psychology, sociology, law...</td>
<td>28</td>
<td>6%</td>
</tr>
<tr>
<td>Health - Medicine - e.g. GP, specialist</td>
<td>7</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>211</td>
<td>21%</td>
</tr>
</tbody>
</table>
### Health - Nursing - e.g. midwifery, theatre, occupational, psychiatric...
- Count: 20
- Percentage: 4%

<table>
<thead>
<tr>
<th>Health - Other - e.g. dentistry, science, pharmacy, allied health...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count: 13</td>
</tr>
<tr>
<td>Percentage: 3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Health informatics - Health information management, library science...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count: 54</td>
</tr>
<tr>
<td>Percentage: 12%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other, please specify</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count: 129</td>
</tr>
<tr>
<td>Percentage: 28%</td>
</tr>
</tbody>
</table>

**Total:** 468 100%

### 6. What was the highest level of education you achieved in this?

<table>
<thead>
<tr>
<th>Certificate or diploma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count: 218</td>
</tr>
<tr>
<td>Percentage: 51%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bachelors degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count: 70</td>
</tr>
<tr>
<td>Percentage: 16%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Post-graduate degree including masterate, specialist fellowships &amp; doctorate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count: 137</td>
</tr>
<tr>
<td>Percentage: 32%</td>
</tr>
</tbody>
</table>

**Total:** 425 100%

### 7. What other domain do you have training in? (3)

<table>
<thead>
<tr>
<th>Informatics - e.g. mathematics, statistics, information science, library science, computer science...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count: 17</td>
</tr>
<tr>
<td>Percentage: 12%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Science and Engineering (non-biology) - e.g. software, biomedical, electrical, communications, process, physics...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count: 9</td>
</tr>
<tr>
<td>Percentage: 6%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Management - e.g. organisational change, contract management, risk, health administration, project management...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count: 26</td>
</tr>
<tr>
<td>Percentage: 18%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Humanities - e.g. psychology, sociology, law...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count: 6</td>
</tr>
<tr>
<td>Percentage: 4%</td>
</tr>
</tbody>
</table>
### Health - Medicine - e.g. GP, specialist

| | | |
| --- | --- | |
| | 3 | 2% |

### Health - Nursing - e.g. midwifery, theatre, occupational, psychiatric...

| | | |
| --- | --- | |
| | 6 | 4% |

### Health - Other - e.g. dentistry, science, pharmacy, allied health...

| | | |
| --- | --- | |
| | 6 | 4% |

### Health informatics - Health information management, library science...

| | | |
| --- | --- | |
| | 15 | 11% |

### Other, please specify

| | | |
| --- | --- | |
| | 54 | 38% |

**Total** 142 100%

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**8.** What was the highest level of education you achieved in this?

| Highest Level of Education | | |
| --- | --- | |
| Certificate or diploma | 62 | 50% |
| Bachelors degree | 20 | 16% |
| Post-graduate degree including masterate, specialist fellowships & doctorate | 42 | 34% |

**Total** 124 100%

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**Section 1(B): Your Current Job**

**10.** With which title do you most closely identify from the following list?

| Title | | |
| --- | --- | |
| Medical practitoner | 71 | 6% |
| Nurse | 83 | 7% |
| Pharmacist | 17 | 1% |
| Allied health professional | 61 | 5% |
| Other healthcare provider | 14 | 1% |
| IT, engineering or science professional | 236 | 19% |
| Support worker | 19 | 2% |
| Manager | 221 | 17% |
| Health information manager | 317 | 25% |
| Health informatician | 225 | 18% |
11. Organisation Type Could you now tell us about the type of organisation that you work for. Click on the box which best fits your organisation:

<table>
<thead>
<tr>
<th>Organisation Type</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>I work for a healthcare provider organisation</td>
<td>527</td>
<td>42%</td>
</tr>
<tr>
<td>I work for a healthcare systems vendor</td>
<td>109</td>
<td>9%</td>
</tr>
<tr>
<td>I work for a government department</td>
<td>201</td>
<td>16%</td>
</tr>
<tr>
<td>I work for a healthcare services supplier</td>
<td>59</td>
<td>5%</td>
</tr>
<tr>
<td>I work for a university</td>
<td>160</td>
<td>13%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>213</td>
<td>17%</td>
</tr>
<tr>
<td>Total</td>
<td>1269</td>
<td>100%</td>
</tr>
</tbody>
</table>

12. Organisation Size Click on the box which best describes the number of staff in your organisation:

<table>
<thead>
<tr>
<th>organisational Size</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 10</td>
<td>109</td>
<td>9%</td>
</tr>
<tr>
<td>11 to 50</td>
<td>144</td>
<td>11%</td>
</tr>
<tr>
<td>50 to 200</td>
<td>116</td>
<td>9%</td>
</tr>
<tr>
<td>200 to 1000</td>
<td>186</td>
<td>15%</td>
</tr>
<tr>
<td>Greater than 1000</td>
<td>718</td>
<td>56%</td>
</tr>
<tr>
<td>Total</td>
<td>1273</td>
<td>100%</td>
</tr>
</tbody>
</table>

Section 1(C): Optional Questions The answers to the following questions will significantly improve our ability to analyse the data from the survey. However they are all optional questions that you have the choice to answer or not.

13. Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>569</td>
<td>45%</td>
</tr>
<tr>
<td>Female</td>
<td>696</td>
<td>55%</td>
</tr>
<tr>
<td>Total</td>
<td>1265</td>
<td>100%</td>
</tr>
</tbody>
</table>

14. Age

<table>
<thead>
<tr>
<th>Age</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 20</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>20-30 years</td>
<td>127</td>
<td>10%</td>
</tr>
<tr>
<td>30-40 years</td>
<td>246</td>
<td>19%</td>
</tr>
<tr>
<td>40-50 years</td>
<td>421</td>
<td>33%</td>
</tr>
</tbody>
</table>
### 15. How much longer do you expect to work?

<table>
<thead>
<tr>
<th>Option</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5 years</td>
<td>103</td>
<td>8%</td>
</tr>
<tr>
<td>5-10 years</td>
<td>231</td>
<td>18%</td>
</tr>
<tr>
<td>10-15 years</td>
<td>294</td>
<td>23%</td>
</tr>
<tr>
<td>15-20 years</td>
<td>242</td>
<td>19%</td>
</tr>
<tr>
<td>More than 20 years</td>
<td>392</td>
<td>31%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1262</td>
<td>100%</td>
</tr>
</tbody>
</table>

The final section of the survey looks at the information related activities in your job. Click on the submit button below to complete the final 14 questions in the survey.

### Section 2: Tell us about the information related activities in your job

The following section asks you to review the information related tasks that you do in your current job. We are requesting you to quantify the amount of time you spend on the task, and the relative importance of the task to meeting your work objectives. Because of potential overlap in the definition of tasks and the targeted nature of the tasks analysed, the sum of the tasks within your job is not expected to be 100%, it could be both over or under that amount.

#### 18. Records Capturing information about a consumer and their interactions with the healthcare system and managing that information. This work is often done full-time by those with job titles like health information manager, clerk, clinical data manager, practice manager, privacy officer...

<table>
<thead>
<tr>
<th>Task Description</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Records Capturing information about a consumer and their interactions with the healthcare system and managing that information. This work is often done full-time by those with job titles like health information manager, clerk, clinical data manager, practice manager, privacy officer...</td>
<td>190</td>
<td>16%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time spent doing this in my job</th>
<th>311</th>
<th>25%</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-15 %</td>
<td>136</td>
<td>11%</td>
</tr>
<tr>
<td>15-25 %</td>
<td>94</td>
<td>8%</td>
</tr>
<tr>
<td>25-35 %</td>
<td>49</td>
<td>4%</td>
</tr>
<tr>
<td>35-45 %</td>
<td>48</td>
<td>4%</td>
</tr>
<tr>
<td>45-55 %</td>
<td>35</td>
<td>3%</td>
</tr>
<tr>
<td>55-65 %</td>
<td>40</td>
<td>3%</td>
</tr>
<tr>
<td>65-75 %</td>
<td>55</td>
<td>4%</td>
</tr>
<tr>
<td>75-85 %</td>
<td>48</td>
<td>4%</td>
</tr>
<tr>
<td>85/100%</td>
<td>85</td>
<td>7%</td>
</tr>
<tr>
<td>N/A</td>
<td>327</td>
<td>27%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>% relative importance of this work to my job</th>
<th>190</th>
<th>16%</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-15 %</td>
<td>72</td>
<td>6%</td>
</tr>
<tr>
<td>15-25 %</td>
<td>59</td>
<td>5%</td>
</tr>
<tr>
<td>25-35 %</td>
<td>40</td>
<td>3%</td>
</tr>
<tr>
<td>35-45 %</td>
<td>71</td>
<td>6%</td>
</tr>
<tr>
<td>45-55 %</td>
<td>46</td>
<td>4%</td>
</tr>
<tr>
<td>55-65 %</td>
<td>52</td>
<td>4%</td>
</tr>
<tr>
<td>65-75 %</td>
<td>80</td>
<td>7%</td>
</tr>
<tr>
<td>75-85 %</td>
<td>69</td>
<td>6%</td>
</tr>
<tr>
<td>85/100%</td>
<td>216</td>
<td>18%</td>
</tr>
<tr>
<td>N/A</td>
<td>299</td>
<td>25%</td>
</tr>
</tbody>
</table>

#### 19. Information Analysis for Care   Retrieving and analysing information for direct patient care or population health management. This work is often done full-time by those with job titles like clinical data manager, pharmacist (undertaking medication review), population health officer...

<table>
<thead>
<tr>
<th>Task Description</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Analysis for Care   Retrieving and analysing information for direct patient care or population health management. This work is often done full-time by those with job titles like clinical data manager, pharmacist (undertaking medication review), population health officer...</td>
<td>190</td>
<td>16%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time spent doing this in my job</th>
<th>311</th>
<th>25%</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-15 %</td>
<td>136</td>
<td>11%</td>
</tr>
<tr>
<td>15-25 %</td>
<td>94</td>
<td>8%</td>
</tr>
<tr>
<td>25-35 %</td>
<td>49</td>
<td>4%</td>
</tr>
<tr>
<td>35-45 %</td>
<td>48</td>
<td>4%</td>
</tr>
<tr>
<td>45-55 %</td>
<td>35</td>
<td>3%</td>
</tr>
<tr>
<td>55-65 %</td>
<td>40</td>
<td>3%</td>
</tr>
<tr>
<td>65-75 %</td>
<td>55</td>
<td>4%</td>
</tr>
<tr>
<td>75-85 %</td>
<td>48</td>
<td>4%</td>
</tr>
<tr>
<td>85/100%</td>
<td>85</td>
<td>7%</td>
</tr>
<tr>
<td>N/A</td>
<td>327</td>
<td>27%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>% relative importance of this work to my job</th>
<th>190</th>
<th>16%</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-15 %</td>
<td>72</td>
<td>6%</td>
</tr>
<tr>
<td>15-25 %</td>
<td>59</td>
<td>5%</td>
</tr>
<tr>
<td>25-35 %</td>
<td>40</td>
<td>3%</td>
</tr>
<tr>
<td>35-45 %</td>
<td>71</td>
<td>6%</td>
</tr>
<tr>
<td>45-55 %</td>
<td>46</td>
<td>4%</td>
</tr>
<tr>
<td>55-65 %</td>
<td>52</td>
<td>4%</td>
</tr>
<tr>
<td>65-75 %</td>
<td>80</td>
<td>7%</td>
</tr>
<tr>
<td>75-85 %</td>
<td>69</td>
<td>6%</td>
</tr>
<tr>
<td>85/100%</td>
<td>216</td>
<td>18%</td>
</tr>
<tr>
<td>N/A</td>
<td>299</td>
<td>25%</td>
</tr>
</tbody>
</table>
20. Direct Care Using information science and technology for the direct provision of healthcare for example the reconstruction of images, the delivery of psychiatric therapy or the use electronic games for rehabilitation. This work is often done full-time by those with job titles like radiographer, biomedical engineer, psychologist, anaesthetist, occupational health therapist, dietician, infection control officer...

<table>
<thead>
<tr>
<th>% time spent doing this in my job</th>
<th>305</th>
<th>183</th>
<th>126</th>
<th>65</th>
<th>66</th>
<th>46</th>
<th>34</th>
<th>25</th>
<th>34</th>
<th>34</th>
<th>298</th>
</tr>
</thead>
<tbody>
<tr>
<td>% relative importance of this work to my job</td>
<td>210</td>
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<td>78</td>
<td>81</td>
<td>66</td>
<td>127</td>
<td>280</td>
</tr>
</tbody>
</table>

21. Decision Support Gaining access to knowledge, helping with workflow and automating processes such as provision of clinical alerts and warnings. This work is often done full-time by those with job titles like librarian, knowledge manager, clinical process improver, quality manager...

<table>
<thead>
<tr>
<th>% time spent doing this in my job</th>
<th>445</th>
<th>69</th>
<th>38</th>
<th>22</th>
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<td>22</td>
<td>22</td>
<td>29</td>
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</table>

22. Communications Meaningful exchange of health information between clinicians and clinical systems within a practice or facility and with others outside the facility including consumers and other health services. This work is often done full-time by those with job titles like interpreter, clinical liaison officer...

<table>
<thead>
<tr>
<th>% time spent doing this in my job</th>
<th>254</th>
<th>209</th>
<th>149</th>
<th>71</th>
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<td>65</td>
<td>80</td>
<td>85</td>
<td>111</td>
<td>251</td>
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</tbody>
</table>
### 23. Education and Training

Direct vocational training for purposes such as changing work practices This work is often done full-time by those with job titles like trainer, in-service educator, health behaviour change marketer...

<table>
<thead>
<tr>
<th>% time spent doing this in my job</th>
<th>270</th>
<th>193</th>
<th>113</th>
<th>64</th>
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</tbody>
</table>

### 24. Systems Development and Management

The development, implementation and management of information and organisational systems This work is often done full-time by those with job titles like health informatician, systems analyst, information architect, programmer, web master, business process engineer, project manager, change manager, health information manager...

<table>
<thead>
<tr>
<th>% time spent doing this in my job</th>
<th>211</th>
<th>168</th>
<th>141</th>
<th>115</th>
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<td>17%</td>
<td>12%</td>
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</table>

### 25. Infostructure Development

Policy development, terminology, structured information, architecture and standards development This work is often done full-time by those with job titles like health informatician, standards developer, terminologist, lawyer, systems analyst, policy officer...

<table>
<thead>
<tr>
<th>% time spent doing this in my job</th>
<th>270</th>
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<th>113</th>
<th>64</th>
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</tr>
</tbody>
</table>
### 26. Information Analysis for Process Improvement

Retrieving and analysing information to improve processes at every level; from care of the individual consumer through to public health and health policy. This work is often done full-time by those with job titles like clinical coder, casemix manager, information auditor, clinical auditor, quality manager, epidemiologist, public health officer, research officer, data manager, practice manager...

<table>
<thead>
<tr>
<th>% time spent doing this in my job</th>
<th>&lt;5%</th>
<th>5-15</th>
<th>15-25</th>
<th>25-35</th>
<th>35-45</th>
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<th>25-35</th>
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<td>8%</td>
<td>5%</td>
<td>6%</td>
<td>5%</td>
<td>5%</td>
<td>10%</td>
<td>19%</td>
</tr>
</tbody>
</table>

### 27. Education and Training Systems Development

eLearning from knowledge presentation and assessment, through to simulation training for both consumers and workers. This work is often done full-time by those with job titles like educator, on-line content developer, health promotions officer, change manager, HR officer, librarian...

<table>
<thead>
<tr>
<th>% time spent doing this in my job</th>
<th>&lt;5%</th>
<th>5-15</th>
<th>15-25</th>
<th>25-35</th>
<th>35-45</th>
<th>45-55</th>
<th>55-65</th>
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<td>58</td>
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<td>40</td>
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<table>
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<th>5-15</th>
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<th>25-35</th>
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<td>5%</td>
<td>7%</td>
<td>8%</td>
<td>12%</td>
<td>19%</td>
</tr>
</tbody>
</table>

### 28. Research

Including biomedical, informatics and management research. This work is often done full-time by those with job titles like research officer, clinical investigator, quality manager, epidemiologist, information strategist, librarian, clinical trials data manager...

<table>
<thead>
<tr>
<th>% time spent doing this in my job</th>
<th>&lt;5%</th>
<th>5-15</th>
<th>15-25</th>
<th>25-35</th>
<th>35-45</th>
<th>45-55</th>
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<th>75-85</th>
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<td>2%</td>
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<table>
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<th>5-15</th>
<th>15-25</th>
<th>25-35</th>
<th>35-45</th>
<th>45-55</th>
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<th>85/100%</th>
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<td>4%</td>
<td>3%</td>
<td>4%</td>
<td>6%</td>
<td>31%</td>
</tr>
</tbody>
</table>
Administration Administration of the business of healthcare including logistics, human resources, planning and finance. This work is often done full-time by those with job titles like billing manager, HR officer, KPI reporter, practice manager, procurement manager, records manager, clinical director, complaints officer, business manager...

% time spent doing this in my job

<table>
<thead>
<tr>
<th>% time</th>
<th>375</th>
<th>170</th>
<th>103</th>
<th>49</th>
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<th>25</th>
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<th>289</th>
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</thead>
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<tr>
<td>%</td>
<td>31%</td>
<td>14%</td>
<td>9%</td>
<td>4%</td>
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% relative importance of this work to my job

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<td>6%</td>
<td>5%</td>
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<td>5%</td>
<td>6%</td>
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<td>23%</td>
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29. Do you consider yourself a health informatician.

<table>
<thead>
<tr>
<th>Option</th>
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<th>Count</th>
<th>% of Total</th>
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<tr>
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<td>41%</td>
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</tbody>
</table>

Total 1233 (100%) 258 Responses
APPENDIX C – COMPETENCIES

HIMAA Competencies

- Communication skills Report writing skills
  - Letter/memo writing skills
  - Public speaking
  - Education skills (e.g., oral presentation skills and teaching)
  - Talking and listening to individuals and groups
  - Public relations
- Personal and interpersonal skills Leadership ability
  - Motivation of staff
  - Motivation of self
  - Working in teams
  - Working with health professionals
  - Working with management
  - Managing change
  - Problem solving
  - Time management
  - Professional ethics
  - Dealing with conflict and stress
  - Negotiation skills
- Industrial relations/human resource management knowledge and skills
  - Industrial relations concepts, implications and laws
  - Awards (structure and provisions)
  - Conflict resolution methods
  - Enterprise bargaining
  - Personnel administration (e.g., recruitment, staff appraisal)
- Financial management knowledge and skills
  - Accounting principles and methods in health
  - Preparation and analysis of budgets
  - Analysis of financial information
- Medical record service planning
  - Planning principles and processes
  - Workforce planning (staffing needs)
  - Operational planning (day-to-day)
  - Strategic planning (long-term)
  - Environmental design (medical record department design)
  - Consumer participation in planning
- Computing skills
  - Use of software packages (e.g., spreadsheets)
  - Patient administration systems
  - (PMI/ATS/DI)*
  - Programming
  - Database design
  - Systems analysis
  - Computer application in health services (including optical disc imaging)
- Analytical methods and research skills
  - Understanding and interpreting statistical data

79 Provided by HIMAA
Research methods
- Understanding and interpreting epidemiological information

- Clinical classification/coding skills ICD-9-CM** skills
  - Computerised coding (encoders)
  - Grouping (Australian National Diagnosis Related Group)

- Quality assurance (QA) knowledge and skills
  - Principles and methods of QA and outcome measures
  - Accreditation
  - Critical pathways
  - Total quality management
  - Utilisation review

- Health information systems knowledge and skills
  - Structure of health record, patient control systems
  - Retention and storage
  - Special purpose records (e.g., general practice, dental records)
  - Forms design
  - Medical terminology knowledge
  - Medical terms abbreviations and laboratory tests
  - Medical science knowledge
  - Knowledge of disease processes and surgical and medical treatments
  - Casemix measurement systems Diagnosis Related Groups (specifically Australian National Diagnosis Related Groups)
  - Casemix funding models
  - Casemix costing
  - Casemix education of others
  - Producing casemix reports
  - Casemix classification systems in acute, non-acute and ambulatory
  - Medico-legal knowledge Australian legal system
  - Health legislation (Commonwealth and State)
  - State health department policies and procedures
  - Subpoena of records and rules of evidence
AMIA/AHIMA Competencies

- Health information literacy and skills
  - Differentiate data versus information.
  - Describe the principles of structure, design, and use of health information (such as individual, comparative reports, and trended data).
  - Use health record data collection tools (such as input screens, document templates).
  - Apply standard data definitions, vocabularies, terminologies, screens, document templates). OASIS, HEDIS, UHDDS) as used in the organization’s health information systems.
  - Differentiate between the types and content of patient health records (such as paper-based, electronic health records, and personal health records).
  - Adhere to health record documentation requirements of external agencies and organizations (such as those specified by the Joint Commission, regulatory bodies, professional review organizations, licensure, reimbursement, discipline-specific “good practice”).
  - Adhere to internal organizational health record documentation requirements, policies, and procedures.
  - Ensure that documentation in the health record reflects timeliness, completeness, accuracy, appropriateness, quality, integrity, and authenticity as required.
  - Adhere to information systems policies and procedures as required by national health information initiatives from national, state, local, and organizational levels.
  - Write or update policies and procedures related to health data and information in daily work.
  - Identify incorrect data and take corrective action.
  - Identify methods and types of data collected in health care.
  - Maintain professional standards in all documentation.

- Health informatics skills using the EHR
  - Create and update documents within the electronic health record (EHR) and the personal health record (PHR).
  - Locate and retrieve information in the electronic health record for various purposes.
  - Perform data entry of narrative information.
  - Locate and retrieve information from a variety of electronic sources.
  - Differentiate between primary and secondary health data sources and databases.
  - Know the architecture and data standards of health information systems.
  - Identify classification and systematic health-related terminologies for coding and information retrieval.
  - Know the policies and procedures related to populating and using the health data content within primary and secondary health data sources and databases.
  - Apply appropriate documentation management principles to ensure data quality and integrity.
  - Use software applications to generate reports.

- Know and apply appropriate methods to ensure the authenticity of health data entries in electronic information systems.
- Use electronic tools and applications for scheduling patients.

- Privacy and confidentiality of health information
  - Explain legal responsibility, limitations, and implications of actions.
  - Apply the fundamentals of privacy and confidentiality policies and procedures.
  - Follow legal aspects and regulations of documentation in requests for information.
  - Identify legal and regulatory requirements related to the use of personal health information.
  - Identify and apply policies and procedures for access and disclosure of personal health information.
  - Identify policies and procedures regarding release of any patient-specific data to authorized users.
  - Identify what constitutes authorized use of personal health data.
  - Participate in privacy and confidentiality training programs.
  - Follow security and privacy policies and procedures to the use of networks, including intranet and Internet.
  - Follow confidentiality and security measures to protect electronic health information.
  - Maintain data integrity and validity within an accordance with organizational policies.
  - Describe any possible breaches of confidentiality in information system. 
  - Describe the possible consequences of inappropriate use of health data in terms of disciplinary action.
  - Document profession-specific information in an electronic health record.
  - Know appropriate methods to correct inaccurate information/errors personally entered in an electronic health record.
  - Authenticate information entered in an electronic health record.
  - Access reference material available through an electronic health record.
  - Identify the source of information entered in an electronic health record.
  - Identify, evaluate, select, and appropriately use computer systems for patient information documentation.
  - Teach others health record concepts, laws, documentation requirements and organizational policies and procedures as it applies to your work.

- Health information/data technical security
  - Implement administrative, physical, and technical safeguards.
  - Develop security policies and procedures.
  - Resolve minor technology problems associated with using an electronic health record.
  - Follow access protocols for entry to an electronic health record.
  - Enforce access and security measures to protect electronic health information.
  - Recommend elements that must be included in the design of audit trials and data quality monitoring programs.
  - Implement policies, procedures, and training for health data security.
  - Apply departmental and organizational data and information system security policies.

- Basic computer literacy skills.
  - Apply basic computer concepts and terminology in order to use computers and peripheral devices, computer communications systems, general purpose and
organization-specific system applications, and patient care/health-related software applications.

- Demonstrate use of the essential aspects of file organization, information storage (such as disk or flash drive), protection from data loss, and basic computer skills.
- Use basic word processing, spreadsheet, database, and desktop presentation applications as applicable to your work.
- Identify, evaluate, and use Web-based literature resources, CD-ROMs, and Internet resources.
- Conduct basic file organization and management for routine storage and protection from data loss.
- Use statistical analysis packages.
- Use portable computing devices to facilitate data input and management.
- Demonstrate basic computer operating procedures such as login the computer and logoff, opening, closure and saving files.
- Demonstrate proficiency in the Windows operating environment.
- Resolve minor technical problems associated with use of computers.
- Demonstrate Internet/intranet communication skills.
- Access and use a Web browsing application.
- Demonstrate use of email, addressing, forwarding, attachments, and netiquette.
- Identify and use icons, windows, and menus.
- Create and name or rename subdirectories and folders.
- Open and work with more than one application at a time.
- Demonstrate how to save work to a computer file, and printing and copy a file.
- Create and edit a formatted document using tables and graphs.
APPENDIX D – UNIVERSITY COURSE INVENTORY

Universities providing related courses in 2009 (from the web as at August 2009).

<table>
<thead>
<tr>
<th>Course / Unit</th>
<th>Section Responsible</th>
<th>URL</th>
<th>Contact Name</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Australian National University [ANU]</strong></td>
<td>National Centre for Epidemiology and Population Health (NCEPH) conducts research, teaching and research training, with a focus on relevance, excellence, the use of innovative methods and a positive health impact</td>
<td><a href="http://nceph.anu.edu.au">http://nceph.anu.edu.au</a></td>
<td>Prof Niels Becker, Director&lt;br&gt;Prof Gabriele Bammer</td>
</tr>
<tr>
<td><strong>Bond University [Bond]</strong></td>
<td>The Centre has current areas of research focus in - the applications of sensor devices, automated patient flow processes and decision support systems to enhance chronic healthcare; workflow and secure document management in healthcare real-time data warehousing; social networking as facilitation for enhanced wellbeing and chronic care support.</td>
<td><a href="http://www.bond.edu.au/research/health%20informatics%20centre.html">http://www.bond.edu.au/research/health%20informatics%20centre.html</a></td>
<td>Prof Chris Del Mar&lt;br&gt;Professor Mieke van Driel</td>
</tr>
<tr>
<td><strong>Central Queensland University [CQU]</strong></td>
<td>Closed</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Charles Darwin University [CDU]</strong></td>
<td>HLT200 Introduction to <em>Health Informatics</em> (8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CDU - Menzies School of Health Research</strong></td>
<td>Centre for <em>Health Informatics</em> (CHI) - School of Medicine in the Faculty of Health Sciences and Medicine - allows a focus on improving community-based care and education programmes through application of the innovative use of emerging technologies, supported by evaluated trials.</td>
<td><a href="http://www.menzies.edu.au/">http://www.menzies.edu.au/</a></td>
<td>Prof Jonathan Carapetis, Director, Menzies School of Health Research&lt;br&gt;Assoc Prof John Condon</td>
</tr>
<tr>
<td><strong>Charles Sturt University [CSU]</strong></td>
<td></td>
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</tr>
<tr>
<td>Bachelor of Science - Health Sciences - BSc 155599.</td>
<td>designed to broaden employment opportunities by enabling you to specialise in health information management or complete a combination of public health and business subjects in the health sciences major.</td>
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<tr>
<td><strong>Graduate Certificate in Public Health 303908.</strong></td>
<td>In this course you will complete one of eight specialist majors. All majors, except nutrition, include an introduction to the scientific method, experimental, quasi-experimental, descriptive and epidemiological research. You will learn various methods of examining raw data while you develop skills in the use of statistical software.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Health Informatics Major (Graduate Certificate).</strong> This major is designed to provide specialist training in the area of health informatics for graduate students.</td>
<td>Health Research Methods; Health Care Systems OR Health Services Management; Introduction to <strong>Health Informatics</strong>, Advanced <strong>Health Informatics</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Katherine Bathgate, Lecturer, School of Public Health

http://futures.students.curtin.edu.au/course_overview/UG/health-sciences
### Deakin University [Deakin]

| Bachelor of Management with a major sequence in **Health Informatics** OR Bachelor of Commerce with a major sequence in **Health Informatics** | HBS107 - Understanding Health; HBS108 - Health Information and Data; MSC220 - Small Business Systems; MSC304 **Health Informatics**; MSC347 - Information Systems Management; MSC350 - Information Security and Risk Management | Faculty of Business and Law's School of Information Systems | http://www.deakin.edu.au/future-students/courses/course.php?course=M302&stutype=local&continue=Continue | OR | http://www.deakin.edu.au/future-students/courses/course.php?course=M300&stutype=local&continue=Continue#CRS-STRUCTURE-UNITS | Caroline Chan, Assoc HoS, School of Information Systems |

### Edith Cowan University [ECU]

<p>| Bachelor of Business Information Systems | HBS107 - Understanding Health; HBS108 - Health Information and Data; MSC220 - Small Business Systems; MSC304 <strong>Health Informatics</strong>; MSC347 - Information Systems Management; MSC350 - Information Security and Risk Management | Faculty of Business and Law's School of Information Systems | <a href="http://www.deakin.edu.au/future-students/courses/course.php?course=M305&amp;stutype=local&amp;continue=Continue#OVERVIEW">http://www.deakin.edu.au/future-students/courses/course.php?course=M305&amp;stutype=local&amp;continue=Continue#OVERVIEW</a> | Matthew Warren, Head of School, School of Information Systems |</p>
<table>
<thead>
<tr>
<th>University</th>
<th>Program Details</th>
<th>Research Interests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flinders University</td>
<td>Bachelor of Health Sciences prepares students for a variety of roles within the health care context, particularly in areas of advanced life support, ambulance, disability, health administration/management, health education/promotion, and nutrition and health informatics. The Bachelor of Health Science is a generic award that offers a flexible program of study where students major in a variety of areas within the health profession.</td>
<td>Population health, Health informatics <a href="http://www.phcris.org.au/oar/profiles.php?elibid=1208">http://www.phcris.org.au/oar/profiles.php?elibid=1208</a></td>
</tr>
<tr>
<td>Griffith University</td>
<td>7314PBH: Health Informatics, Introduction to Health Informatics, Introduction to the building blocks of Health Informatics; Health information systems; Management issues in Health Informatics; Human issues; Future issues and directions.</td>
<td>Griffith Institute for Health and Medical Research - Population Health <a href="http://www.griffith.edu.au/health/griffith-institute-health-medical-research">http://www.griffith.edu.au/health/griffith-institute-health-medical-research</a></td>
</tr>
</tbody>
</table>
### La Trobe University [LA TROBE]

**Bachelor of Health Information Management**

<table>
<thead>
<tr>
<th>Health Informatics: A</th>
<th>Faculty of Health Sciences, School of Public Health</th>
<th><a href="http://www.latrobe.edu.au/publihealth/HIM/health_informatics.htm">http://www.latrobe.edu.au/publihealth/HIM/health_informatics.htm</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>(HIM11HIA), B (HIM21HIC), D (HIM22HID), E (HIM32HIE), F (HIM41HIF)</td>
<td>Foundations of management, management information systems, systems analysis and design, object-oriented programming, human biosciences, medical terminology, databases and database management, web application development, health information management, <strong>health informatics</strong>.</td>
<td>Ms Kerin Robinson, Head, Health Information Management Program</td>
</tr>
</tbody>
</table>

**Bachelor of Information Systems/Master of Health Information Management.** This integrated program is designed to produce graduates with specialist skills in **health informatics** and health information management.

**Bachelor of Health Sciences and Master of Health Information Management.** This comprehensive, specialist degree is one of only three of its kind offered in Australia. It deals with the business side of medicine, combining health, health information management and health informatics—technology disciplines.

**Health Policy and Management - Research Project**

|-------------------------------------------------|-------------------------|-----------------------------------------------------------------|

**Bioinformatics**

### Macquarie University [MACQUARIE]

**Bioinformatics**
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<tr>
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</thead>
<tbody>
<tr>
<td>Contemporary Issues in Health Informatics - Post Graduate Short Courses delivered by Off Campus Distributed Learning</td>
<td>CRH1001 Research methods in health; CRH1032 Applied research for health practitioners; <em>Health Informatics</em> stream: CPE7601 Healthcare information systems; CPE7602 Developing health information systems; CPE7603 Contemporary issues in <em>health informatics</em>: CPE7604 Health information systems management; CPE7605 Electronic health record; CPE7606 Project management for health professionals; MPH2066 Clinical leadership and management; MPH2067 Principles of health care quality improvement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3897 - Master of Health Sciences</td>
<td>Faculty of Medicine, Nursing and Health Sciences</td>
<td><a href="http://www.monash.edu/">http://www.monash.edu/</a> pubs/handbooks/courses/3897.html</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Murdoch University [MURDOCH]</th>
<th>e-Health Research Unit (incorporating Health Informatics Education)</th>
<th>Faculty of Medicine, Nursing and Health Sciences</th>
<th>Janette Gogler, Health Informatics Education</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>
### Open University


### Queensland University of Technology [QUT]

**e-Health Research:**
Our research group investigates the tools and techniques that help managers of health information systems make more informed decisions. This results in higher quality IT solutions for the e-health sector. Professor Peter Croll leads this group specialising in the areas of risk and trust with e-health applications.


- Executive Director: Prof Ross Young
- Institute Manager: Elizabeth Kerr
- Ms Sue Walker: Associate Director

*Human Health and Wellbeing*

*Institute of Health and Biomedical Innovation (ihbi)*
### RMIT University [RMIT]

**Introduction to Biocomputing and Medical Informatics.** Is an emerging discipline that coalesces the health science knowledge including biology, medicine, pharmacy, and nursing with computer science, mathematics, statistics, engineering, information technologies and management.


**Course Coordinator:** Dr John Fang

**Master of Applied Science (Medical Science) - online distance education program, accredited by the Institute of Biomedical Science in the United Kingdom**

Develop skills in using and applying information technology for learning as well as in the rapidly evolving fields of telepathology and e-health

School of Medical Sciences


**Research interests:** Health informatics, particularly interface usability of clinical information systems and utilization of handheld computing devices in the clinical area.

Mr Ian McGrath

### Southern Cross University [SCU]

**Aged Service Learning and Research Centre**


**Prof Colleen Cartwright**

**Prof. Peter R. Croll**

Professor of Information Technology & Information Systems

### Swinburne University of Technology [SWINBURNE]

**School of Population Health and Clinical Practice**


### University of Adelaide [ADELAIDE]

**The Discipline of General Practice** is part of the School of Population Health and Clinical Practice

**Current Discipline of General Practice Research Programs - Health Informatics:**

- MOCHA - GP Cardiovascular Risk Assessment Software Tool;
- Medic-GP: Current Investigations;
- General Practice (GP) Vocabulary Project;
- Introduction to Drug Dose-Forms in the Polybrowser and Authoring Tool (PAT);
- AMDT Demo 4

**School of Population Health and Clinical Practice**

The Health Informatics Unit has collaborators in the fields of: General Medicine, Pharmacy, Emergency Medicine, Intensive Care, Respiratory Medicine, Cardiology, Surgery, Histopathology, Paediatrics, Anaesthesia, Rheumatology, Bioinformatics.

Faculty of Health Sciences

http://wwwinformatics.adelaide.edu.au/Courses.html

Unit Director: Dr Malcolm Pradhan

Health Informatics Research Project:

Health Systems Analysis

Assessing the information needs of doctors; Use of simulation modelling to overcome operational and structural inefficiencies; Use of Simulation Modelling to Overcome Operational and Structural Inefficiencies.

Other Health Informatics Research Projects:

Pre-operative Screening Decision Support; Community Acquired Pneumonia Decision Support; Cooling Tower Risk Management for Legionnaire’s Disease; Virtual Sentinel Node for the detection of Breast Cancer Spread; Falls Risk Assessment; Central Venous Line Cost Benefit Modelling.


Graduate Diploma in Nursing Science (Mental Health Nursing); Graduate Diploma in Nursing Science (Community Health and Primary Care); Graduate Diploma in Nursing Science (Emergency Nursing); Graduate Diploma in Nursing Science (Intensive Care Nursing); Graduate Diploma in Nursing Science (Acute Care Nursing)

Developing Advanced Practice in Health Systems I - This course examines contemporary issues related to advanced nursing practice and considers the supports and constraints within which nurses practice. Topics include ethics of care, leadership, advocacy, evidence based practice, health service management, professional standards, health informatics and multicultural health care.

### Bachelor of Nursing

Graduates will be particularly distinguished by the following attributes: 10. Being well equipped to practice as a registered nurse in a technological environment. This means being flexible, receptive and knowledgeable regarding technology, being literate in **health informatics** and general information technology and being able to best use this to provide quality nursing care.

### University of Ballarat [BALLARAT]

**Health Informatics Laboratory (HIL)**  
HIL encompasses the Collaborative Centre for **eHealth** (CCeH) and the Australian Health Messaging Laboratory (AHML).

**CIAO**  
The Centre for Informatics and Applied Optimization (CIAO) is a unique research centre, established in 2001 and located within the Graduate School of Information Technology & Mathematical Sciences.

CIAO is internationally recognized for pure and applied research in optimization, data mining, internet commerce security, virtual reality and simulation, and **health informatics**.

---

Prof Alison Kitson, Head of Nursing Discipline  

Discipline of Nursing  

Group Leader:  
Dr Andrew Stranieri  

HIL Staff:  
Dr Ahmed Bani-Mustafa  
Ms Priscilla Clark  
Dr Jeffrey Cohen  
Dr Richard Dazeley  
Mr Evan Dekker  
Dr Bing Du  
Dr Zari Dzalilov  
Ms Jane Gilbert  
Dr Long Jia  
Prof Sid Morris  
Dr Chris Turville  

CIAO Director:  
Prof. John Yearwood  

CIAO has five Research Groups and Laboratories:  
- Mathematical Analysis & Optimization;  
- Data Mining & Informatics;  
- Virtual Reality & Simulation;  
- Internet Commerce Security;  
- **Health Informatics**.
<table>
<thead>
<tr>
<th>Institution</th>
<th>Course/Program</th>
<th>Website</th>
<th>Faculty Members</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>University of Canberra [CANBERRA]</strong></td>
<td>CB 620 Introduction to Health Informatics</td>
<td><a href="http://www.ballarat.edu.au/fees/2008/outlines/CP_620_Outline.pdf#search=%22health%20informatics%22">http://www.ballarat.edu.au/fees/2008/outlines/CP_620_Outline.pdf#search=%22health%20informatics%22</a></td>
<td>Prof Peter Harris, Faculty of Medicine, Dentistry and Health Sciences (Chair)</td>
</tr>
<tr>
<td></td>
<td>Bachelor of Biomedical Science</td>
<td></td>
<td>Liz Sonenberg, Faculty of Science (Co-chair)</td>
</tr>
<tr>
<td><strong>University of Melbourne [MELBOURNE]</strong></td>
<td>The University of Melbourne’s Health Informatics Network</td>
<td><a href="http://www.healthinformatics.unimelb.edu.au/">http://www.healthinformatics.unimelb.edu.au/</a></td>
<td>Dr Kathleen Gray, Victorian Biomedical Multimedia Unit A/Prof Graeme Hart, Austin Centre for Applied Clinical Informatics Dr Marienne Hibbert BioGrid Australia (formerly Bio21:MMIM) Ms Reeva Lederman, Department of Information Systems Prof Graeme Shanks, Dept of Information Systems Prof Loan Skene, Faculty of Law</td>
</tr>
</tbody>
</table>
Research Interests:
- Record Linkage,
- Consent, Ethics,
- Health Informatics


<table>
<thead>
<tr>
<th>University of New England [UNE]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bachelor of Health Science</strong> no longer offered. Currently enrolled students must complete this course by 31st December 2012</td>
</tr>
</tbody>
</table>
The CHI designed a two-year evaluation program of the Clinical Information Access Program (CIAP). The aim of the CIAP evaluation was to improve understanding of clinicians’ information needs and assess the extent to which the CIAP supports clinical decision-making processes and improves patient care. A paper on the findings from the NSW-wide survey of allied health professionals’ use of CIAP won the best paper award at the 11th National Health Informatics Conference.

Centre for Health Informatics (CHI) is Australia's largest academic research group in the emerging discipline of information and systems in healthcare and is internationally recognized for its groundbreaking contributions to the field. It conducts fundamental and applied research to map the complex nature of today’s health systems, and designs scientifically rigorous and system-wide interventions that will sustain tomorrow's health system.
Asia-Pacific Ubiquitous Healthcare Research Centre (APuHC) - The main objectives of APuHC are to conduct collaborative research in ubiquitous healthcare (u-Health) areas.
<table>
<thead>
<tr>
<th>University of Newcastle [NEWCASTLE]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dampney Centre for IT Applications - Project: Health Informatics</strong></td>
</tr>
<tr>
<td><strong>Bachelor of Computer Science</strong></td>
</tr>
<tr>
<td><strong>Internet Communications; Computer Engineering; Introduction to Engineering Practice; Introduction to Telecommunications; Information Systems Programming; Fundamentals of Statistics; Contemporary Issues in Information Technology; Data Security; User Interface Design.</strong></td>
</tr>
<tr>
<td><strong>Janet Aisbett, Conjoint Professor in Information Technology</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>University of Notre Dame Australia - The [UNDA]</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/Prof Ljiljana Brankovic</td>
</tr>
<tr>
<td>Peter Summons</td>
</tr>
<tr>
<td>Martin Sutton</td>
</tr>
<tr>
<td>Brian Regan</td>
</tr>
<tr>
<td><strong><a href="http://www.newcastle.edu.au/program/10177.html">http://www.newcastle.edu.au/program/10177.html</a></strong></td>
</tr>
<tr>
<td>University of Queensland</td>
</tr>
<tr>
<td>--------------------------</td>
</tr>
<tr>
<td>Master of e-Healthcare (MeH)</td>
</tr>
<tr>
<td>Univ Qld Centre for Online Health - research in the areas of telehealth and homecare teaching about online health the delivery of online health services.</td>
</tr>
</tbody>
</table>
Dr Anthony Smith, Deputy Director, UQ Centre for Online Health, Senior Research Fellow (Telepaediatric s)
Mr Mark Bensink, Senior Research Assistant (Telepaediatric s)
Mr Nigel Armfield, Senior Research Assistant (Telepaediatric s)
Ms Megan White, Coordinator - Telepaediatric Service
Ms Galen Elliott, Project Officer (Telepaediatric s, Indigenous Online Health Screening Project)
Mr Wing Kit (Kenneth) Fung, Systems Programmer
Mr Wei-I (Will) Wu, IT Officer, Programmer
Dr Sophie Cockcroft
Ms Danielle Penn
Dr Sisira Edirippulige
### University of South Australia [UniSA]

**Bachelor of Software Engineering**
- From course flyer: Computer science, systems development, database and knowledge management, **health informatics**, networking and security, computer systems engineering, multimedia, mathematics.

**Professional Topics in Health Informatics** (this course has not been timetabled for 2009, and 2010 information will not be available until August 2009)
- This course discusses topical issues in any area of medical and **health informatics**

**Division of Information Technology, Engineering and the Environment | School of Computer and Information Science**
- Dr Jan Stanek
- Dr Svetla Gadzhanova MSc
- Dr Jean-Pierre Calabretto

### University of Southern Queensland [USQ]

**APAI in Health Informatics**
- USQ has won two ARC linkage grants with Queensland Health as a primary industry partner to develop a refined digital stethoscope that can work with Queensland Statewide Telehealth Systems

**School of Computer and Information Science**
- A/Prof Jeffrey Soar
- A/Prof Trudy Yuginovich
- A/Prof Raj Gururajan
<table>
<thead>
<tr>
<th>University of Sydney [SYDNEY]</th>
<th>Bachelor of Health Sciences/Master of Health Informatics</th>
<th>Faculty of Health Sciences, Discipline of Health Informatics</th>
<th>Faculty of Health Sciences</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSBH1006 Foundations of Health Science; HSBH1007 Health Science and Research; HSBH1008 Health Determinants and Interventions; HSBH1009 Health Care Resources and Systems; HIMT1051 Introduction to Management Principles; HIMT5085 Information Systems in Health Care; HIMT5086 Health Informatics Principles; BACH5341 Research &amp; Inquiry in Health Professions; COMP5138 Relational Database Management Systems; HSBH3004 Health, Ethics and the Law; HIMT5059 Health Classification Systems; HIMT5087 Professional Practice-Health Informatics; HIMT5058 Health Informatics Applications; HIMT5088 Health Informatics Evaluation; HIMT5060 Integration of Health Informatics.</td>
<td><a href="http://www.usyd.edu.au/handbooks/health_sci/23_himtpg.shtml">http://www.usyd.edu.au/handbooks/health_sci/23_himtpg.shtml</a></td>
<td><a href="http://www.fhs.usyd.edu.au/hireu/">http://www.fhs.usyd.edu.au/hireu/</a></td>
<td></td>
</tr>
<tr>
<td><strong>Health Informatics</strong> Research and Evaluation Unit conducts innovative research aimed at understanding and improving the way in which health care delivery and patient outcomes are enhanced through the effective use and exchange of information.</td>
<td>Prof Robert Steele</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Prof Johanna Westbrook, Director, HIREU  
Dr Joanne Callen, Snr Research Fellow, HIREU  
Dr Nerida Creswick - Postdoctoral Fellow, HIREU  
Ms Anne Marks, Lecturer
### University of Tasmania [TASMANIA]

<table>
<thead>
<tr>
<th>Program</th>
<th>Courses</th>
<th>Department of Rural Health</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>H5E Graduate Certificate in E-Health (Health Informatics)</td>
<td>CRH500 An introduction to Health Informatics; CRH501 Data, information and knowledge; CRH503 Legal and ethical issues of emerging health technologies; CRH505 Electronic health records: trends and issues; CRH506 Understanding Health Informatics Research; CRH507 Health Informatics Research Methods</td>
<td>Department of Rural Health</td>
<td><a href="http://fcms.its.utas.edu.au/healthsciruralhealth/courses.asp">http://fcms.its.utas.edu.au/healthsciruralhealth/courses.asp</a></td>
</tr>
</tbody>
</table>

Ms Sue Whetton
Ms Yvette Massey
Ms Jessica Whelan

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### University of Technology Sydney [UTS]

<table>
<thead>
<tr>
<th>Program</th>
<th>Courses</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>C10251v1 Bachelor of Arts in Communication (Information Management) - 50492 Legal and Health Information</td>
<td>Australian health system – environment, trends, health informatics, health records; health information behaviour of professionals, consumers and patients; primary and secondary sources of health information; issues, eg access, quality, authority, appropriateness (cultural, gender), privacy of health records; medical terminology</td>
<td><a href="http://www.handbook.uts.edu.au/courses/c10251.html">http://www.handbook.uts.edu.au/courses/c10251.html</a></td>
</tr>
</tbody>
</table>

Ms Kristine Deray
<table>
<thead>
<tr>
<th>University of the Sunshine Coast [USC]</th>
<th>Rania Shibl, Lecturer, Information Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Western Australia [UWA]</td>
<td>Faculty of Medicine, Dentistry and Health Sciences</td>
</tr>
<tr>
<td>Master of Public Health</td>
<td>PUBH8784 Special Topics in Public Health [PG] - Health Informatics. This is a five-day course consisting of lectures, small group tutorials and computer lab work. It teaches important concepts in health informatics and computing, including: modelling of health, communication theory, information retrieval, medical decision making, terminology and standards, evaluation, ethics, computer hardware and software. It also examines applications of health informatics such as electronic medical records, clinical decision support systems and telemedicine.</td>
</tr>
<tr>
<td>Bachelor of Information and Communications Technology - major in Health Informatics, sub-majors in Health Information Applications and Health Information Management</td>
<td>Introduction to Health Informatics; E Health; Services Computing in Health Care; Information and Communication Technology in Health Care</td>
</tr>
<tr>
<td>Research in eHealth</td>
<td>School of Computing and Mathematics; College of Health and Science</td>
</tr>
<tr>
<td>Health Informatics Research group</td>
<td>Prof Anthony Maeder</td>
</tr>
<tr>
<td>University of Wollongong [UOW]</td>
<td>Prof John Fulcher, HoS, SCSSE A/Prof Neil Gray Janusz Getta</td>
</tr>
<tr>
<td>Master of Health Informatics, Graduate Certificate in Health Informatics</td>
<td>Research into E-Business and E-Health</td>
</tr>
<tr>
<td>Faculty of Informatics</td>
<td>School of Computer Science and Software Engineering (SCSSE)</td>
</tr>
<tr>
<td>Faculty of Informatics/research/scholarships/index.html</td>
<td>Prof John Fulcher, HoS, SCSSE A/Prof Neil Gray Janusz Getta</td>
</tr>
<tr>
<td>-------------------------</td>
<td>---------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Key research area:</td>
<td>Health - research that applies to health and medical initiatives, that includes medical practitioners, administrators and support staff <strong>informatics</strong> requirements, and extends to the general public information requirements as users of medical facilities</td>
</tr>
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</tr>
</tbody>
</table>


Michael Legg – BSc(Hons) MCom PhD FAICD FAIM FACHI MACS(PCP) ARCPA

Michael Legg first trained as a researcher in experimental pathology. He has had 25 years as a successful leader in the health industry with some 20 years of that in CEO level positions in large, medium and small; not-for-profit and for-profit organisations.

Since 2000 he has been the Principal of Michael Legg & Associates, a consultancy in information and organisational systems. In that time he has led more than 30 successful projects. Prior to that he was ‘Director Developments – Pathology’ with Health Care of Australia; the ‘General Manager’ of Southern Pathology and ‘Executive Director’ of Medicheck, The Sydney Square Diagnostic Breast Clinic and BreastHealth.

He has received recognition both for his leadership and for the systems he has introduced which have been considered worthy of benchmark and set healthcare management milestones. Southern Pathology, under his leadership, was the first health care provider recognised by the Australian Quality Awards Foundation and was later awarded the Australian Quality Award. It was identified as a benchmark site for ‘Employee Opinion Best Practice’ against 165 others including some of Australia’s best companies and was the first Australian health care provider to have its ISO 9000 quality systems accredited.

Dr Legg is a trained facilitator and leader in quality, educated through the Australian Quality Council and the University of Wollongong. His emphasis has been on planning, measurement and people.

He is also a Scotwork trained negotiator, successful in agreements with Government, Unions and in business. He was involved in negotiating a 3 year Government agreement for the funding of pathology through Medicare, the first of its kind; negotiated a first industrial award for private pathology in NSW; and gained agreement for a joint venture with the Labour Council and 3 large unions for a rehabilitation service.

He is the current President of the Health Informatics Society of Australia having been five times re-elected and has been an Adjunct Professor in Health Informatics with Central Queensland University and a Professorial Fellow with the Centre for Health Informatics Research at the University of Wollongong.

He has been an active standards developer for more than 10 years and was the inaugural Chairman of the Health and Food Standards Sector Board of Standards Australia where he continues as a member of their health informatics committee (IT-14) and co-chair of the diagnostics working group (IT-14-6-5). He is a member of the National eHealth Transition Authority (NEHTA) Stakeholder Reference Forum and is co-chair of the NEHTA Clinical Terminology and Information Reference Group.

He has previously served on many National Committees including the National Health Information Standards Advisory Committee (NHISAC) and the HealthConnect Stakeholder Reference Group.

He was Vice President of the Australian Association of Pathology Practices (AAPP), a member of the Quality Use of Pathology Committee (QUPC) and the Pathology Services Table Committee (PSTC) advising on the Medicare benefits for pathology.
Brendan Lovelock – PhD AFAIM MRACI C Chem

Brendan has an extensive national and international background in technology commercialisation and marketing with experience across the health, consumer electronics and the telecommunications industries. He has a special interest in the application of online technologies to engage and mobilise communities in areas of social and commercial importance.

Brendan trained in chemistry and spent 7 years in drug delivery systems and membrane modelling. Transitioning into technology management and marketing led to a 16 year Kodak career. Initially managing their research chemical business, he then led their Health Sciences Division in Australia and New Zealand, spearheading the introduction of some of the first digital x-ray printing systems in Australia.

Leveraging Kodak’s initial technology leadership in CD production, Brendan led their highly successful launch into the commercial CD markets in the United States. He then established Kodak’s consumer digital imaging businesses in Korea, Southeast Asia and India.

Attracted by the rapid growth of the telecommunications sector Brendan took up the position of Director of Telstra’s indirect channel business, rebuilding their professional reseller and indirect consumer channel operations. This led to an intense interest in the application of online technologies to engage and mobilise communities on commercial and social issues. Leading a number of small software companies delivering technologies in these areas prepared Brendan for the role at the Health Informatics Society of Australia (HISA).

Fulfilling a strong desire to return to the health sector, Brendan has, for the past 3 years, severed as the CEO of HISA. In this role he has sought to build the organisation through the more effective engagement of its members and the broader heath community. This has been achieved by combining insightful industry commentary with advanced online communication, social networking and survey systems. These activities were built upon HISA’s the existing strength in the delivery of high value conferences and events.

Brendan completed a PhD in physical chemistry at Melbourne University, is an Associate Fellow of the Australian Institute of Management and a Chartered Chemist. He has completed advanced management courses at the Kellogg School of Management (North Western University), University of Melbourne and the Australian Department of Defence (industry mobilisation). He has served on Melbourne University’s Centre for Global Innovation and Entrepreneurship advisory board.