

Frontiers of Health Informatics - Selected Proceedings of the 2009 Health Informatics Conference

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The 2009 Health Informatics Conference, the annual event organised by the Health Informatics Society of Australia (HISA), has provided an opportunity to review the Australian and international developments in health IT and has re-emphasized the multidisciplinary nature of rapidly maturing research field of health informatics. The conference showcased the technologies and processes that are required to deliver the patient centric healthcare. The experience of HIC 2009 was enhanced by the opportunity to see the latest developments in health informatics products, and the support of industry sponsors for the industry exhibition and other conference activities was sincerely appreciated. The four themes of the conference ranged from bioinformatics applications for personalised prescribing to studies of organisational change caused by the introduction of health information systems. Each theme aimed to analyse the leading edge technologies that are being implemented and the opportunities they create:

- Personalised medicine and bioinformatics
- Next generation electronic health records
- New models of healthcare delivery
- Preventative healthcare and wellness

Original research was presented in 46 papers and abstracts covering all four tracks and spanning from methods to applications. Eight keynote presentations addressed the core initiatives of Australian eHealth reform and international perspectives on the research and development of information technologies for health. Ten papers selected for this special issue of the electronic Journal of Health Informatics (eJHI) are extended and improved versions of the best papers accepted to the HIC'09. These papers were nominated by members of the Scientific Program Commit-

tee and then subjected to revision and additional peer review in collaboration with eJHI. These papers illustrate the breadth of the HISA annual conference and the truly international nature of this event. These papers also highlight the power of systems science approach in modern health informatics research.

The first three papers contribute to the foundation of health informatics and address key challenges of health IT system integration and patient privacy. David Hansen and colleagues [1] developed an interface terminology using SNOMED CT and pathology terms from a standard text. Records of diagnostic colonoscopies were used as case studies and the utility of their reference sets was tested at the CSIRO Colonoscopy Simulator. The authors described the Reference Set Editor and highlighted how its ease of use and flexibility made it a useful supplement to complex and cognitively demanding rule-based reference set builders. Jean-Pierre Calabretto and co-authors from the National Prescribing Service [2] have focussed their attention on computational solutions that help primary care providers to access multiple independent information sources at the point of care. They developed and implemented an integration tool based on the results of user-needs assessment. The authors also provided important insights into the information resources and search tools in Australian general practice. Nicola Shaw and co-authors [3] identified two major aspects of patients' and healthcare providers' concerns about the privacy of health records: general concerns with the privacy of electronic health records (EHR) and specific concerns regarding sharing information within EHR. This literature review offered new, interesting insights by reporting that healthcare providers appeared to be more concerned with the privacy of EHR-based information than were their patients.

The authors of the next group of articles aimed to improve our understanding of healthcare systems and the ways in which information technology could optimise them. Kieren Diment and co-authors [4] employed complex adaptive systems' theory in order to explain the dynamics of organisational change following the introduction of health information systems. This theoretical framework offered new insights into potential facilitators, barriers and unintended consequences of the introduction of EHR. Mark Ballerman, Nicola Shaw and colleagues [5] were concerned with the nurse workflow patterns in critical care which they studied to decipher communication patterns and information continuity. Significant increases in time devoted to professional communication and information management have been identified around shift changes. These findings are critical to the planning of effective clinical information systems.

The papers that follow fulfil the demand for objective evidence on the utility of information technology in healthcare settings. Two studies by Sue McLellan and colleagues [6] and Nina Wang and co-authors [7], both focused on improving the quality of data collection for benefit realisation. The first study [6] explored the hypothesis that an automated anaesthetic record keeping systems can reduce the cost and enhance the quality of data in comparison with a manual system. Indeed, using the pre- and post-implementation study design, the authors confirmed that progressive use of this system has improved the accuracy of clinical data and user satisfaction with an average reduction of clinician recording time in the range of 48-93%. The second study [7] advanced the measurements of the quality of electronic records using an aged care facility as an application domain to proof their assumptions. A practical application of this research was the validation of audit instrument for nursing electronic documentation. John Forsythe and colleagues [8] tested whether electronic discharge summaries can improve clinical outcomes. In this case-control study, the authors compared practices in two public hospitals in Queensland and demonstrated that electronic discharge summaries offered advantages in information delivery, quality and speed. For example, the hospital that relied on electronic discharge summaries achieved their dispatch within 48 hours in 75% of cases.

Finally, the last two papers presented research work in an emerging area of infectious disease informatics. Stefan Edlund and colleagues [9] presented new ways to monitor and learn about seasonal influenza through interactive spatiotemporal epidemiologic modelling. They utilised ten years of geocoded biosurveillance data to build a model that takes into account the temporal changes in virus composition and accurately predicts annual epidemics of influenza with a seasonal forcing function. Manal Helal and her co-author [10] outlined the translation of comparative genomics into clinical decision support tools for personalised antibiotic prescribing that relies on the analysis of pathogen genomes. The authors developed and tested a novel multiple sequence alignment algorithm suitable for

the high-throughput comparative analysis of different microbial genomes. This algorithm outperformed existing algorithms in the task of detecting gene mutations that were associated with drug resistance.

The HIC'09 succeeded in its objective of bringing together healthcare professionals, researchers and medical software developers who believe in the transformational potential of health informatics. And we hope that this volume will help to reinforce the trend.

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