

FINAL

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

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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

AACB	Australian Association of Clinical Biochemists
AAPM	Australian Association of Practice Managers
AAPP	Australian Association of Pathology Practices
ACAA	Aged Care Association Australia
ACHI	Australian College of Health Informatics
ACHS	Australian Council on Healthcare Standards
ACHSE	Australian College of Health Service Executives
ACRRM	Australian College of Rural and Remote Medicine
ACS	Australian Computer Society
ADIA	Australian Diagnostic Industry Association
AGPN	Australian General Practice Network
AHHA	Australian Healthcare and Hospital Association
AHML	Australian Healthcare Messaging Laboratory
AHRDMA	Australasian Health and Research Data Managers Association
AIIA	Australian Information Industry Association
AMA	Australian Medical Association
ANCC EH	Australian National Consultative Committee on eHealth
APS	Australian Psychology Society
ASM	Australian Society of Microbiology
ATHS	Australian TeleHealth Society
CCA	Cancer Council Australia
CFA	Consumers' Health Forum of Australia
EA	Engineers Australia
FA	Fitness Australia
HGSA	Human Genetics Society of Australasia
HIMAA	Health Information Managers Association Australia
HIPS	Health Information Privacy & Security
HISA	Health Informatics Society of Australia
IHE Australia	Integrating the Health Enterprise Australia
LFA	Leukaemia Foundation of Australia
MSIA	Medical Software Industry Association
NCCH	National Centre for Classifications in Health
NCOPP	National Coalition of Public Pathology
NIA	Nursing Informatics 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



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 HISA². 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 area³. 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 organisations⁴ to attend one of two, half-day workshops – one held in Sydney, the other in Melbourne. These were structured and used mind-mapping⁵. 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 comment⁷ to: (1) all of those previously involved in consultations directly; (2) to all CeH member organisations; and (3) to DoHA, NEHTA, Deloitte, 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*.

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:

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.

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

Health informatics is the science and practice around information in health that leads to informed and assisted healthcare

A health informatician is a specialist worker in this field.

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 Conference¹¹. 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 book¹² defines 'medical informatics'¹³ 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.

¹¹ Whetton, SG, 2005, Health informatics workforce skills: technology is king, time for a consort? Proceedings of HIC 2005: Thirteenth National Health Informatics Conference, 31st July - 2nd August, (2005) Melbourne, Australia, pp. 1-7. ISBN 0975101358

¹² Coiera, E. 2003, Guide to Health Informatics, Arnold, London.

¹³ '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*'.

¹⁴ See http://www.hisa.org.au/system/files/ul/rmed_by_Health_Informatics_v8_Public_Release_3.pdf viewed July 2009



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'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)¹⁶ and work has been done on the competencies perceived by health professionals as required for roles in health informatics¹⁷ 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.

¹⁵ Soar J, Marsault A, Sara T, Mount C, Hardy J, Swinkels W, Yearwood J, 2003, Health Informatics Education, See: [http://www.health.gov.au/internet/hconnect/publishing.nsf/Content/7746B10691FA666CCA257128007B7EAF/\\$File/hiefrept.pdf](http://www.health.gov.au/internet/hconnect/publishing.nsf/Content/7746B10691FA666CCA257128007B7EAF/$File/hiefrept.pdf) viewed July 2009

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.

¹⁷ 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



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. Hersh¹⁸ and the International Medical Informatics Association¹⁹ 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.

¹⁸ Hersh W, 2006, Who are the Informaticians? What We Know and Should Know, J Am Med Inform Assoc. 2006; 13:166–170.

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



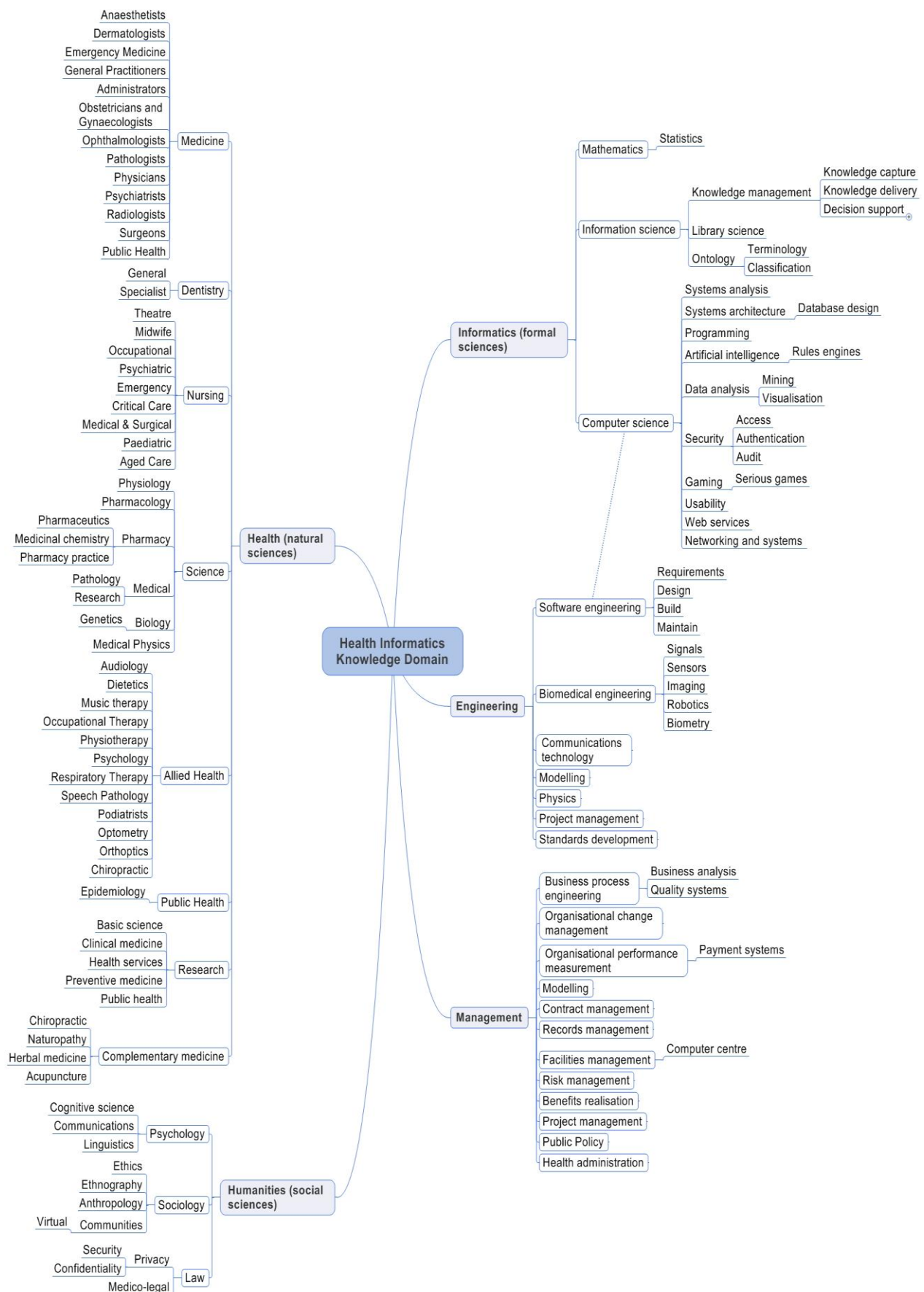


Figure 1 - A Map of the Health Informatics Knowledge Domain

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 clinicians²⁰:

- 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

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
- Pathology²¹
- 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'

²² Berwick DM. Escape Fire: Lessons for the Future of Health. New York: The Commonwealth Fund; 2002

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'²⁴ put the view that:

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.

The NHHRC in their report²⁵ here in Australia and US President, Barack Obama in his speech²⁶ 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.

²⁴ See http://www.hisa.org.au/system/files/u1/rmed_by_Health_Informatics_v8_Public_Release_3.pdf

²⁵ See <http://www.nhhrc.org.au/internet/nhhrc/publishing.nsf/Content/nhhrc-report> viewed Aug 2009

²⁶ See http://www.whitehouse.gov/the_press_office/remarks-of-president-barack-obama-address-to-joint-session-of-congress/ viewed Aug 2009



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 used²⁷. The time available for the project precluded testing of the survey instrument.

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

²⁷ See http://www.hisa.org.au/system/files/u1/rmed_by_Health_Informatics_v8_Public_Release_3.pdf



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 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 list²⁸.

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*.

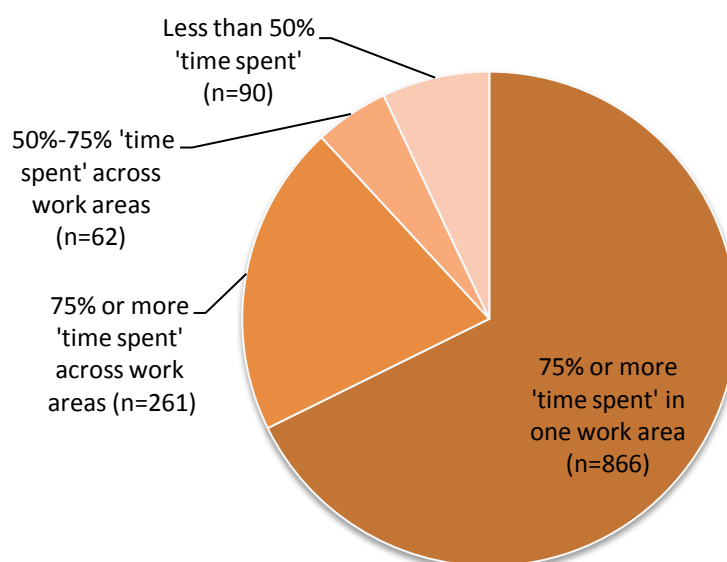


Figure 2 – Number of respondents categorised by % of their time spent on information-related activities

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.

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

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*.

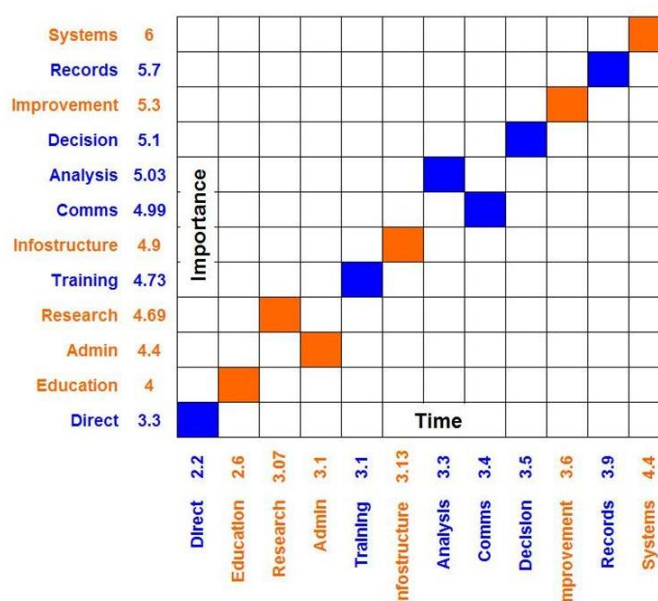


Figure 3 - Ranking of ‘time spent’ versus ‘importance to the job’ for information-related activities. The key to the categories is provided in Table 1 above. Orange denotes ‘in the system’ jobs while blue denotes ‘on the system’

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?’²⁹

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*

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.

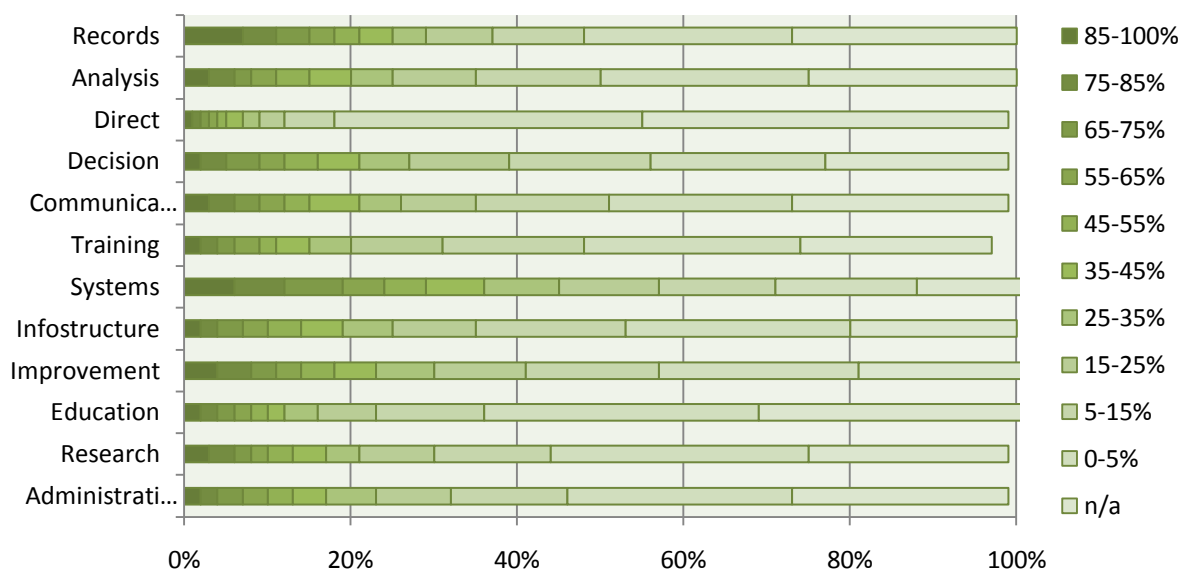


Figure 5 - % number of respondents by % 'time spent' for each work category for ALL respondents (n=1,279)

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

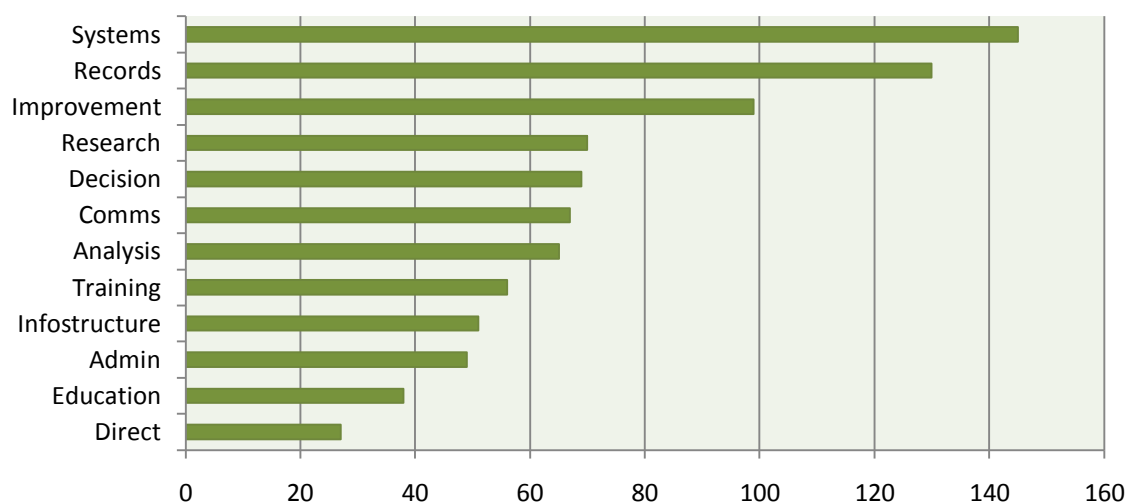


Figure 6 – Number of respondents working full-time by work category (n=866)

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 coders
Clinical data manager	Clinical Trials
Data and information co-ordinator	Data entry clerk
Data manager	FOI officer
Health information manager	Health records manager
Health records officer	Medical record administrator
Practice managers	Privacy officer
Registrar	

Job titles for this work category from the survey:

Administration Manager	Administration Officer
ADON, Nursing Informatics & Management support	Advanced Clinical Coder
Analyst	Assistant Data manager
Assistant Health Information Manager	Assistant Manager Clinical Coding & Casemix
Auditor	Business Analyst
Cancer Information Manager	Cancer Registry Data Manager
Casemix Coder	Certified coder
Chief Health Information Manager	Clinical Audit Coordinator
Clinical Coder	Clinical coder - health information manager
Clinical Coder and Client Services Administration	Clinical Coder, Health Information Services
Clinical Coder/Health Information Manager	Clinical Coding
Clinical Coding Manager	Clinical Data Coordinator
Clinical Data Services Officer	Clinical Information Coder
Clinical Nurse Specialist / Health Adviser	Clinical Research Coordinator
Clinical Transcriptionist	Clinical Trial Coordinator/HIM
Coding Manager	Consultant
Coordinator Clinical Coding	Data Management Analyst
Data Manager	Data Manager/Clinical Trial Coordinator
Doctor	General Practitioner
Gynaecologist	Health Adviser
Health Information Manager	Health Information Manager - Clinical Coder



Health Information Manager - HBCIS & medico-legal	Health Information Officer
Health Information Release Manager	Health Information Services Training Coordinator
Health Systems Business Analyst	HIE Data Manager
Information Manager	Joint Records Centre Deputy Manager
Lecturer	Manager - Clinical Information
Manager - Medical Record Services	Manager Coding Services
Manager Health Information Services	Medical Laboratory Scientist
Patient Health Information Services Coordinator	Professional Officer
Project Manager	Project Officer
Psychiatric Nurse	Reconciliation Officer
Research Manager	Senior Analyst
Senior Business Analyst Clinical Systems	Senior Clinical Coder
Senior Clinical Systems Analyst	Senior Health Information Manager
Senior Health Information Officer	Senior Health Records Officer
Senior Laboratory Information Technology Officer	Senior Medical Receptionist
Software Engineer	Supervisor, Pathology IT
Unique Patient Identifier (UPI) Systems Manager	

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:

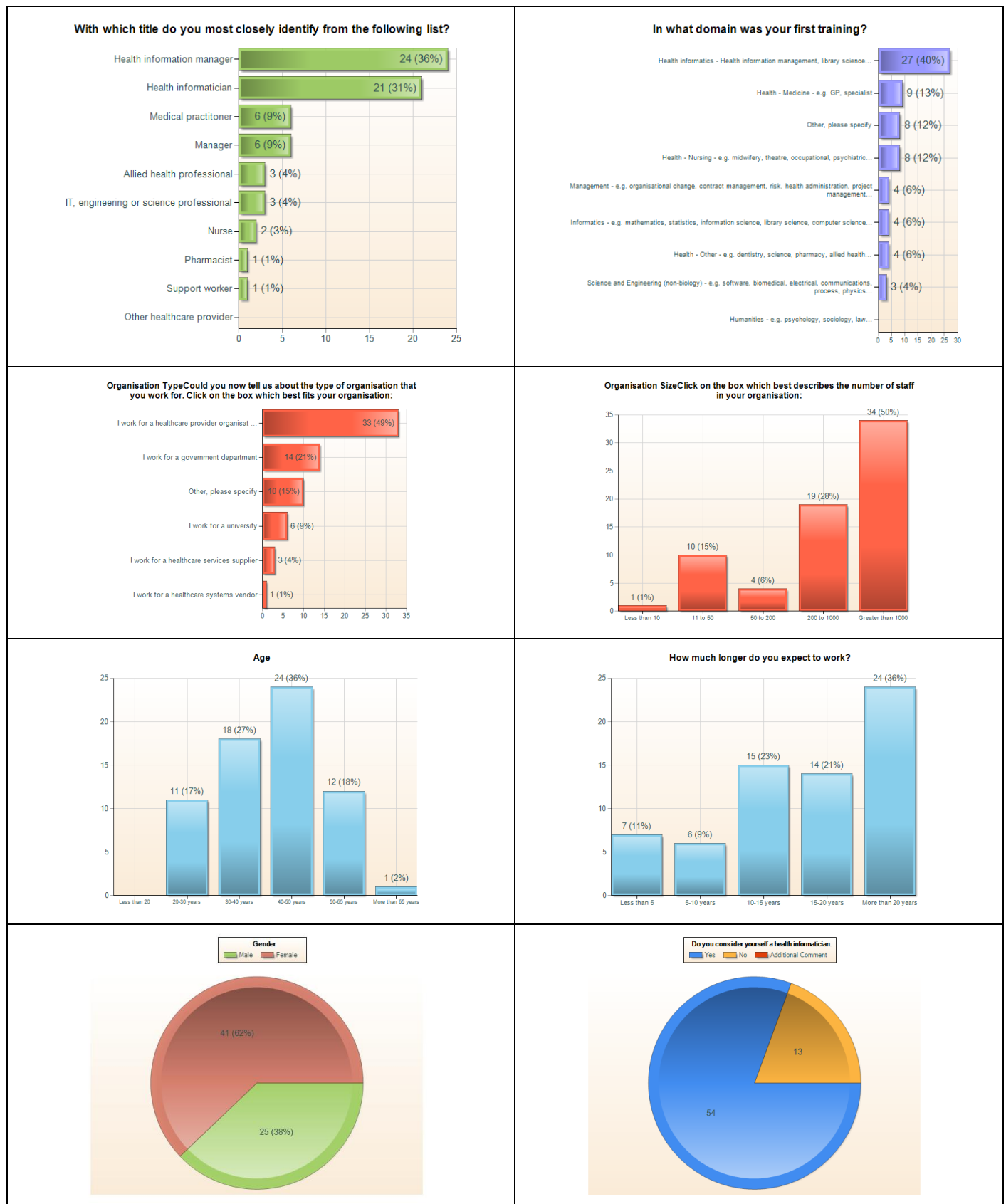
Data manager
Pharmacist undertaking medication review

Job titles for this work category from the survey:

Administration Officer	Associate Genetic Counsellor
Associate Professor	Auditor
Cancer Information Manager	Chief Health Information Manager
Clinical Audit Coordinator	Clinical Coder
Clinical Information Coder	Clinical Nurse
Clinical Research Coordinator	Clinical Trial Coordinator/HIM
Data Analyst	Data Management Analyst
Data Manager	Data Manager/Clinical Trial Coordinator
Director of Nursing	E-health Programme Officer
Epidemiologist	General Practitioner
Health Information Manager	Health Information Systems Consultant
Hospital Data Analyst	Hospital Scientist
Implementation Manager	Lecturer
Librarian	Manager
Manager, Practice Information Services	Medical Informatics
Medical scientist	Oncology Pharmacist
Practice Principal	Product Subject Matter Expert
Professor	Project Manager
Project Officer	Psychiatric Nurse
Reconciliation Officer	Research Assistant Professor
Senior Analyst	Senior Business Analyst Clinical Systems
Senior Clinical Coder	Senior Clinical Systems Analyst
Senior Health Information Manager	Senior Software Engineer
System Administrator	Team Leader - Clinical Costing & Analysis Unit
Team Leader - PAS Support and Data Quality	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

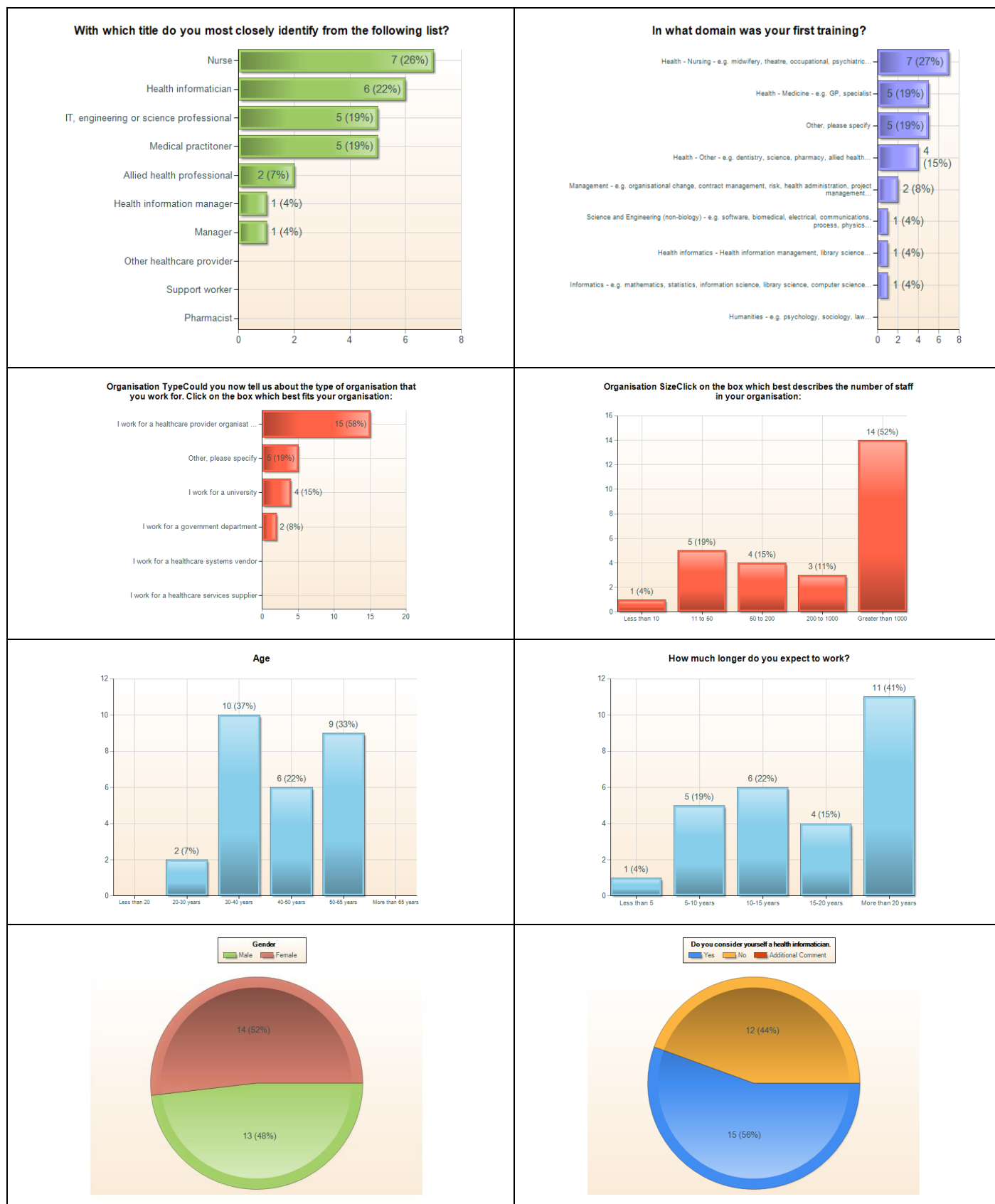
Job titles for this work category from consultation:

Allied health professional	Anaesthetists
Biomedical engineer	Dieticians
Infection control officer	Occupational health
Pathologists	Pharmacist undertaking medication review
Psychologists	Radiation oncologists
Rehabilitation	Surgeons

Job titles for this work category from the survey:

Administration Officer	Application Specialist
Associate Professor	Biochemist
Clinical Educator	Clinical Midwife
Clinical Nurse Specialist	Clinical Nurse Specialist (ICU)
Clinical Nurse Specialist / Health Adviser	Consultant Gastroenterologist
General Practitioner	Health Services Manager
Lecturer	Medical Scientist
Nurse Manager Business & Informatics	Nurse Practitioner
PhD student	Product Subject Matter Expert
Psychiatric Nurse	Research Fellow
Senior Business Analyst Clinical Systems	Senior Medical Scientist
Software Engineer	Speech Pathologist
Supervisor of Immunoassay Laboratory	

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:

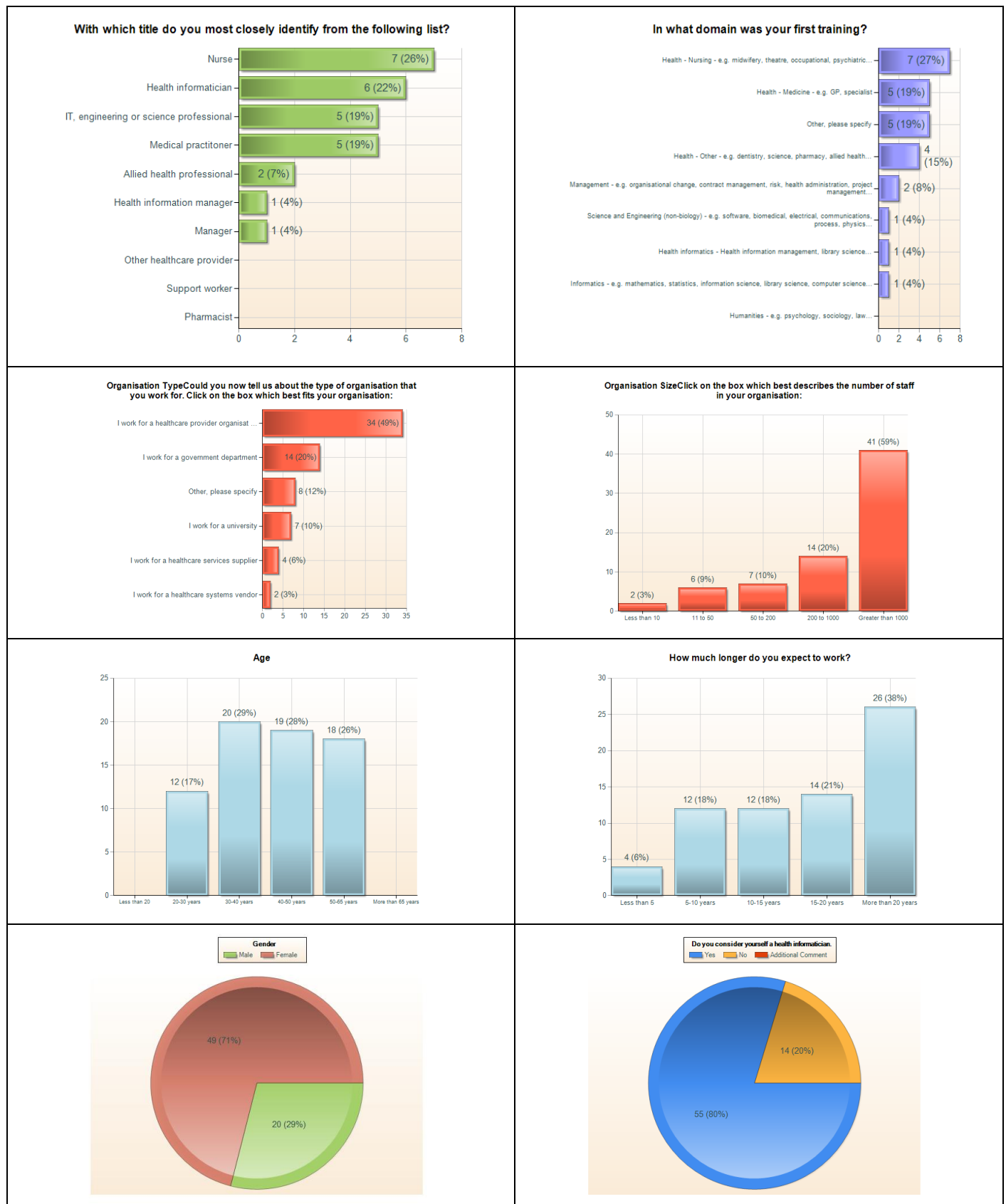
Librarian
Knowledge manager
Clinical process improver

Job titles for this work category from the survey:

Administration Officer	Application Specialist
Assistant Librarian	Associate Professor
Auditor	Biochemist
Biomedical information specialist	Business Analyst
Business Analyst HIM	Business Development Manager
Chief Medical Information Officer	Clinical Audit Coordinator
Clinical Coder	Clinical Costing Manager
Clinical Director	Clinical Trial Coordinator
Consultant	Data Management Analyst
Digital Strategy Consultant	Director
Director - Nursing Informatics	Director of Nursing
District Coordinator Electronic Discharge Project	District Librarian
Doctor	Electronic Services Librarian
eMR Application Manager	eMR Clinical Change Manager
Expert Medical Records	General and projects librarian
Health Informatician	Health Informatics Manager
Health Information Systems Consultant	Hospital Librarian
Lecturer	Librarian
Library Manager	Library Manager
Manager	Manager, Health Information and Record Service
Medical Laboratory Scientist	Medical Librarian
Metadata manager	Operations Manager
Product Subject Matter Expert	Professor
Project Consultant	Rehabilitation Services Development Officer
Research Fellow	Research Manager
Senior Analyst	Senior Business Analyst
Senior Business Analyst Clinical Systems	Senior Clinical Business Analyst
Senior Laboratory Information Technology Officer	Senior Medical Scientist
Senior Solutions Analyst	Software engineer
Trauma Program Manager	

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:

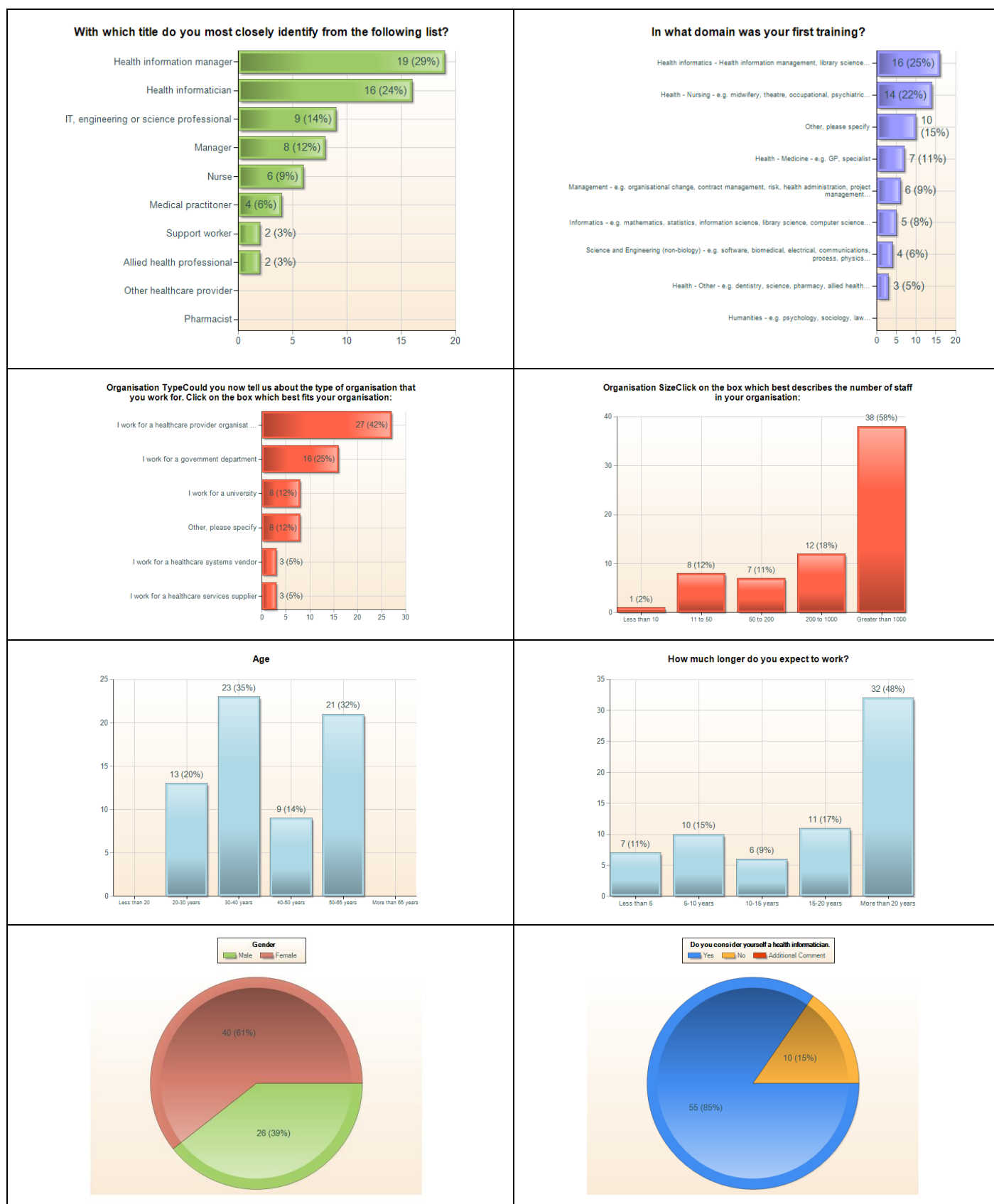
Interpreters
Clinical liaison officers

Job titles for this work category from the survey:

Administration Officer	Application Specialist
Assistant Professor	Case-mix Clinical Coder
Chief Information Officer	Child Protection Information Manager (IVPRS)
Clinical Coder	Clinical Costing Manager
Clinical Nurse	Clinical Transcriptionist
Consultant	Consultant Applications Administrator
Consultant Medical Informatics	Customer Support Manager
Data Analyst	Digital Strategy Consultant
Director of Nursing	Director, (lower level management DOHA)
District Coordinator Electronic Discharge Project	eMR Application Manager
Expert Medical Records	General Practitioner
Health Informatics Manager	Health Information Management Consultant
Health Information Release Manager	Health Information Services Training Coordinator
Health Services Manager	Health Systems Business Analyst
Implementation Manager	Information Management Consultant
Lecturer	Manager
Manager Application Systems	Manager for Clinical Forms and Discharge Summary
Manager Primary and Community Health Development	Medical Equipment Manager Home Health Care Service
Medical Records Supervisor	Nurse Educator
Nurse Manager Nursing Clinical Support Systems	Nurse Practitioner / Lecturer
PhD Candidate Biomedical Informatics	Product Subject Matter Expert
Professor	Project Analyst
Project Manager	Project Officer
Rehabilitation Services Development Officer	Research Fellow
Senior Analyst	Senior Business Analyst
Senior Business Analyst Clinical Systems	Senior Medical Scientist
Senior Software Engineer	Software Engineer
Solution and Database Architect	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	Associate professor
Chief Health Information Manager	Chief Medical Information Officer
Clinical Coder	Consultant
Consultant Family Physician	Digital Strategy Consultant
Director of Nursing	Director, National Telehealth Centre
Doctor	Education Manager
eMR Application Manager	eMR Clinical Change Manager
eMR Clinical support and training	eMR Learning Coordinator
Health Information Manager	Health Information Services Training Coordinator
Health information Systems Consultant	Health Systems Business Analyst
Implementation Manager	Information Management Educator
Lecturer	Lecturer
Librarian	Manager Primary and Community Health Development
Manager Program Implementation	Manager, Clinical and Client Services
Medical Laboratory Scientist	Nurse Educator
Nurse Manager Business & Informatics	Nurse Practitioner
Patient Health Information Services Coordinator	Practice Manager
Product Specialist	Professor
Program Co-ordinator - Health, Nursing & Aged Care	Project Analyst
Project Consultant	Service Coordination Program Manager
Speechwriter	Staff Development Educator
Trainer	

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:

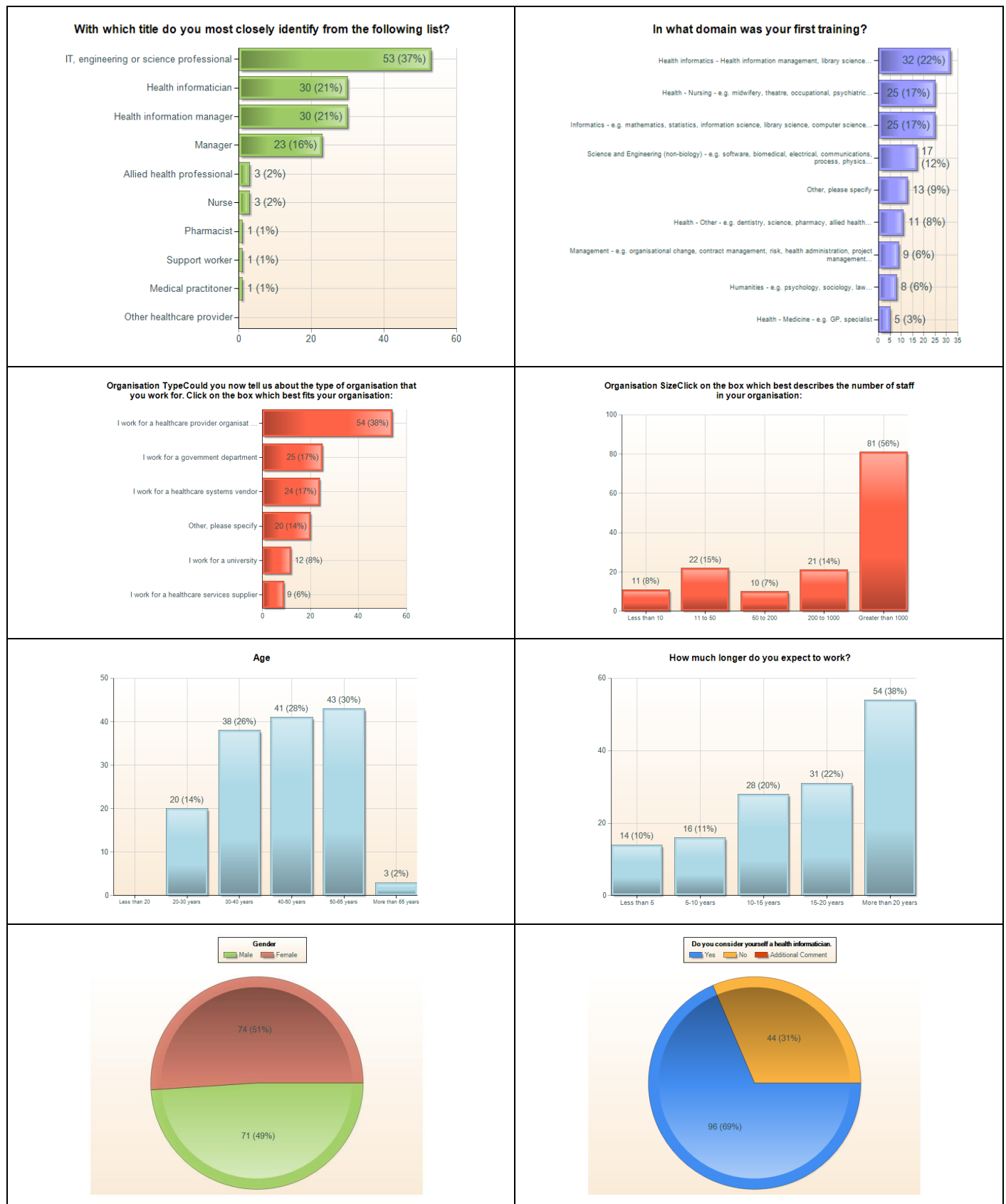
Biomedical engineers	Business process engineers
Change managers	Chief Information Officer
Clinical liaison officers	Data managers
Data standards developer	Health information managers
Implementers	Information analysts
Information Architects	Medical systems analyst
Programmer	Project managers for implementation
Quality managers	Systems analysts
Systems support	Terminology analysts
Web developers	Web editors
Web master	

Job titles for this work category from the survey:

Account Executive	Administration Officer
Application Manager	Assistant Director of Nursing - Nursing Informatics & Management support
Associate Professor	Business Analyst
Business Development Manager	Business Solutions Manager
Chief Executive Officer	Chief Operations Officer
Chief Technology Officer	Chief, Laboratory for Informatics Development
Clinical Coder	Clinical Director
Clinical Software Developer	Clinical Trial Coordinator
Computer Applications Nurse	Computer Scientist in Pathology
Consultant	Consultant Applications Administrator
Data and Systems Manager	Data Management Analyst
Data Manager/Clinical Trial Coordinator	Development Implementation, Support
Development Manager and Architect	Digital Strategy Consultant
Director of Residential Aged Care	Director of Sales
Doctor	EDP Analyst
E-health Programme Officer	eMR Application Manager
eMR Learning Coordinator	Expert in Medical Records
Head of Primary, Aged and Community Care Sector	Health Informatician
Health Informatics Manager	Health Information Manager
Health information Systems Consultant	HIE Data Manager
Implementation Manager	Information and Communication Technology Manager
Integration Specialist and Client Implementation	Intellectual Property Strategist
IT Manager	IT Project Officer
Lecturer	Manager
Manager Application Systems	Manager Information Systems
Manager Of Data Collection	Manager Primary and Community Health Development

Manager Program Implementation	Manager, Business Support and Innovation
Managing Director	Medical Informatics
Medical Scientist	Medical Systems Analyst
Principal Consultant	Principal Systems Integrator
Principal Technical Consultant	Principal Test Consultant
Product Manager	Product Subject Matter Expert
Professor	Program Analyst
Program Manager, Organisational Change Management	Programme Manager
Programmer	Project Analyst
Project Consultant	Project Development Manager
Project Director	Project Manager
Project Manager - Health Information System	Project Manager Health Informatics
Project Officer	Projects Coordinator
QA Assistant	Rehabilitation Services Development Officer
Report Writer	Research Assistant
Research Fellow	Senior Account Manager
Senior Analyst	Senior Business Analyst
Senior Business Analyst Clinical Systems	Senior Business Systems Analyst
Senior Developer and Technology Specialist	Senior Health Information Manager
Senior Manager IM & IT Strategic Planning	Senior Project Manager Clinical Information System
Senior Project Officer	Senior Software Engineer
Senior Solutions Analyst	Senior Systems Specialist
Service Coordination Program Manager	Software Developer
Software Engineer	Solution and Database Architect
Solutions Architect	Speechwriter
Support Manager	Surgical Data Manager
Systems Administrator Senior	Systems Architect
Systems Integration Specialist	Systems Manager
Systems Specialist	Team Leader - Application Support Team
Team Leader - PAS Support and Data Quality	Test Analyst
Unique Patient Identifier (UPI) Systems Manager	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:

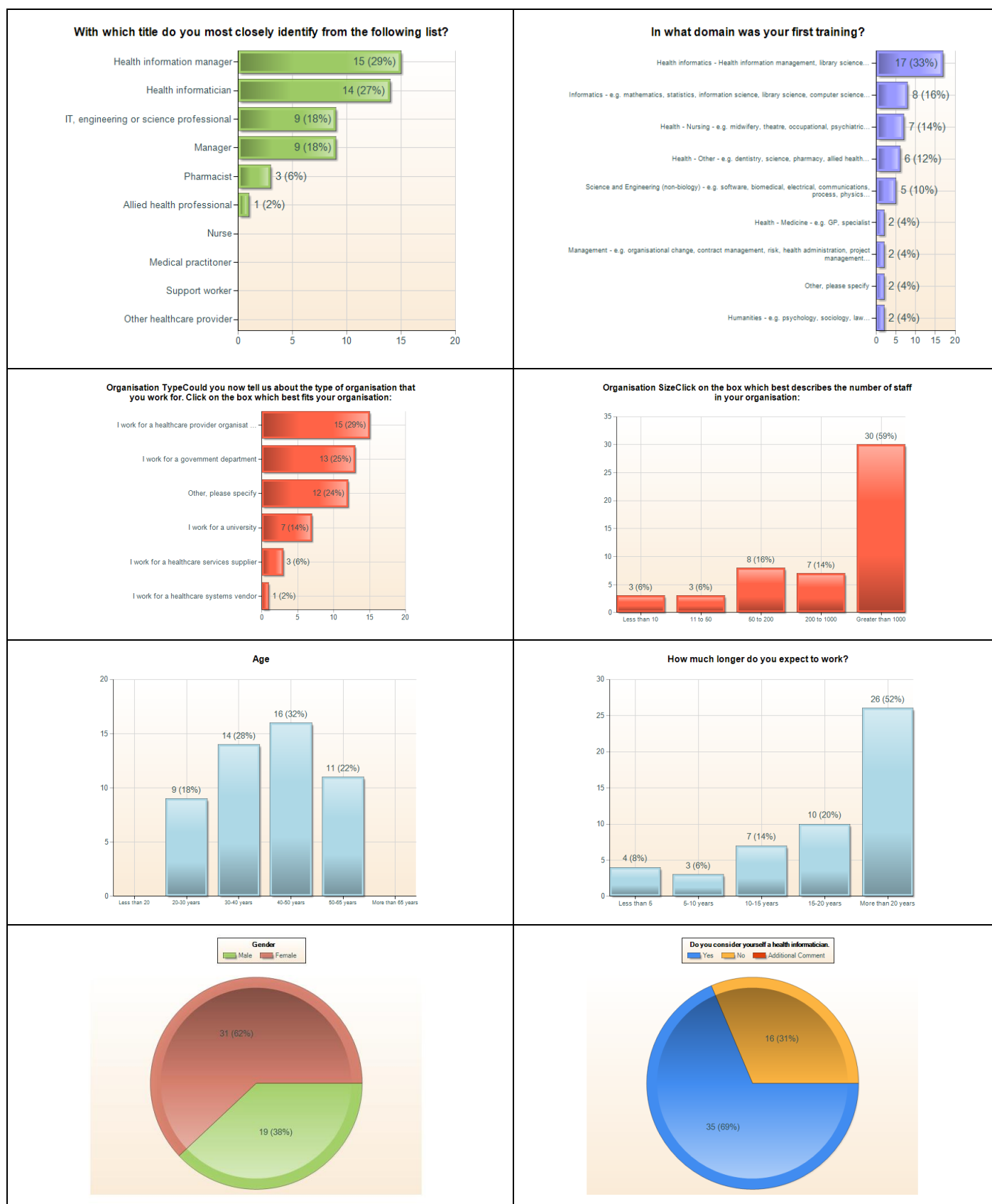
Clinical researchers	Data managers
Health informaticians	Lawyers
Nosologists	Policy officer
Standards developers	Systems analysts
Systems architects	Terminologists

Job titles for this work category from the survey:

Account Executive	Acting Director, (lower level management DOHA)
Associate Director	Auditor
Business Analyst	Chief Medical Information Officer
Chief, Laboratory for Informatics Development	Classification Support Officer
Consultant	Data Management Analyst
Development, Implementation, Support	Director Policy and Regulatory Affairs
EHealth Architect	Expert in Medical Records
Health Information Manager	Healthcare Enterprise Architect and Informatician
IT Manager	Manager Maternal and Child Health
Manager of Data Collection	Manager, Health Information and Record Service
Managing Director	Medical Informatics
Metadata Manager	Product Manager
Program Analyst	Project Manager
Rehabilitation Services Development Officer	Research Fellow
Senior Advisor - Strategy and Planning	Senior Analyst
Senior Business Analyst Clinical Systems	Senior Project Officer
Senior Solutions Analyst	Senior Terminology Analyst
Service Coordination Program Manager	Solution and Database Architect
Systems Administrator Senior	Systems Architect
Systems Manager	Team Leader - PAS Support and Data Quality
Terminology Analyst	Terminology Mapping Lead

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

Job titles for this work category from the survey:

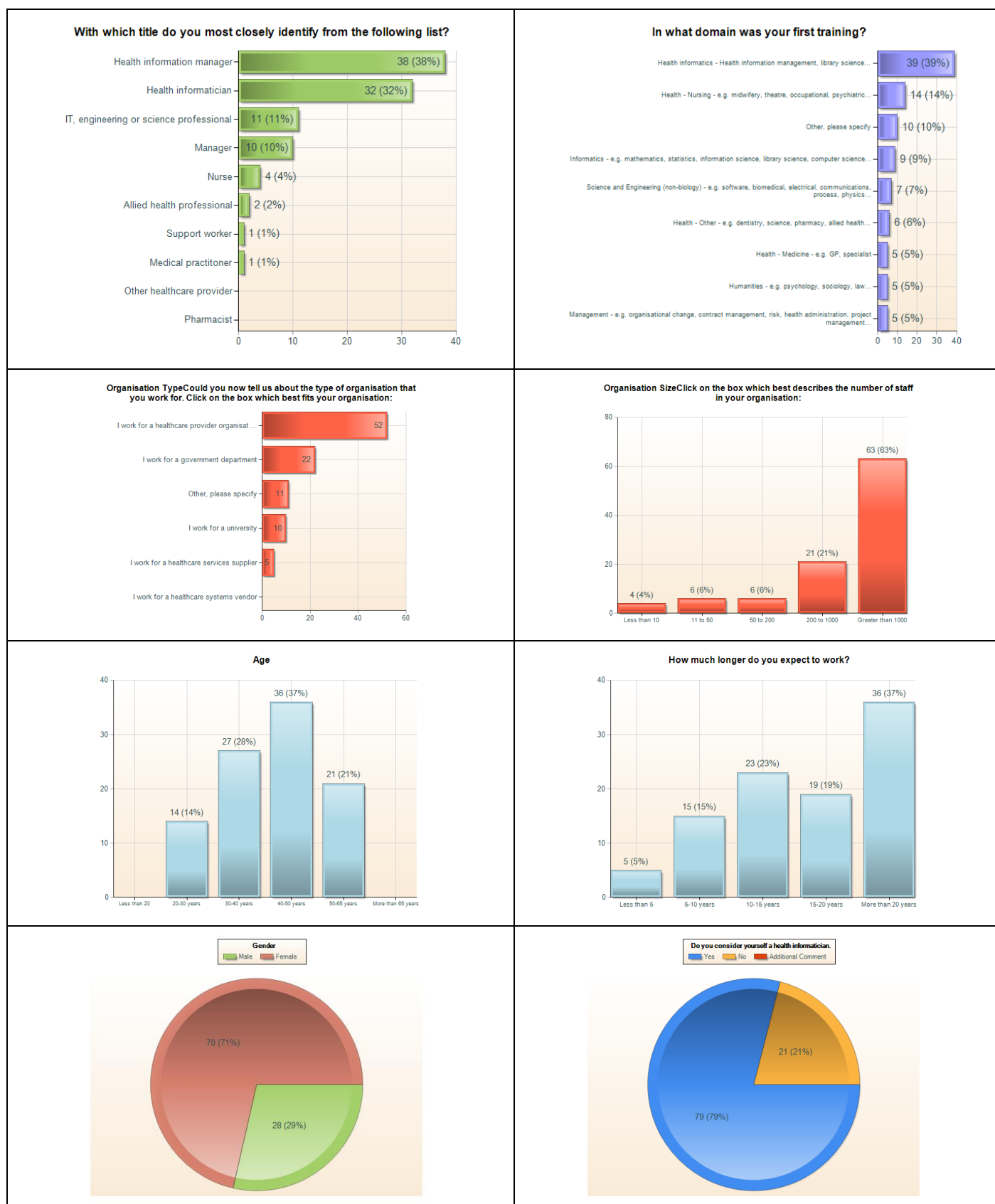
Administration Officer	Application specialist
Assistant Manager Clinical Coding & Casemix	Associate Genetic Counsellor
Auditor	Business System Support Officer
Certified Coder	Clinical Audit Coordinator
Clinical Coder	Clinical Coder and Client Services Administration
Clinical Coding & Casemix Manager	Clinical Coordinator
Clinical Costing Manager	Clinical Information Coder
Clinical Projects and Audit Facilitator	Clinical Service Coordinator - Medical Services
Clinical Trial Coordinator	Coding Manager
Consultant	Coordinator Clinical Coding
Data Analyst	Data Management Analyst
Data Manager	Development, Implementation, Support
Director	Director of Residential Aged Care
Epidemiologist	Health Information Management Consultant
Health Information Manager	Health information Systems Consultant
Health Information Systems Specialist	Health Systems Business Analyst
Implementation Manager	Lecturer
Manager Coding Services	Manager Of Data Collection
Manager Program Implementation	Manager, Business Support and Innovation
National Health Information Manager	PhD candidate
Product Manager	Product Subject Matter Expert
Professor	Program Analyst
Project Analyst	Project Consultant
Project Manager	Project Officer
Public Servant	Reconciliation officer
Rehabilitation Services Development Officer	Research Assistant
Research Co-ordinator	Research Fellow
Senior Advisor - Strategy and Planning	Senior Analyst
Senior Business 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	Change managers
Clinical content editor	Educators
Health promotions officer	HR Officer
Knowledge workers	Librarian
Marketer	On-line content developer
Web developers	

Job titles for this work category from the survey:

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

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.

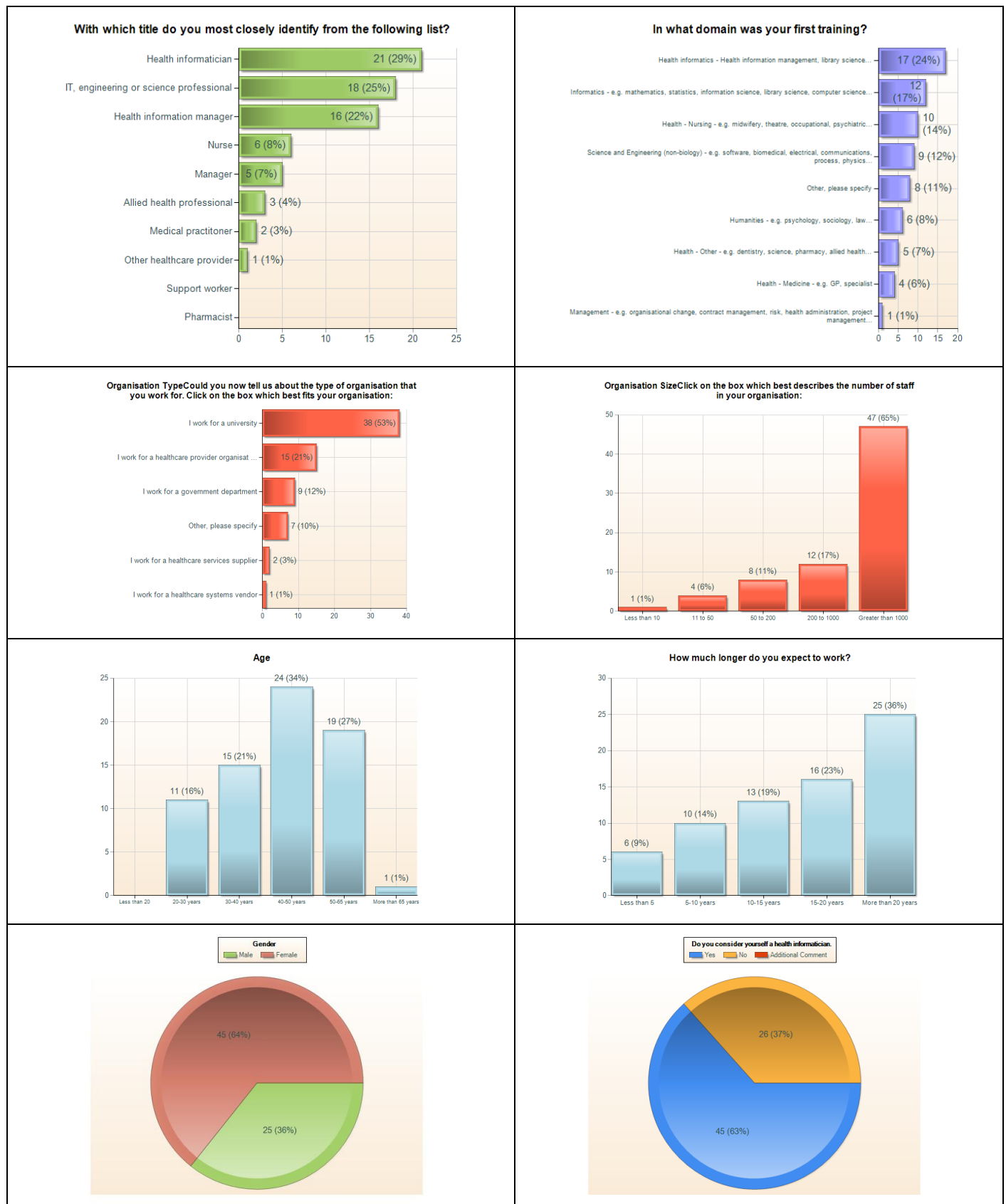
Job titles for this work category from consultation:

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

Job titles for this work category from the survey:

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

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 analysts
Business managers	Casemix manager
Claims review	Clinical costing analysts
Clinical directors	Complaints officer
Consumer advocate	Facilities manager
FOI Officer	Funding contracts
HR Officer	Information auditor
KPI reporters	Optimiser of the system
Performance reporters	Practice managers
Privacy officer	Procurement managers
Program managers	Purchasing officer
Records managers	

Job titles for this work category from the survey:

Application Specialist	Assistant Director of Nursing - Nursing Informatics & Management support
Assistant Professor	Associate Director
Associate Head, (Academic Programs)	CEO
Chief Financial Officer	Chief Health Information Manager
Clinical Coder	Clinical Coding Manager
Consultant	Data and Systems Manager
Director of Residential Aged Care	Director of Surgical and Acute Care (Nursing)
Financial And Administrative Manager	General Manager
Health Information Manager	Health information Systems Consultant;
Implementation Manager	Lecturer
Manager Pathology lab	Laboratory Information Systems Manager
Manager, Health Data Acquisition	Manager Program Implementation
Medical Informatics	Manager, Health Information & Record Service
National Business Manager	Medical Records Supervisor
Professional Officer	Practice Manager
Program Manager - Electronic Medical Record	Program Analyst
Psychiatric Nurse	Project Manager
Research Officer	Public Health Manager
Scientist in Charge	Scientific Supervisor
Senior Project Officer	Senior Health Information Manager
Unique Patient Identifier (UPI) Systems Manager	Strategic Project Manager
Ward clerk	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

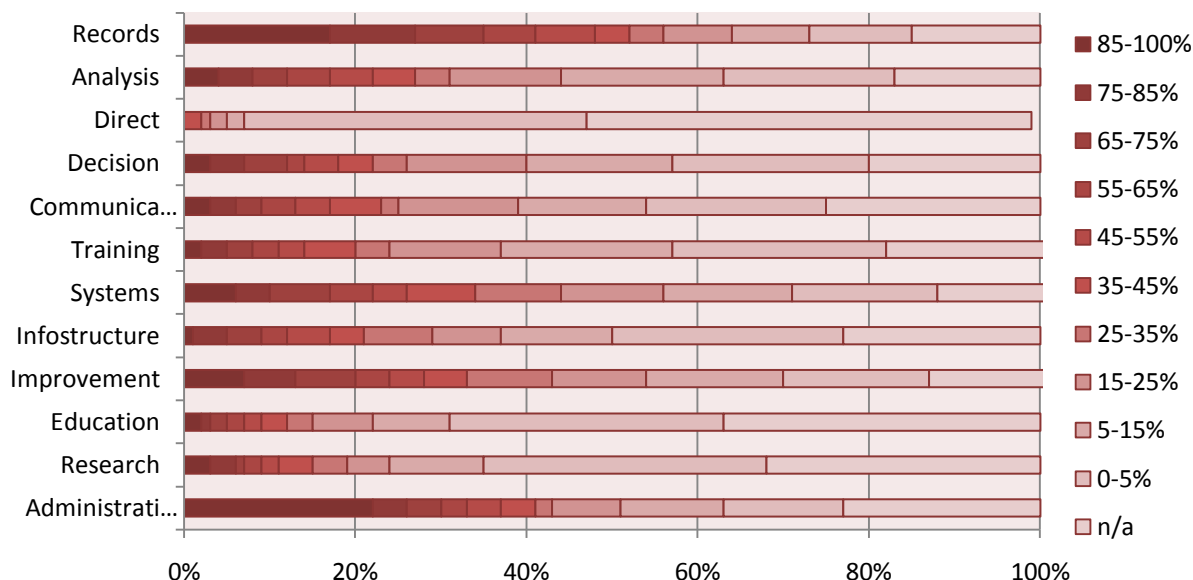


Figure 19 – Relative time spent doing each type of information work for those who identify with the title 'health Information Manager' (n=317, 25%)

Health Informatician

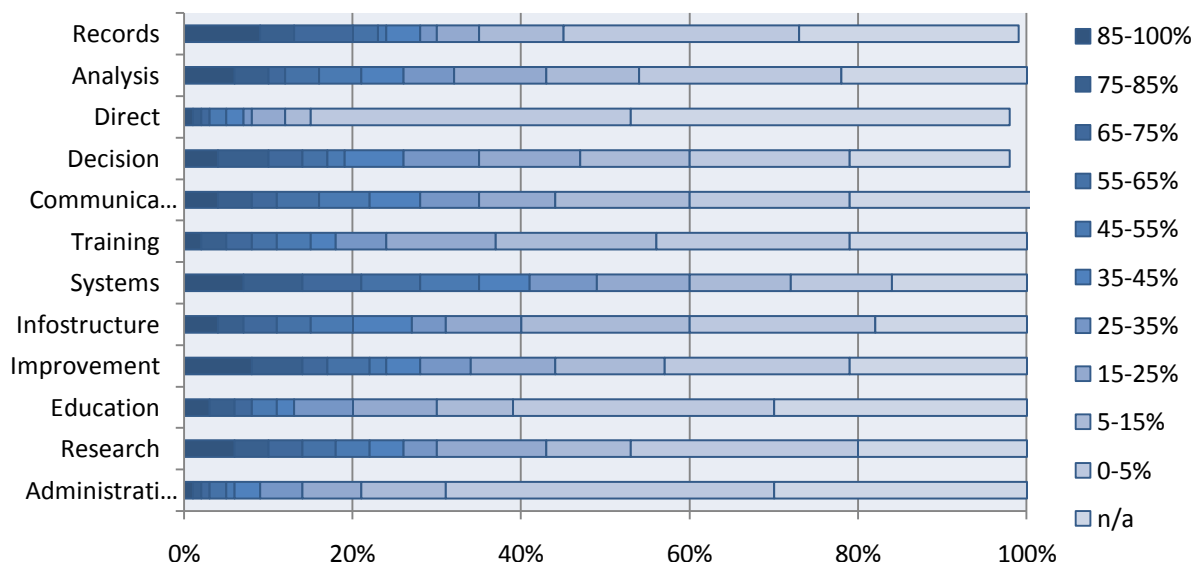


Figure 20 – Relative time spent doing each type of information work – those who identify with the title 'health informatician' (n=225, 18%)

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.

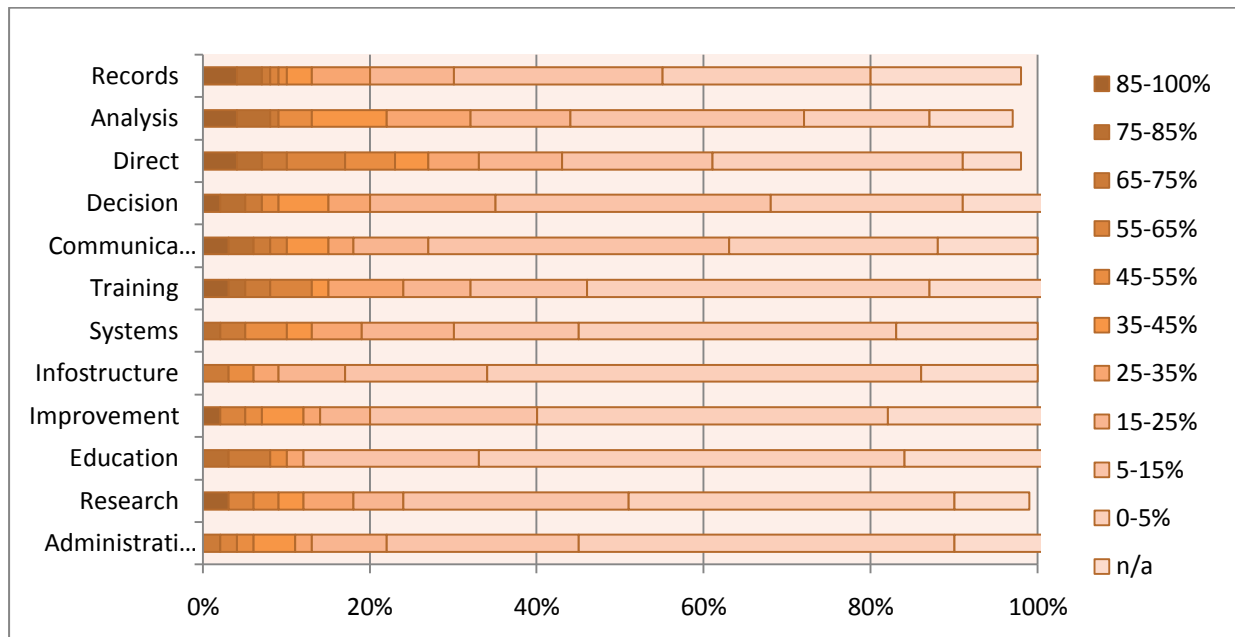
Medical Practitioner

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

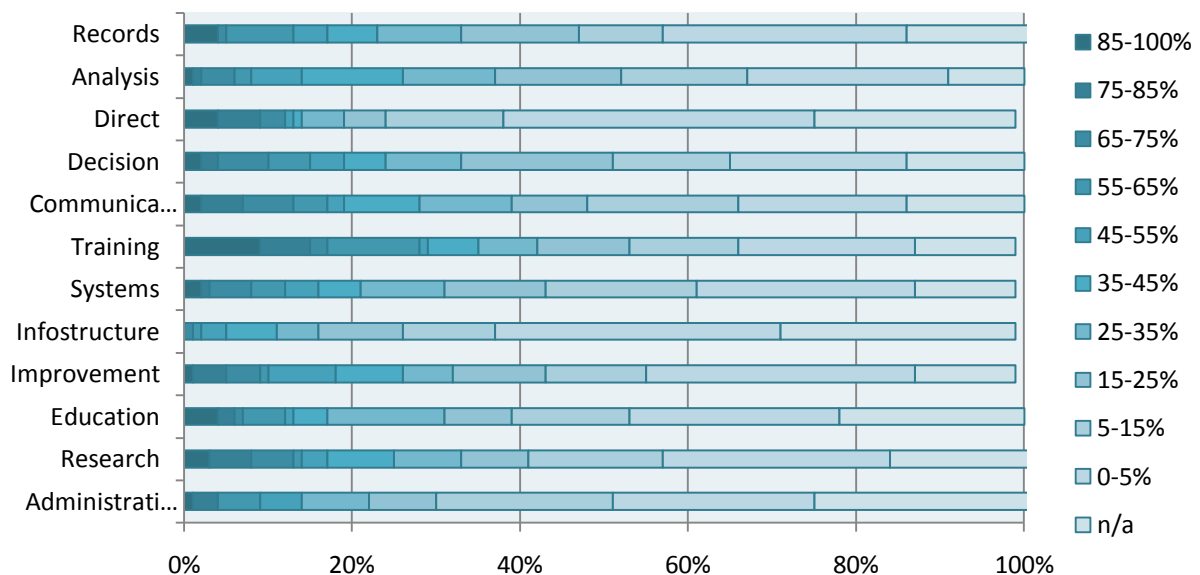
Nurse

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

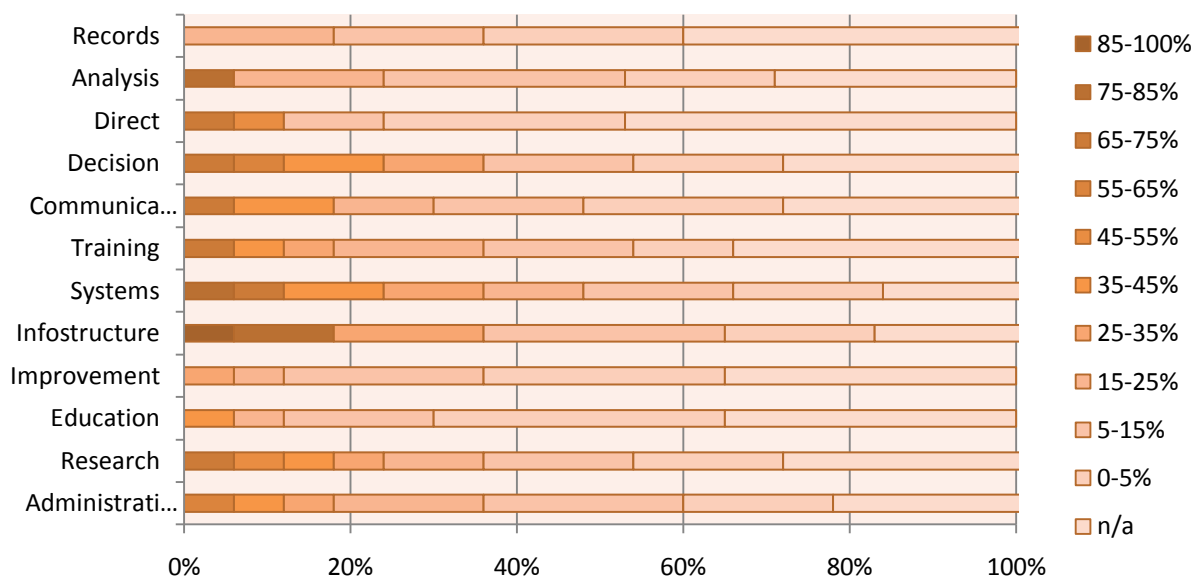
Pharmacist

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

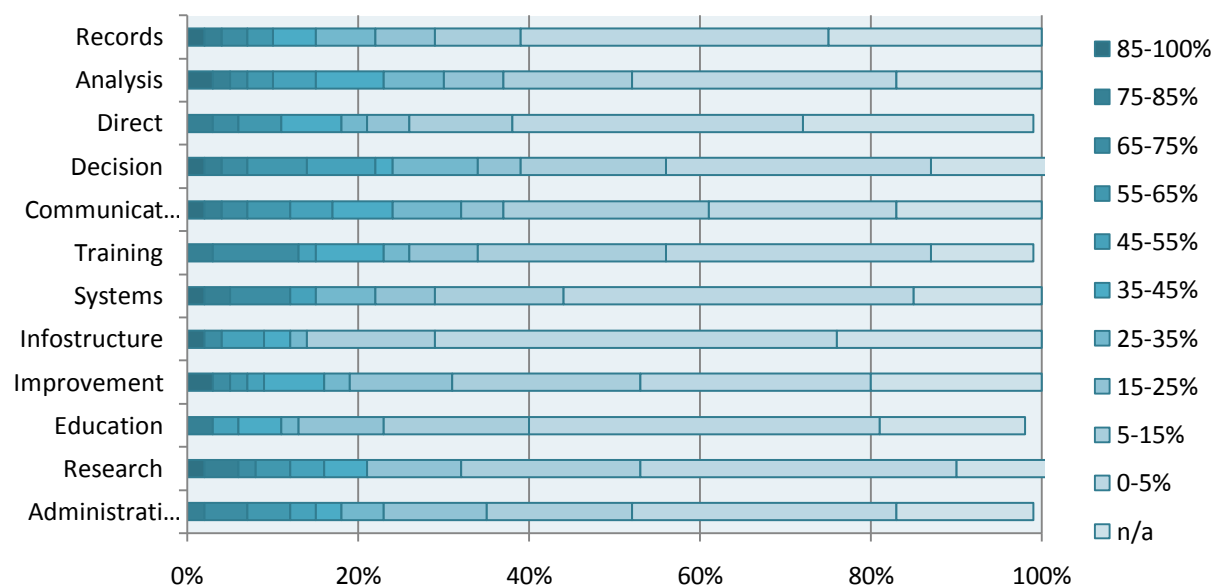
Allied Health Professional

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

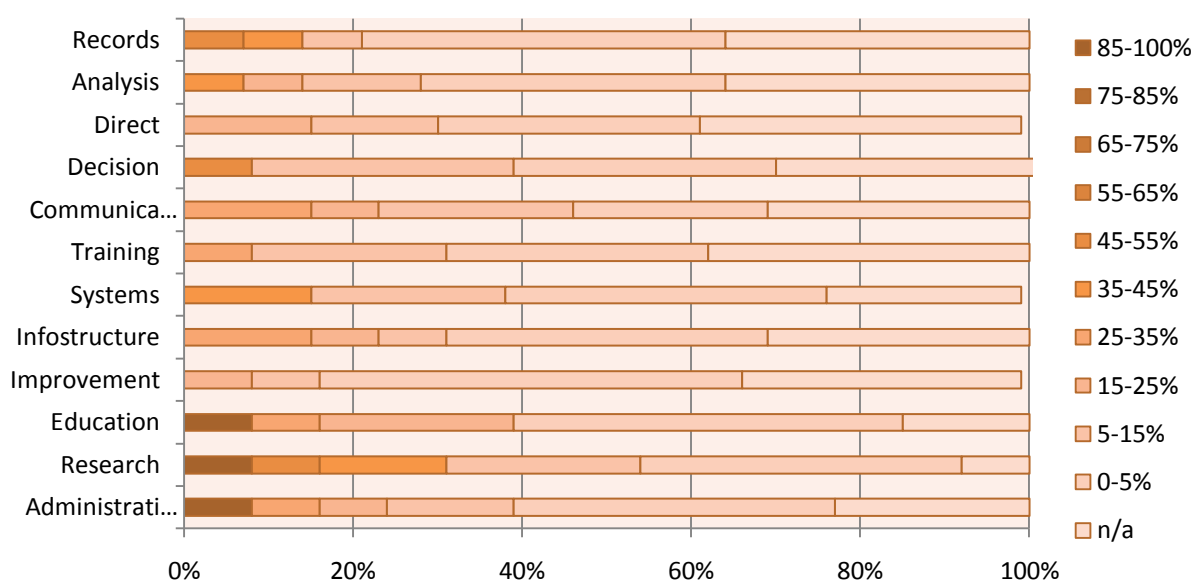
Other Healthcare Provider

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

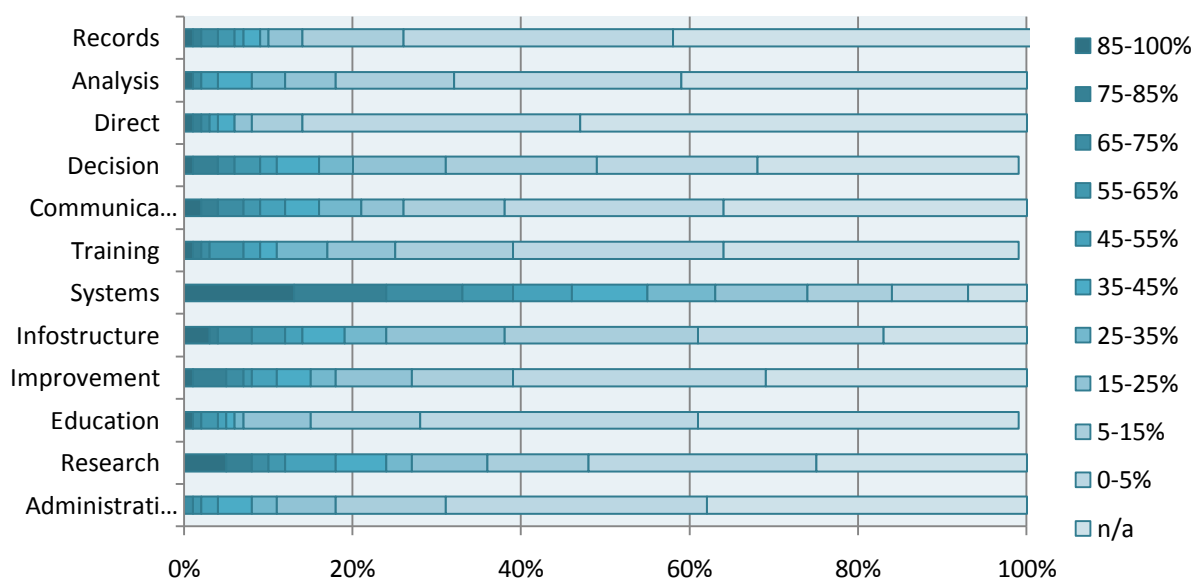
IT, Engineering or Science Professional

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%)

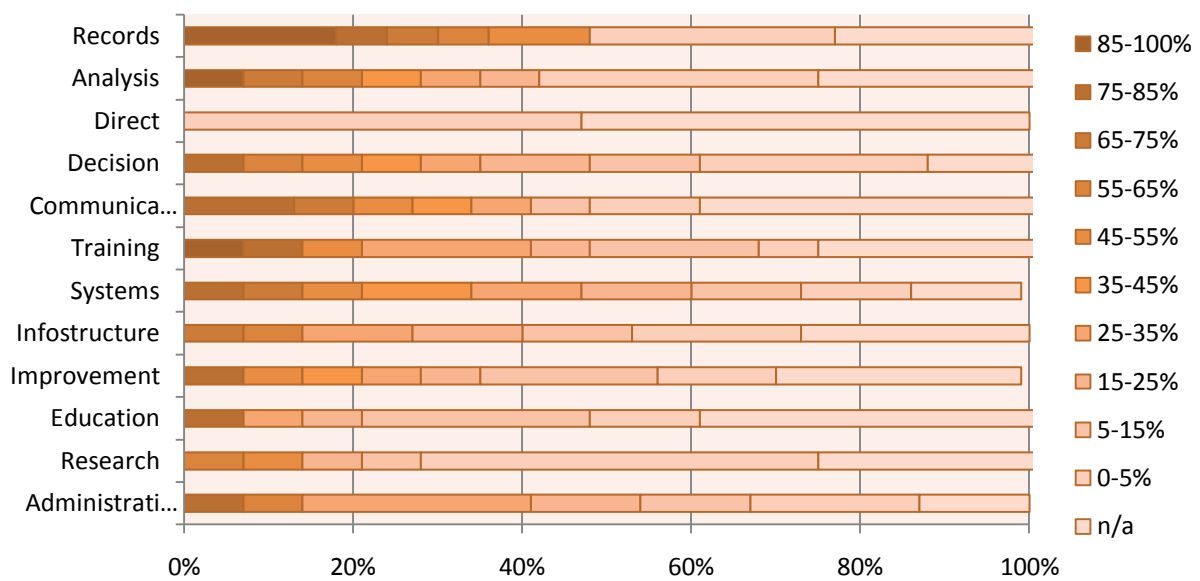
Support Worker

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

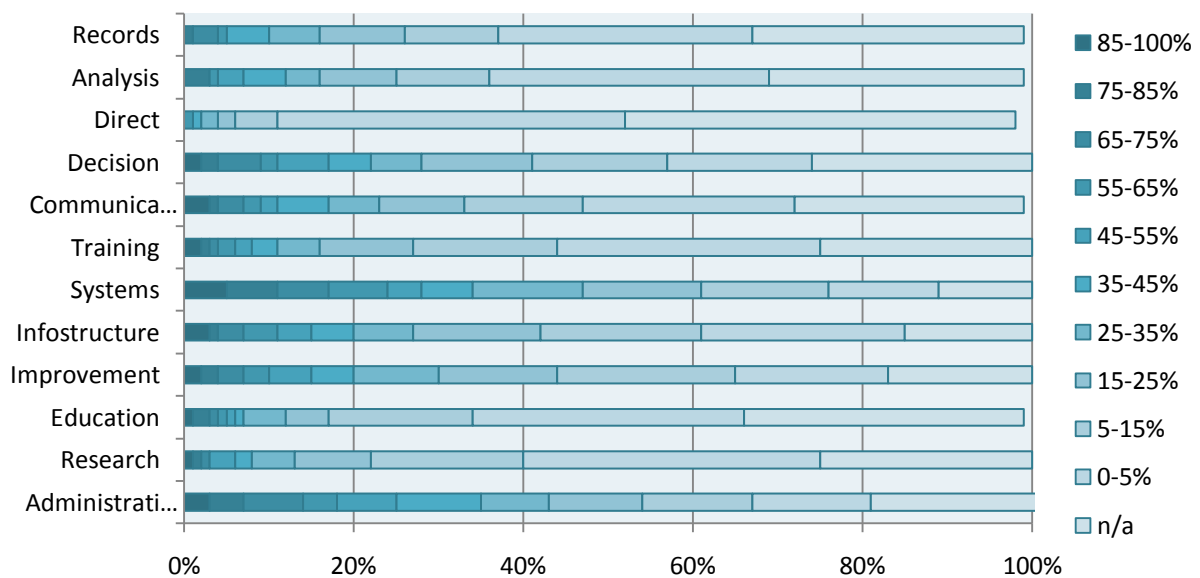
Manager

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'

Title	Males	Females	Total
599911 Coding Clerk	261 (12%)	1,917 (88%)	2,178 (100%)
224213 HIM	168 (13%)	1,088 (87%)	1,256 (100%)
Total			3,434

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 Australia³² – 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:

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

³¹ As of February 2009 and using the ACS definition - ACS, 2009, Australian ICT Statistical Compendium See: <https://www.acs.org.au/index.cfm?action=show&conID=compendium> viewed Aug 2009

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:

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

Estimate based on overseas data extrapolation

In the UK, the National Health Service (NHS) has counted their health informatics workforce⁴⁰ 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 Database⁴¹.

From the AIHW analysis of the 2006 census in Australia⁴² 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 $477,800 / 753,800 = 0.63$ (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

⁴⁰ Eardley T, NHS Informatics Workforce Survey. 2006, ASSIST: London, England,

http://www.bcs.org/upload/pdf/finalreport_20061120102537.pdf

⁴¹ Bill Hersh – ACMI discussion group

⁴² See <http://www.aihw.gov.au/publications/aus/ah08/ah08.pdf> viewed Aug 2009



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 eHealth⁴³ 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
 - ACAA - 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

⁴³ See www.ceh.net.au



- Informatics Societies, Associations & Research Units
 - ACS - Australian Computer Society
 - AIG – Australian Industry Group (AEEMA)
 - AIIA -Australian Information Industry Association
 - ANCC EH - Australian National Consultative Committee on eHealth
 - ATHS - Australian Tele-Health Society
 - CSIRO through The Australian e-Health Research Centre
 - Engineers Australia
 - HISA - Health Informatics Society of Australia
 - HIPS - Health Information Privacy & Security
 - MSIA - Medical Software Industry Association
 - Melbourne University
 - Monash University
 - NIA - Nursing Informatics Australia
 - Sydney University
 - University of NSW
 - University of Western Sydney
- Standards Development & Testing Organisations
 - AHML - Australian Healthcare Messaging Laboratory
 - ACHS - Australian Council on Healthcare Standards
 - HL7 Australia
 - IHE Australia - Integrating the Health Enterprise
 - OpenEHR
 - Standards Australia
 - NCCH - National Centre for Classifications in Health

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.





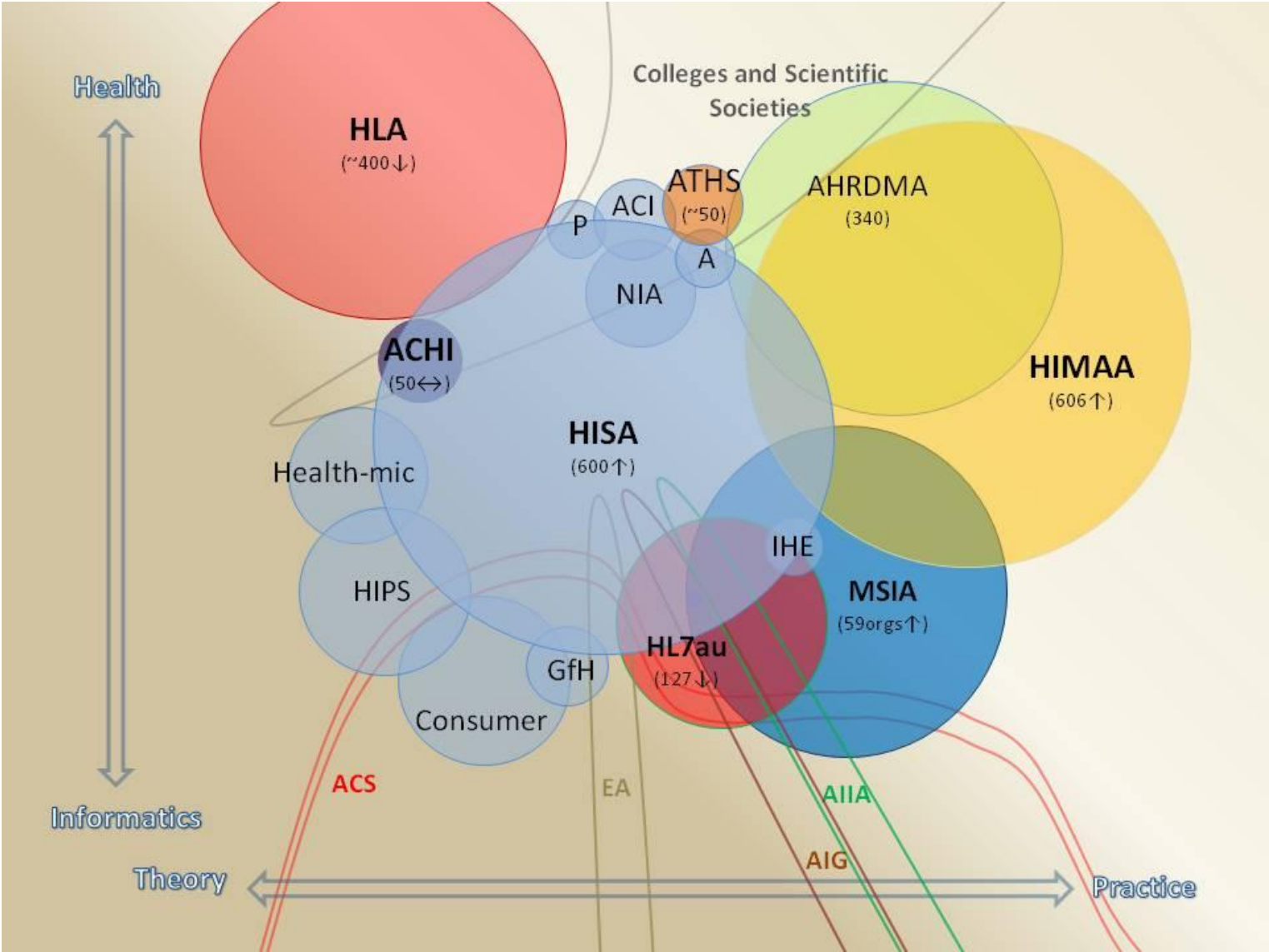


Figure 29 - Organisations that represent health informaticians in Australia - showing positioning, relative size, overlap and membership growth



Table 4 - The main organisations representing health informaticians (and providing a key to the map of organisations shown on the previous page)

Acronym	Name	Description	Members	Contacts	Works with	Activities
ACHI	Australian College of Health Informatics	'Peak health informatics professional body' www.achi.org.au	Fellows = 36 Mmbrs = 14 Total = 50 ⁴⁴	Terry Hannan – President Heather Grain - Secretary	HISA, HIMAA, HL7 Australia, Coalition for eHealth	eJHI AHIEC
HISA	Health Informatics Society of Australia	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 www.hisa.org.au	Mmbrs = 600 ⁴⁵ plus those associated through SIG activity = ~500 Total = ~1,100	Michael Legg – President Brendan Lovelock - CEO	National rep IMIA National rep APAMI Convener- Coalition for eHealth (CeH) NEHTA SRF HIMAA AHHA	Conferences Special Interest Groups Lobbying AusCHIP eJHI AHIEC
NIA	Nursing Informatics Australia	Nursing Informatics Australia (NIA) is a special interest group of HISA and is the pre-eminent group of nursing informaticians in Australia http://www.hisa.org.au/nursing	HISA = 72 Others = 0 Total = 72 ⁴⁶	Paul Donaldson – Chair Jo Foster-Secretary Robyn Cook- IMIA Nursing Representative	CoNNA Coalition of National Nursing Organisations Royal College of Nursing ANF IMIA – Nursing NEHTA	Annual conference IMIA Nursing Education
P	Pathology and Bioinformatics SIG	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 http://www.hisa.org.au/pathology	HISA = 10 Others = 20 Total = 30 ⁴⁷	Michael Legg – SIG Leader Vitali Sintchenko	Royal College of Pathologists of Australasia Australian Association of Clinical Biochemists Standards Australia Association of Pathology Informatics	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

⁴⁴ Source: Website membership list as at 01/07/09⁴⁵ Source: Membership database as at 3/09/09⁴⁶ Source: Secretary⁴⁷ Source: SIG Leader – Michael Legg

Acronym	Name	Description	Members	Contacts	Works with	Activities
ACI	Aged Care Informatics	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 www.hisa.org.au/agedcare	HISA = 20 Others =30 Total =50 ⁴⁸	Jeffrey Soar- SIG Leader	Aged and Community Services Australia (ACSA) Aged Care Association Australia (ACAA)	Annual HISA symposium Industry conference - ITAC (managed by HISA) Annual HIC workshop
A	Allied Health SIG	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 www.hisa.org.au/alliedhealth	HISA = 10 Others =40 Total =50 ⁴⁹	Louise Schaper SIG Leader	Allied Health Alliance	Active email list
HIPS	Health Information Privacy and Security Group	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 www.hisa.org.au/hips	HISA = 50 Others =70 Total =120 ⁵⁰	Peter Croll SIG Leader	Australian Law Reform Commission Federal Privacy Commission NEHTA Privacy Foundation Consumer Forum International Association of Privacy Professionals (Malcolm Crompton, President)	Annual Conference Health Privacy Futures Advice to the Australian Law Reform Commission Advice to NEHTA

⁴⁸ Source: SIG Leader⁴⁹ Source: Guesswork!⁵⁰ Source: SIG Leader

Acronym	Name	Description	Members	Contacts	Works with	Activities
health-mic	health-mic.org	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 www.hisa.org.au/health-mic	HISA = ? Others = ? Total = 75 ⁵¹	Chris Bain SIG Leader	Australian College of Health Service Executives (ACHSE) Royal Australian College of Medical Administrators (RACMA)	Active Google group First meeting to be held at HIC'09
Consumer	HealthBeyond	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 www.healthbeyond.org.au/	HISA = 20 Others = 80 Total = 100 ⁵²	Brendan Lovelock SIG Leader	Consumer Health Forum Chronic Care Alliance Interactive Entertainment Association of Australia Game Developer Association Centre for Health Innovation NEHTA Allied Health Alliance Australian Psychological Society	HealthBeyond Conferences Social Networking
GfH	Games for Health	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 www.hisa.org.au/games4health	HISA = 10 Others = 40 Total = 50 ⁵³	Stuart Smith SIG Leader	Interactive Entertainment Association of Australia Game Developer Association NEHTA Allied Health Alliance Australian Psychological Society	HealthBeyond Conferences Industry development
IHE	Integrating the Health Enterprise (IHE)	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 www.ihe.net.au	HISA = 10 Others = 20 Total = 30 ⁵⁴	Vincent McCauley Chair of IHE Jon Hilton – Deputy Chair Peter MacIsaac Secretary	MSIA, HL7au, RANZCR, ADIA, NEHTA, Standards Australia, AHML, IHE International	Profile development Connectathons Interoperability showcases

⁵¹ Source: SIG Leader – Chris Bain

⁵² Source: SIG Leader – Brendan Lovelock

⁵³ Source: HISA CEO – Brendan Lovelock

⁵⁴ Source: Deputy Chair – Jon Hilton



Acronym	Name	Description	Members	Contacts	Works with	Activities
HLA	Health Libraries Australia Group of the Australian Library & Information Association	The national peak body for health librarians under the umbrella of the Australian Library and Information Association www.alia.org.au/groups/healthnat/	~400 members in 446 libraries ⁵⁵	Mary Peterson Secretary Cheryl Hamill Committee Member	Australian Library and Information Association	Annual conference
ATHS	Australasian Tele-Health Society (ATHS)	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 www.aths.org.au	50 ⁵⁶	K Yogesan, President Laurie Wilson, Hon Sec	IsfTeH Standards Australia IT-14-12	Annual conference: Successes and Failures in Telehealth Bidding for 2010 International Telehealth Conf in Perth
AHRDMA	Australasian Health and Research Data Managers Association	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 www.ahrdma.com.au	340 ⁵⁷	Susan Smith Adam Stonely		Annual Scientific Meeting
HIMAA	Health Information Management Association of Australia	The peak association for health information managers in Australia www.himaa.org.au	~400 ⁵⁸	Vicki Bennett – President Bob Blue - CEO	HISA	Annual Conference Training Accreditation AHIEC

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



Acronym	Name	Description	Members	Contacts	Works with	Activities
MSIA	Medical Software Industry Association	The recognised official 'voice' of the healthcare software industry www.msia.com.au	59 organisations ⁵⁹	Vincent McCauley – President Bridget Kirkham – CEO	AIIA HL7au	Industry projects IHE Connectathons
HL7au	HL7 Australia	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). www.hl7.org.au	127 ⁶⁰	Klaus Veil – Chairman Chris Lynton-Moll – Hon Secretary	IHE MSIA	Standards Development Education Connectathons
ACS	Australian Computer Society	The recognised association for IT Professionals www.acs.org.au	Health group has low activity			
EA	Engineers Australia	Engineers Australia is the national peak body for all engineering disciplines www.engineersaustralia.org.au	Small group	Richard Dixon-Hughes	Standards Australia	Standards development Course accreditation Recognition of Practicing Computer Professional
AIIA	Australian Information Industry Association	The Australian Information Industry Association is the national organisation representing the information technology and telecommunications industry www.aiia.com.au	Has an active health group	Michael Hedley George Margelis	MSIA	Lobbying Seminars
AIG	Australian Industry Group	Created to help Australian Industry to be more competitive www.aigroup.com.au	AIG eHealth cluster group is active	Lorraine Lilly Angus Robinson		

⁵⁹ Source: MSIA CEO – Bridget Kirkham

⁶⁰ 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.

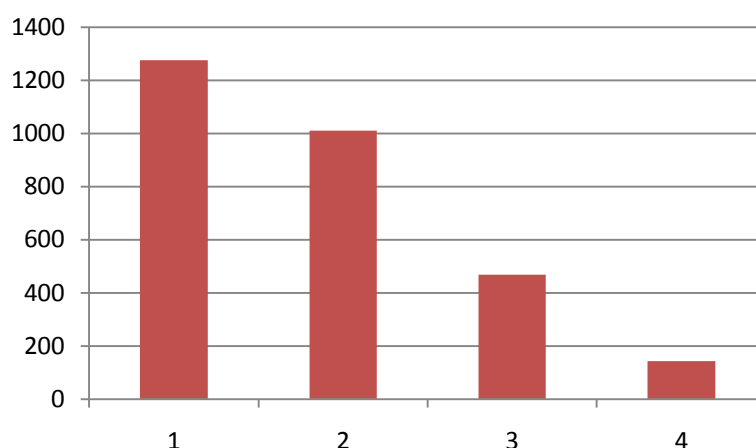


Figure 30 – The number of respondents with 1, 2, 3, and 4 or more qualifications

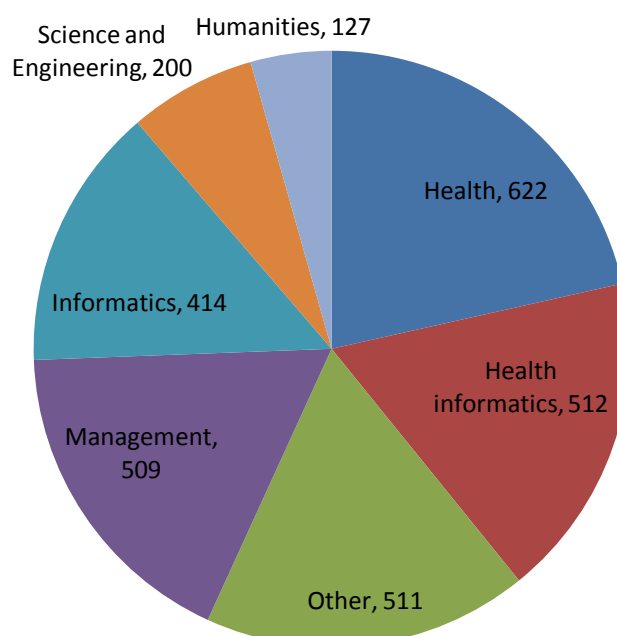


Figure 31 – The number of qualifications by knowledge domain held by the cohort

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

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

Figure 32 below shows the numbers of respondents with training by type showing the order of attainment.

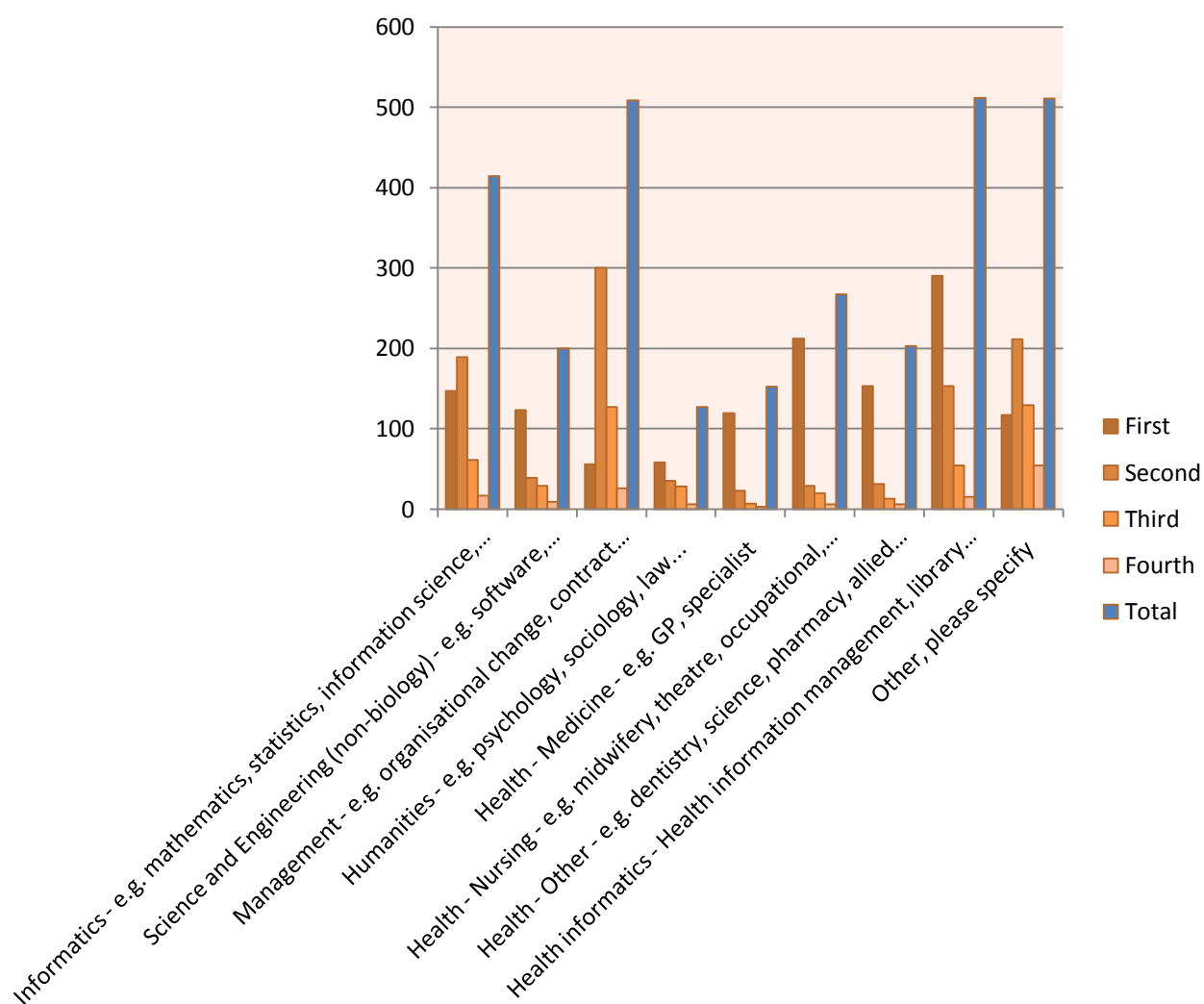


Figure 32 - Numbers with education and training by type showing the order of attainment

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 particular⁶¹:

- 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 strategy⁶² and three education, training and development programmes⁶³. Its work serves as a good model for what might be done in Australia (including their 2006 workforce study⁶⁴).

The Welsh NHS program (*Figure 33*) has developed a sophisticated health informatics career framework based on 9 levels in the following 7 disciplines⁶⁵:

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 portal⁶⁶ 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 UKchip⁶⁷ 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.

⁶² http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4073078

⁶³ See

http://www.dh.gov.uk/en/Managingyourorganisation/Informationpolicy/Policyarchive/WorkingTogetherforHealth/DH_4015203 viewed Aug 2009

⁶⁴ See http://www.bcs.org/upload/pdf/finalreport_20061120102537.pdf viewed Aug 2009

⁶⁵ See HiProfile (Wales) <http://www.wales.nhs.uk/sites3/page.cfm?orgid=584&pid=24219> viewed Aug 2009

⁶⁶ See <http://www.connectingforhealth.nhs.uk/systemsandservices/capability/phi> viewed Aug 2009

⁶⁷ See UKCHIP <http://www.ukchip.org/> viewed Aug 2009



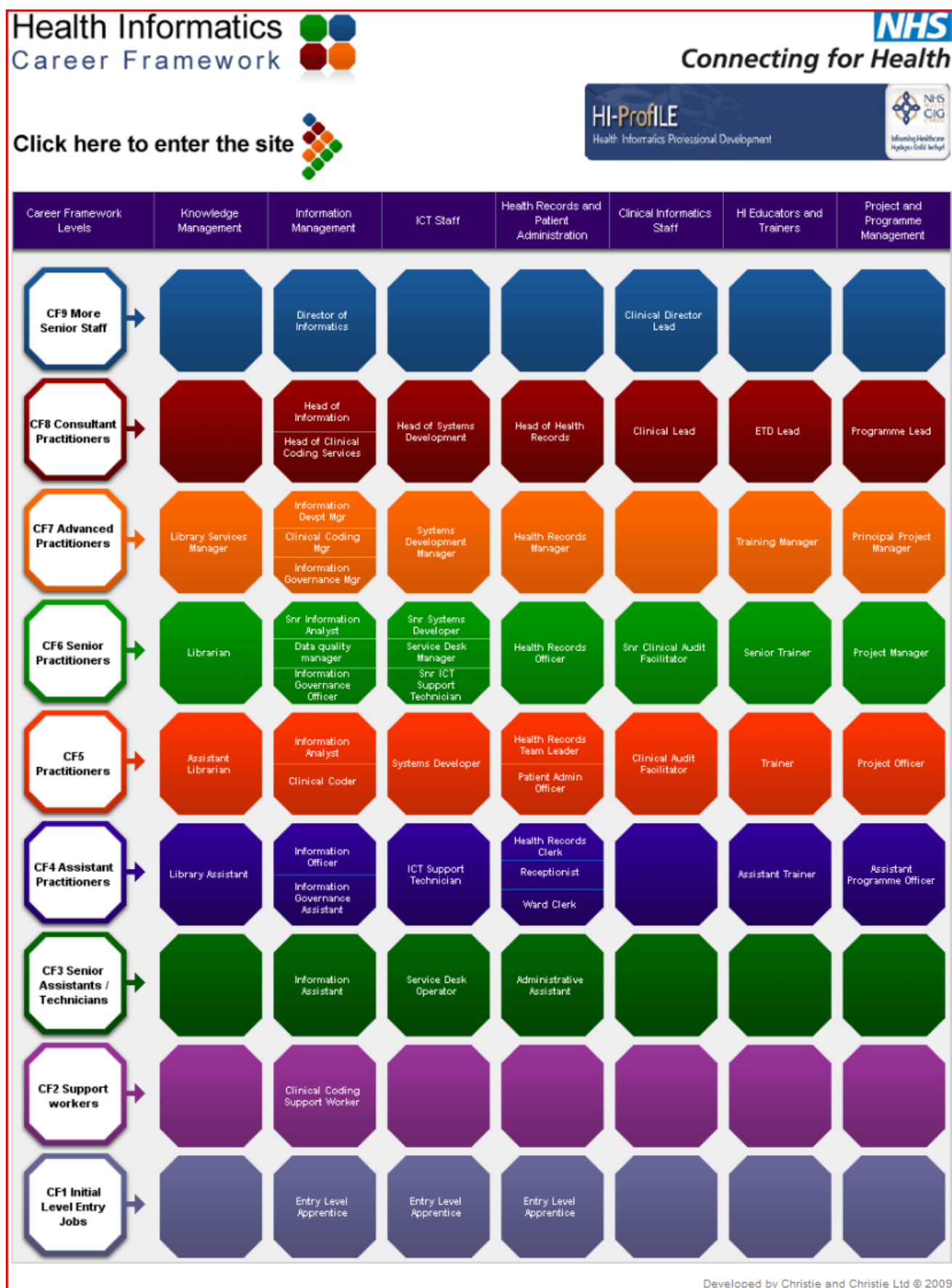


Figure 33 - Health informatics career framework from the Welsh NHS

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[®]



Level	Clinical & Health Sciences	Canadian Health System	Project Management	Organizational & Behavioural Management	Analysis & Evaluation	Information Management	Information Technology
5 Master	Chief Medical Informatics Officer	Chief Information Officer		Practice Director	Research & Analysis Vice President	Chief Privacy Officer	Chief Technology Officer
4 Expert	Clinical Informatics Director	Senior Policy Analyst	Program Management Office Director Program Director	Change & Evaluation Services Director	Senior Methodologist	Chief Quality Officer Information Management Director Standards Director	Architecture Director Information Technology Director
3 Proficient	Clinical Informatics Manager Outcomes Specialist	Business Development Analyst Risk Manager Senior Business Analyst	Project Director Program Management Office Manager	Engagement Manager Program Manager Service Manager	Senior Researcher	Privacy Specialist Registry Manager Standards Manager	Data Architect Security Specialist Solution Architecture Lead
2 Competent	Clinical Analyst Clinical Informatics Specialist	Business Analyst Policy Analyst Risk Analyst	Project Manager	Product Specialist Trainer Transition & Change Management Lead	Benefits & Evaluation Analyst Business Intelligence Analyst Information Analyst	Data Integrity Analyst Privacy & Data Access Lead Standards Subject Matter Expert	Data Modeller Integration Analyst Senior Testing Analyst Solutions Architect Technical Lead
1 Emerging Professional	Clinical Coordinator	Junior Business Analyst	Project Coordinator Program Coordinator	Product Support Analyst Training Coordinator	Research Analyst	Operations Assistant Privacy Analyst Standards Analyst	Help Desk Coordinator Testing Analyst

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 3016⁶⁸.

AMIA, the HISA equivalent in the US, lists the following activities in 2008⁶⁹

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> viewed Aug 2009

⁶⁹ AHIMA- AMIA, 2008 Joint Work Force Task Force - Health Information Management and Informatics Core Competencies for Individuals Working With Electronic Health Records See: http://library.ahima.org/xpedio/groups/public/documents/ahima/bok1_040723.pdf viewed Aug 2009



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 2008⁷⁰

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

⁷⁰ AHIMA- AMIA, 2008 Joint Work Force Task Force - Health Information Management and Informatics Core Competencies for Individuals Working With Electronic Health Records See: http://library.ahima.org/xpedio/groups/public/documents/ahima/bok1_040723.pdf viewed Aug 2009



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.
8. Through AHIMA's Vision 2016 for Quality Education in HIM, two studies in 2008 focus on educators' issues and an employer survey of future roles and competencies of graduate level HIM professionals. See http://www.ahima.org/emerging_issues/Vision2016BlueprintforEduc.pdf
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 ofACHI.

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

⁷² See UKCHIP <http://www.ukchip.org/> viewed Aug 2009

⁷³ See <http://www.auschip.org.au/> viewed Aug 2009



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 developed⁷⁴.

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 Strategy⁷⁵ prepared by Deloitte 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.

⁷⁴ See:

[http://www.health.gov.au/internet/hconnect/publishing.nsf/content/7746B10691FA666CCA257128007B7EAF/\\$File/wcnap03-04.pdf](http://www.health.gov.au/internet/hconnect/publishing.nsf/content/7746B10691FA666CCA257128007B7EAF/$File/wcnap03-04.pdf) viewed Aug 2009

⁷⁵ See: http://www.ahmac.gov.au/cms_documents/National%20E-Health%20Strategy.pdf viewed Aug 2009



The First National Workshop on Quality and Safety in Pathology in 2007 (and confirmed in 2008⁷⁶) 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 Gwynnyth 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:

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.

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 21 st 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.

⁷⁶ See: <http://www.health.gov.au/internet/main/publishing.nsf/Content/qupp-safety-qualityrept08-toc~qupp-safety-qualityrept08-wkshop> viewed Aug 2009



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
 - Reviews have shown big losses to hospitals - \$500,000 forgone activity at one hospital in 9 months
 - Demonstrated improvements in throughput with good understanding of information in hospitals - shorter waiting lists
- HIMAA
 - HIMs don't want to change or think they need to
 - No recognition of competencies required and so inappropriate grading by HR
 - Have to describe the whole knowledge domain in an ad
 - No career progression
 - True of HIMs and librarians esp
 - Information is power so problems with sharing
 - Understanding of health system required to evaluate overseas offerings
 - Specific Australian requirements
 - Can't attract new students
 - common problem to science but worse here
 - No vocational draw card
 - Health is different
 - Engagement is an imperative
 - Best systems have people that know them part of the business
 - Clinical champions
 - Time quarantined
 - Understanding of the domain
 - Lack of recognition of the consequences of failure
 - Continuing professional education not adequate
 - Compliance and conformance
 - Medical devices safety
 - Lack of control of large systems
 - Poaching of staff
 - Mismatch of training with jobs
 - Cannibalising other health workers
 - Eg Nurses
 - 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 down⁷⁷ 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 longer⁷⁸ 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
 - There has been a marked change but there exist islands of unrelated systems of heterogeneous quality
- Quality and Safety
 - Information is on the Australian Council for Safety and Quality in Healthcare list of high priority improvement opportunities.
- Efficiency
 - Pay for performance relies on data which relies on systems and knowledge workers
- Partisan Mutual Adjustment
 - 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
 - Multiple entry and exit points
- Increase recognition of support for clinicians as a way of addressing the more general health workforce
- Marketing
 - Innovation funding
 - U-tube
 - e.g. WA training program
- Business case from the Alfred available
- OS recruitment
 - 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
 - ACS
- Make the training free
 - Internships
 - Scholarships
- Professional exchange
- Prestigious affiliations
 - Institution to institution
- TAFE training
 - 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
 - Conjoint degree
- Consortium multi-university education program
 - Consider multi institution programs as for statisticians
 - As done in public health
 - and statistics
- Good postgrad projects with meaningful outcomes
- Paid training after successful completion
- Separation of vocational training vs higher education sectors
 - 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
 - Graduate recruitment program
 - 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



- Archetypes
 - Computable guidelines
- Further consolidation
 - Data centres
 - Outsourcing
 - Shareable electronic record
 - Cloud computing
 - Centralising medical records
 - BUT communication and team building with people is key
 - Facilitated teamwork
- Standardisation
- Improve funding system to reduce cost shifting
 - A lot of work done to optimise funding arrangements
- Sharing of information and people
 - 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
 - No fat left
 - No capacity to ration
- Make sure that information is valuable
 - 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

7 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 Bios

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

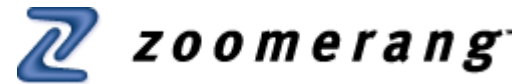


APPENDIX B – SURVEY QUESTIONS AND RESULTS



Health Informatics Workforce Study

Results Overview



Date: 6/29/2009 4:19 PM PST

Responses: Completes

Filter: No filter applied


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 that 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?







Informatics - e.g. mathematics, statistics, information science, library science, computer science...		147	12%
Science and Engineering (non-biology) - e.g. software, biomedical, electrical, communications, process, physics...		123	10%
Management - e.g. organisational change, contract management, risk, health administration, project management...		56	4%
Humanities - e.g. psychology, sociology, law...		58	5%
Health - Medicine - e.g. GP, specialist		119	9%
Health - Nursing - e.g. midwifery, theatre, occupational, psychiatric...		212	17%




Health - Other - e.g. dentistry, science, pharmacy, allied health...		153	12%
Health informatics - Health information management, library science...		290	23%
Other, please specify		117	9%
Total		1275	100%

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




Certificate or diploma		217	17%
Bachelors degree		625	49%
Post-graduate degree including masterate, specialist fellowships & doctorate		423	33%
Total		1265	100%

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






Informatics - e.g. mathematics, statistics, information science, library science, computer science...		189	19%
Science and Engineering (non-biology) - e.g. software, biomedical, electrical, communications, process, physics...		39	4%
Management - e.g. organisational change, contract management, risk, health administration, project management...		300	30%
Humanities - e.g. psychology, sociology, law...		35	3%
Health - Medicine - e.g. GP, specialist		23	2%
Health - Nursing - e.g. midwifery, theatre, occupational,		29	3%





psychiatric...			
Health - Other - e.g. dentistry, science, pharmacy, allied health...		31	3%
Health informatics - Health information management, library science...		153	15%
Other, please specify		211	21%
Total		1010	100%

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




Certificate or diploma		351	37%
Bachelors degree		201	21%
Post-graduate degree including masterate, specialist fellowships & doctorate		407	42%
Total		959	100%

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


Informatics - e.g. mathematics, statistics, information science, library science, computer science...		61	13%
Science and Engineering (non-biology) - e.g. software, biomedical, electrical, communications, process, physics...		29	6%
Management - e.g. organisational change, contract management, risk, health administration, project management...		127	27%
Humanities - e.g. psychology, sociology, law...		28	6%
Health - Medicine - e.g. GP, specialist		7	1%






Health - Nursing - e.g. midwifery, theatre, occupational, psychiatric...		20	4%
Health - Other - e.g. dentistry, science, pharmacy, allied health...		13	3%
Health informatics - Health information management, library science...		54	12%
Other, please specify		129	28%
Total		468	100%

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




Certificate or diploma		218	51%
Bachelors degree		70	16%
Post-graduate degree including masterate, specialist fellowships & doctorate		137	32%
Total		425	100%

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

Informatics - e.g. mathematics, statistics, information science, library science, computer science...		17	12%
Science and Engineering (non-biology) - e.g. software, biomedical, electrical, communications, process, physics...		9	6%
Management - e.g. organisational change, contract management, risk, health administration, project management...		26	18%
Humanities - e.g. psychology, sociology, law...		6	4%











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%







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






Certificate or diploma		62	50%
Bachelors degree		20	16%
Post-graduate degree including masterate, specialist fellowships & doctorate		42	34%
Total		124	100%

Section 1(B): Your Current Job



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




Medical practitioner		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%



		Total	1264	100%
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:			
I work for a healthcare provider organisation			527	42%
I work for a healthcare systems vendor			109	9%
I work for a government department			201	16%
I work for a healthcare services supplier			59	5%
I work for a university			160	13%
Other, please specify			213	17%
Total			1269	100%

12.	Organisation Size Click on the box which best describes the number of staff in your organisation:			
Less than 10			109	9%
11 to 50			144	11%
50 to 200			116	9%
200 to 1000			186	15%
Greater than 1000			718	56%
Total			1273	100%






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			
Male			569	45%
Female			696	55%
Total			1265	100%

14.	Age			
Less than 20			0	0%
20-30 years			127	10%
30-40 years			246	19%
40-50 years			421	33%

50-65 years		451	36%
More than 65 years		20	2%
Total		1265	100%

15. How much longer do you expect to work?

Less than 5		103	8%
5-10 years		231	18%
10-15 years		294	23%
15-20 years		242	19%
More than 20 years		392	31%
Total		1262	100%

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...

Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option.	<5%	5-15	15-25	25-35	35-45	45-55	55-65	65-75	75-85	85/100%	N/A
% time spent doing this in my job	311 25%	136 11%	94 8%	49 4%	48 4%	35 3%	40 3%	55 4%	48 4%	85 7%	327 27%
% relative importance of this work to my job	190 16%	72 6%	59 5%	40 3%	71 6%	46 4%	52 4%	80 7%	69 6%	216 18%	299 25%

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...

Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option.	<5%	5-15	15-25	25-35	35-45	45-55	55-65	65-75	75-85	85/100%	N/A
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% time spent doing this in my job	305 25%	183 15%	126 10%	65 5%	66 5%	46 4%	34 3%	25 2%	34 3%	34 3%	298 25%
% relative importance of this work to my job	210 18%	86 7%	77 7%	56 5%	82 7%	41 3%	78 7%	81 7%	66 6%	127 11%	280 24%

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...

Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option.	<5%	5-15	15-25	25-35	35-45	45-55	55-65	65-75	75-85	85/100%	N/A
% time spent doing this in my job	445 37%	69 6%	38 3%	22 2%	25 2%	14 1%	13 1%	14 1%	14 1%	13 1%	533 44%
% relative importance of this work to my job	361 31%	46 4%	33 3%	31 3%	32 3%	29 2%	22 2%	22 2%	29 2%	62 5%	502 43%

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...

Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option.	<5%	5-15	15-25	25-35	35-45	45-55	55-65	65-75	75-85	85/100%	N/A
% time spent doing this in my job	254 21%	209 17%	149 12%	71 6%	63 5%	46 4%	33 3%	46 4%	42 3%	28 2%	269 22%
% relative importance of this work to my job	171 15%	105 9%	91 8%	70 6%	86 7%	60 5%	65 6%	80 7%	85 7%	111 9%	251 21%

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...

Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option.	<5%	5-15	15-25	25-35	35-45	45-55	55-65	65-75	75-85	85/100%	N/A
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% time spent doing this in my job	270 22%	193 16%	113 9%	64 5%	72 6%	40 3%	39 3%	41 3%	33 3%	33 3%	309 26%
% relative importance of this work to my job	198 17%	102 9%	71 6%	53 5%	89 8%	41 3%	59 5%	86 7%	72 6%	115 10%	289 25%

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...

Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option.	<5%	5-15	15-25	25-35	35-45	45-55	55-65	65-75	75-85	85/100%	N/A
% time spent doing this in my job	317 26%	212 17%	131 11%	66 5%	46 4%	30 2%	41 3%	30 2%	30 2%	29 2%	281 23%
% relative importance of this work to my job	200 17%	121 10%	93 8%	64 5%	72 6%	72 6%	70 6%	72 6%	55 5%	103 9%	266 22%

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...

Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option.	<5%	5-15	15-25	25-35	35-45	45-55	55-65	65-75	75-85	85/100%	N/A
% time spent doing this in my job	211 17%	168 14%	141 12%	115 9%	82 7%	62 5%	62 5%	80 7%	68 6%	77 6%	157 13%
% relative importance of this work to my job	133 11%	89 7%	69 6%	77 6%	89 7%	69 6%	78 7%	138 12%	102 9%	206 17%	146 12%

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...

Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option.	<5%	5-15	15-25	25-35	35-45	45-55	55-65	65-75	75-85	85/100%	N/A
---	-----	------	-------	-------	-------	-------	-------	-------	-------	---------	-----

% time spent doing this in my job	332 27%	212 18%	121 10%	73 6%	55 5%	46 4%	36 3%	41 3%	25 2%	26 2%	241 20%
% relative importance of this work to my job	209 18%	119 10%	66 6%	81 7%	93 8%	60 5%	73 6%	74 6%	64 5%	118 10%	221 19%

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...

Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option.	<5%	5-15	15-25	25-35	35-45	45-55	55-65	65-75	75-85	85/100%	N/A
% time spent doing this in my job	285 24%	193 16%	128 11%	79 7%	58 5%	44 4%	34 3%	40 3%	49 4%	51 4%	247 20%
% relative importance of this work to my job	181 15%	114 10%	81 7%	63 5%	72 6%	60 5%	57 5%	81 7%	100 8%	143 12%	229 19%

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...

Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option.	<5%	5-15	15-25	25-35	35-45	45-55	55-65	65-75	75-85	85/100%	N/A
% time spent doing this in my job	391 33%	155 13%	87 7%	50 4%	23 2%	24 2%	20 2%	19 2%	21 2%	21 2%	377 32%
% relative importance of this work to my job	264 23%	111 10%	83 7%	55 5%	52 4%	33 3%	48 4%	40 3%	50 4%	67 6%	356 31%

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...

Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the	<5%	5-15	15-25	25-35	35-45	45-55	55-65	65-75	75-85	85/100%	N/A
---	-----	------	-------	-------	-------	-------	-------	-------	-------	---------	-----



option.											
% time spent doing this in my job	375 31%	170 14%	103 9%	49 4%	54 4%	41 3%	26 2%	25 2%	32 3%	40 3%	289 24%
% relative importance of this work to my job	254 22%	95 8%	71 6%	56 5%	71 6%	65 6%	44 4%	55 5%	66 6%	127 11%	272 23%

29.

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...

Top number is the count of respondents selecting the option. Bottom % is percent of the total respondents selecting the option.	<5%	5-15	15-25	25-35	35-45	45-55	55-65	65-75	75-85	85/100%	N/A
% time spent doing this in my job	327 27%	171 14%	113 9%	75 6%	46 4%	40 3%	38 3%	32 3%	27 2%	22 2%	306 26%
% relative importance of this work to my job	245 21%	103 9%	84 7%	65 6%	76 7%	52 4%	52 4%	67 6%	46 4%	83 7%	292 25%

30. Do you consider yourself a health informatician.

Yes		733	59%
No		500	41%
Total		1233	100%

258 Responses

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APPENDIX C – COMPETENCIES

*HIMAA Competencies*⁷⁹

- Communication skills Report writing skills
 - Letter/memo writing skills
 - Public speaking
 - Education skills (eg, 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 (eg, 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 (eg, 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 Competencies⁸⁰

- 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.

⁸⁰ AHIMA- AMIA, 2008 Joint Work Force Task Force - Health Information Management and Informatics Core Competencies for Individuals Working With Electronic Health Records See: http://library.ahima.org/xpedio/groups/public/documents/ahima/bok1_040723.pdf viewed Aug 2009



- 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
 - Report any possible breaches of confidentiality in information system. accordance with organizational policies.
 - Describe the possible consequences of inappropriate
 - Describe monetary and prison penalties for breaches. 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 trails 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).

Course / Unit	Section Responsible	URL	Contact Name
Australian National University [ANU]			
	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	http://nceph.anu.edu.au	Prof Niels Becker , Director Prof Gabriele Bammer
Bond University [Bond]			
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.	Centre for Health Informatics (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.	http://www.bond.edu.au/research/health%20informatics%20centre.html	Prof Chris Del Mar Professor Mieke van Driel
Central Queensland University [CQU]			
Closed			
Charles Darwin University [CDU]			
HLT200 Introduction to Health Informatics (8)			
CDU - Menzies School of Health Research			
		http://www.menzies.edu.au/	Prof Jonathan Carapetis, Director, Menzies School of Health Research Assoc Prof John Condon
Charles Sturt University [CSU]			

Curtin University of Technology [CURTIN]				
<p>Bachelor of Science - Health Sciences - BSc 155599. 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</p> <p>Graduate Certificate in Public Health 303908. 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.</p>	<p>Epidemiology and biostatistics; management theory; fundamental computing and health information systems; study in subsequent years includes units in database management, electronic health information systems and health informatics, health economics, casemix and clinical costing.</p> <p>Health informatics - examine the concepts and principles of health informatics, standards and legislation, terminologies and vocabularies, privacy, security and contingency planning, health information systems and classification systems. You will study systems theory, enterprise and information architecture, information engineering, data modelling and health informatics policy formation. You will also complete a unit in either health services management or health care systems. 311330 Health Informatics Major (Graduate Certificate) - This major is designed to provide specialist training in the area of health informatics for graduate students.</p>	School of Public Health	http://futurestudents.curtin.edu.au/course_overview/UG/health-sciences	Katherine Bathgate, Lecturer, School of Public Health
311330 v.2 Health Informatics Major (Graduate Certificate). This major is designed to provide specialist training in the area of health informatics for graduate students.	Health Research Methods; Health Care Systems OR Health Services Management; Introduction to Health Informatics ; Advanced Health Informatics			

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
Bachelor of Business Information Systems - the course addresses the business applications of technology, the management of large quantities of information and the way in which this affects and changes modern organisations.	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=M305&stutype=local&continue=Continue#OVERVIEW	Matthew Warren, Head of School, School of Information Systems
Edith Cowan University [ECU]				

Flinders University [FLINDERS]					
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.y	Legal/Ethical Aspects and Health Care; Human Bioscience; Human Bioscience; Reforming Health Care: Policy, Politics and the Professions; Communication for Health Practitioners; Health: A Psychological Perspective; Society and Health: Sociology and Epidemiology.	School of Medicine, Faculty of Health Sciences	/www.flinders.edu.au/calendar/vol2/ug/BHlthSc.htm#Prog	Prof Paul Arbon, Deputy Head, Faculty Health Sciences	
		Research Interests Population health, Health informatics	http://www.pocris.org.au/rour/profiles.php?elibid=1208	Dr Andrew Baird	
Griffith University [GRIFFITH]					
7314PBH: Health Informatics	Introduction to Health Informatics ; Introction to the building blocks of Health Informatics ; Health information systems; Management issues in Health Informatics ; Human issues; Future issues and directions.	School of Public Health	http://www3.griffith.edu.au/03/STIP4/app?page=CourseEntry&service=external&sp=S7314PBH		
		Griffith Institute for Health and Medical Research - Population Health	http://www.griffith.edu.au/health/griffith-institute-health-medical-research		
James Cook University [JCU]					
QRDP Queensland Research and Development Priority	Health and well-being: 506 Cost-effective rural and remote healthcare (e-health solutions)		http://cms.jcu.edu.au/researchservices/data/classification/JCU/PRD_032506		

La Trobe University [LA TROBE]					
Bachelor of Health Information Management	Health Informatics: A (HIM11HIA), B (HIM12HIB), C (HIM21HIC), D (HIM22HID), E (HIM32HIE), F (HIM41HIF)	Faculty of Health Sciences, School of Public Health	http://www.latrobe.edu.au/publichealth/HIM/health_informatics.htm		
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.	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, health informatics.	Faculty of Health Sciences, School of Public Health	http://www.latrobe.edu.au/publichealth/HIM/index.htm	Ms Kerin Robinson, Head, Health Information Management Program	
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	Basic human biosciences and factors influencing health, developing an understanding of the roles of health professionals in the health and welfare sectors, health information management, including health classification, health information systems, and health informatics (e-health).	Faculty of Health Sciences, School of Public Health	http://www.latrobe.edu.au/publichealth/HIM/index.htm	Ms Kerin Robinson, Head, Health Information Management Program	
Health Policy and Management - Research Project	E-Health Policy	School of Public Health		Dianne Williamson, Senior Lecturer	
				Graham Hart, Adjunct Assoc. Prof & Deputy Director Austin Hospital Heather Grain, Researcher	
				Ben Spurr, Researcher	
Macquarie University [MACQUARIE]					
	Bioinformatics				

Monash University [MONASH]				
Contemporary Issues in Health Informatics - Post Graduate Short Courses delivered by Off Campus Distributed Learning 3897 - Master of Health Sciences	Course 1: Emerging Trends in Clinical Care; Course 2: Evaluation Methodologies; Course 3: Internet Technologies;		http://www.monash.edu.au/informatics/shortcourses/contemporary.html	Janette Agg, Lecturer and Co-ordinator of Postgraduate Health Informatics .
	CRH1001 Research methods in health; CRH1032 Applied research for health practitioners; Health Informatics stream: CPE7601 Healthcare information systems; CPE7602 Developing health information systems; CPE7603 Contemporary issues in health informatics ; 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 ;	Faculty of Medicine, Nursing and Health Sciences	http://www.monash.edu.au/publications/handbooks/courses/3897.html	
e-Health Research Unit (incorporating Health Informatics Education)		Faculty of Medicine, Nursing and Health Sciences	http://www.monash.edu.au/ehsr/ehsr.org/ehsrpublications.html	Janette Gogler, Health Informatics Education
Murdoch University [MURDOCH]				



Open University			
Postgraduate - Health Industry Management Program	HTHM603 - Introduction to Health Informatics - 1. The Context for Health Informatics 2. Fundamental Concepts in Health Informatics 3. Governance Framework for Health Informatics 4. Managing information requirements 5. Socio-technical approaches to informatics 6. Project Management 7. Project Evaluation 8. Health Care Information Systems 9. Health Care and the Internet 10. Business Systems in Health Care 11. Evidence-based Practice 12. Public Health & Population-based Health Systems	Study Provider - Curtin University of Technology	https://www.open.edu.au/wps/portal/cxml/04_Sj9SPykssy0xPLMnMz0vM0Y_QjzKLN4h3NQTKRJoDWUG--iH6UfpR-aWJoXmZJc75Kan6kR4hHr5mBsb6BdmJkQC9Sazm
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.	Human Health and Wellbeing	Institute of Health and Biomedical Innovation (ihbi)	http://www.e-health.qut.edu.au/ http://www.giving.qut.edu.au/opportunities/ihbi.jsp Executive Director: Prof Ross Young Institute Manager: Elizabeth Kerr Ms Sue Walker: Associate Director

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.			http://www.rmit.edu.au/browse;ID=036667heparta;STATUS=A?QRY=Introduction%20to%20Biocomputing%20and%20Medical%20Informatics&STYLE=ENTIRE	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	http://www.rmit.edu.au/browse;ID=cm6evu2ybxtb1;STATUS=A?QRY=e-Health&STYLE=ENTIRE	
		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	http://aslarc.scu.edu.au/	Prof Colleen Cartwright Prof. Peter R. Croll Professor of Information Technology & Information Systems
		School of Commerce and Management		
Swinburne University of Technology [SWINBURNE]				
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 Poly-browser and Authoring Tool (PAT); AMDT Demo 4	School of Population Health and Clinical Practice	http://www.adelaide.edu.au/health/gp/research/current/informatics/	

	<p>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.</p>	Faculty of Health Sciences	http://www.informatics.adelaide.edu.au/Courses.html	Unit Director: Dr Malcolm Pradhan
<p>Health Informatics Research Project: Health Systems Analysis</p>	<p>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.</p>	<p>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.</p>	http://www.informatics.adelaide.edu.au/Research.html	
<p>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)</p>	<p>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</p>		http://www.adelaide.edu.au/programfinder/2009/gdnsc_gdnsmnthn.html	

Bachelor of Nursing	Bachelor of Nursing Graduates will be particularly distinguished by the following attributes: 10. Being well equipped to practice as a registered nurse in an 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.	Discipline of Nursing	http://www.adelaide.edu.au/programfinder/2009/bnurs_bnursing.html#outline	Prof Alison Kitson, Head of Nursing Discipline
University of Ballarat [BALLARAT]				
	Health Informatics Laboratory (HIL)	HIL encompasses the Collaborative Centre for eHealth (CCeH) and the Australian Health Messaging Laboratory (AHML).	http://www.ballarat.edu.au/ard/itms/research/researchGroups/HIL/	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
	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 .	CIAO has five Research Groups and Laboratories: Mathematical Analysis & Optimization; Data Mining & Informatics; Virtual Reality & Simulation; Internet Commerce Security; Health Informatics .	http://www.ballarat.edu.au/ard/itms/CIAO/ciao.shtml	

<p>CB 620 Introduction to Health Informatics</p> <p>Bachelor of Biomedical Science</p>	<p>ITECH 2105 Introduction to Health Informatics</p>	<p>http://www.ballarat.edu.au/fees/2008/outlines/CP_620_Outline.pdf#search=%22health%20informatics%22</p> <p>http://www.ballarat.edu.au/fees/current/displayunit.cgi?UnitCode=ITECH%202105</p>
University of Canberra [CANBERRA]		
892AA Graduate Certificate in Health Informatics		
University of Melbourne [MELBOURNE]		
	<p>The University of Melbourne's Health Informatics Network</p>	<p>http://www.healthinformatics.unimelb.edu.au/</p> <p>Prof Peter Harris Faculty of Medicine, Dentistry and Health Sciences (Chair) Prof Liz Sonenberg Faculty of Science (Co-chair) Dr Ann Borda Victorian eResearch Strategic Initiative A/Prof Jim Black, Nossal Institute for Global Health Dr Kathleen Gray Biomedical Multimedia Unit A/Prof Graeme Hart, Austin Centre for Applied Clinical Informatics Dr Marianne Hibbert BioGrid Australia (formerly Bio21:MMIM) Ms Reeve Lederman Department of Information Systems Prof Graeme Shanks, Dept of Information Systems Prof Loan Skene, Faculty of Law</p>

Research Interests:
Record Linkage,
Consent, Ethics,
Health Informatics

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hp?elibid=24
13](http://www.p
hcris.org.au/r
oar/profiles.p
hp?elibid=24
13)

Prof Leon
Sterling,
eResearch
Directorate,
Information
Services
Prof Justin
Zobel, National
ICT Australia
Victoria
Research
Laboratory
DR DOUGLAS
IAIN ROSS
BOYLE, Ph.D.
**Health
Informatics**
(Dundee,
Scotland)
Dr Justin Tse
Dr Lisa Zafrina
Wise
Mrs Reeva
Miriam
Lederman
Dr Michael
Victor Arnold
Dr Christopher
Pearce
Dr Jane Sims
Dr Kathleen
Mary Gray
Dr Hilary Jane
Davis
Dr James
Bailey
Dr James Black
Dr Andrew
Lonie
Dr Yin Paradies

University of New England [UNE]

Bachelor of Health Science no longer offered. Currently enrolled students must complete this course by 31st December 2012



University of New South Wales [UNSW]		
<p>Health Informatics - 9036: The Master of Health Informatics and the Master of Health Informatics (Extn) programs are initiatives of the Centre for Health Informatics and the School of Public Health and Community Medicine at UNSW. The Centre for Health Informatics (</p>	<p>PHCM9911 Health Informatics Principles; PHCM9912 Clinical Information Systems; PHCM9913 Evidence Based Health Systems; PHCM9914 Managing Information Projects; COMP9081 Harnessing the Power of IT; PHCM9915 Intro to ICT for Health; PHCM9041 Health Care Systems; PHCM9304 Learning Clinical Reasoning; BINF9010 Bioinformatics Methods and App; PHCM9503 Statistics for Public Health; PHCM9517 Advanced Biostatistics; PHCM9741 Management of Change; PHCM9902 AI in Health Care; PHCM9903 Data Analysis, Data Mining; PHCM9904 Res & Eval Methods: Informatic; PHCM9922 Decision Support Systems; IMGT5445 Information Management and Business Intelligence for Organisations and Industry; IMGT5430 Health Information Management.</p>	<p>Faculty of Medicine http://www.handbook.unsw.edu.au/postgraduate/programs/2006/9036.html Prof Raina MacIntyre, Head of School, Public Health & Community Medicine</p>
<p>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.</p>	<p>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.</p>	<p>http://www.chi.unsw.edu.au/</p>

Asia-Pacific Ubiquitous Healthcare Research Centre (APuHC) - The main objectives of APuHC are to conduct collaborative research in ubiquitous healthcare (u-Health) areas

Australian School of Business

http://www.business.unsw.edu.au/nps/servlet/portalservice?GID=System.LoggedOutInheritableArea&maxWnd=T_APuHC_home

A/Prof Pradeep Ray, Director, APuHC

A/Prof Fethi Rabhi, Deputy Director, APuHC Academic Staff

Anthony, Stephen Research Associate
Dunn, Adam Research Fellow
Gallego Luxan, Blanca Research Fellow
Lau, Annie Research Fellow
Li, Simon Y. W. Post-Doctoral Fellow
Magrabi, Farah Senior Research Fellow
McDonnell, Geoff Research Fellow
Sintchenko, Vitali NICS Research Fellow
Tsafnat, Guy Senior Research Fellow
Zimec, Tatjana Senior Lecturer



University of Newcastle [NEWCASTLE]			
<p>Dampney Centre for IT Applications - Project: <i>Health Informatics</i></p>	<p>The research topics involved in this field are: Investigation of security protocols and techniques appropriate to the distributed database model intended for accumulating and sharing clinical information among the various organizations in the health system, and possibly with the patient. This must take into account the sensitivity of individual data elements as well as the possible effects of aggregation.</p> <p>Investigation of web based delivery models for inter-connecting the range of software and databases required for achieving the new integrated architectures. This includes evaluation of Application Service Provider (ASP) technologies.</p> <p>Building theoretical models that explain information structures as they are developed in practice.</p>	<p>http://www.newcastle.edu.au/centre/dc_ita/project_healthinfo.htm</p>	<p>Janet Aisbett, Conjoint Professor in Information Technology</p>
<p>Bachelor of Computer Science - Career opportunities include computer games developer, graphics and animation expert for movies and television, health informatics professional, Internet web engineer, developing and enhancing defence and security systems, bio-informatics and the human genome, developing adaptive robotics systems, systems engineering, and developing new software systems for business and engineering.</p>	<p>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.</p>	<p>Faculty of Engineering and Built Environment</p> <p>http://www.newcastle.edu.au/program/10177.html</p>	<p>A/Prof Ljiljana Brankovic Peter Summons Martin Sutton Brian Regan</p>
University of Notre Dame Australia - The [UNDA]			



University of Queensland [QUEENSLAND]				
eHealthcare (HLTH2000) - The course is to foster awareness of e-health at national and international level. Students will examine the characteristics of e-health in various countries such as Australia, US, Canada, Europe and the developing world.	HLTH 2000 is an introductory course in e-health . This course aims to provide you with an understanding of important aspects related to the use of ICT in healthcare, particularly the types of e-health applications, relevant technologies and telecommunication needs, current status of e-health and future potential.	Faculty of Health Sciences, School of Medicine	http://www.uq.edu.au/study/course.html?course_code=HLTH2000&fees_wi_z_search=	Dr Sisira Edirippulige, Lecturer and Coordinator - eHealthcare courses
Master of e-Healthcare (MeH)	The e-Healthcare suite of programs are designed to provide knowledge and hands-on skills in e-healthcare. The programs are designed to involve graduates in planning and implementing e-health research	Faculty of Health Sciences, School of Medicine	http://www.uq.edu.au/study/program.html?acad_prog=5274#	Dr Sisira Edirippulige, Lecturer and Coordinator - eHealthcare courses
Bachelor of Information Technology (BlInfTech) - Health Informatics Major/s	ECON2460 Health Economics HLTH3000 Legal & Ethical Principles in Health HMST3617 Ergonomics in Occupational Health & Safety PUBH1102 Introduction to Population Health PUBH1103 Health Systems & Policy PUBH2007 Health Research Methods [PUBH3002 Evaluation of Health Services [OR [PUBH3003 Evaluation of Health Programs: Field Placement	School of Information Technology and Electrical Engineering, Faculty of Engineering, Architecture & Information Technology	http://www.uq.edu.au/study/plan_display.html?year=2009&acad_plan=HLINFY2230	Prof Paul Bailes, HoS
Univ Qld Centre for Online Health - research in the areas of telehealth and homecare teaching about online health the delivery of online health services.		Faculty of Health Sciences	http://www.uq.edu.au/health/	Prof Len Gray, A/Director UQ Centre for Online Health Senior Principal Research Fellow (Geriatric Medicine)

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.	Division of Information Technology, Engineering and the Environment School of Computer and Information Science	http://www.unisanet.unisa.edu.au/programs/program.asp?Program=LBSG&Plan=N/A06-LBSG
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	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		http://www.usq.edu.au/scholars/hips/postgrad/apai+in+health+informatics.htm A/Prof Jeffrey Soar A/Prof Trudy Yuginovich A/Prof Raj Gururajan

University of Sydney [SYDNEY]			
Bachelor of Health Sciences/Master of Health Informatics	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 & 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 .	Faculty of Health Sciences, Discipline of Health Informatics	http://www.usyd.edu.au/handbooks/health_sci/23_himtpg.shtml Prof Robert Steele
Health Informatics	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.	Faculty of Health Sciences	http://www.fhs.usyd.edu.au/hireu/ Prof Johanna Westbrook, Director, HIREU Dr Joanne Callen, Snr Research Fellow, HIREU Dr Nerida Creswick - Postdoctoral Fellow, HIREU Ms Anne Marks. Lecture



University of Tasmania [TASMANIA]			
H5E Graduate Certificate in E-Health (Health Informatics)	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; CRH508 Health Information Systems; CRH509: Rural and Remote Health Informatics .	Department of Rural Health	http://fcms.its.utas.edu.au/healthsci/ruralhealth/courses.asp
H6E Graduate Diploma of E-Health (Health Informatics)	CRH502 E-Health ; CRH504 The diffusion of health technology: change management; CRH505 Electronic health records: trends and issues; CRH506 Understanding Health Informatics Research; CRH507 Health Informatics Research Methods; CRH508 Health Information Systems; CRH509: Rural and Remote Health Informatics	Department of Rural Health	http://fcms.its.utas.edu.au/healthsci/ruralhealth/courses.asp
			Ms Sue Whetton Ms Yvette Massey Ms Jessica Whelan
University of Technology Sydney [UTS]			
C10251v1 Bachelor of Arts in Communication (Information Management) - 50492 Legal and Health Information	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		http://www.handbook.uts.edu.au/courses/c10251.html
			Ms Kristine Deray

University of the Sunshine Coast [USC]				Rania Shibl, Lecturer, Information Systems
University of Western Australia [UWA]				
Master of Public Health	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.	Faculty of Medicine, Dentistry and Health Sciences	http://www.sph.uwa.edu.au/courses/summer-school/health-info	A/Prof Keith Lui
University of Western Sydney [UWS]				
Bachelor of Information and Communications Technology - major in Health Informatics , sub-majors in Health Information Applications and Health Information Management	Introduction to Health Informatics; E Health ; Services Computing in Health Care; Information and Communication Technology in Health Care	School of Computing and Mathematics; College of Health and Science		Mr Peter Jones
	Research in eHealth	Health Informatics Research group	http://www.hi.r.uws.scn.edu.au	Prof Anthony Maeder
University of Wollongong [UOW]				
Master of Health Informatics ; Graduate Certificate in Health Informatics				
	Research into E-Business and E-Health	Faculty of Informatics	http://www.uow.edu.au/informatics/research/scholarships/index.html	Prof John Fulcher, HoS, SCSSE A/Prof Neil Gray Janusz Getta
		School of Computer Science and Software Engineering (SCSSE)		

Victoria University [VU]					
Key research area: Health - research that applies to health and medical initiatives, that includes medical practitioners, administrators and support staff informatics requirements, and extends to the general public information requirements as users of medical facilities	Areas of Research Strength: Applied Informatics Web mining and data management, health informatics and E-health and service-oriented computing.	Applied Informatics Research Centre (CAI)	http://www.vu.edu.au/research/centres-and-institutes/centres	Prof Yanchun Zhang	
					Prof John Zeleznikow

APPENDIX E – PROFILES OF THE AUTHORS

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 Medichcek, 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, served 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 health 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 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.

