Preface

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Biographical notes: Ning Jackie Zhang is a Professor in the Department of Health Sciences and Health Administration at Seton Hall University. As a health services researcher, her research focuses on health policy, outcome research, nurse staffing, clinical outcomes, quality of care, long-term care, health informatics and big data analytics. She has been PI or co-PI on a number of federal, state, and local governments, foundation and industrial research grants. She is currently a Fellow of Gerontological Society of America, an Associate Editor of the *International Journal of Healthcare Technology and Management*, and a federal grant panel reviewer.

Thomas T.H. Wan is a Professor of Public Affairs, Health Management and Informatics, and Medical Education at the University of Central Florida. He is an Associate Dean for Research for the College of Health and Public Affairs. His research expertise includes healthcare informatics and health systems analysis. He receives a major NIH research grant on assessing Affordable Care Act on rural health disparities and outcomes and a research grant from the Pabst Foundation for evaluating the use of a web-based artistic toolkit for reducing caregiving burden for caregivers of Alzheimer and related disorders.

In the wake of huge expansion in data collection in recent decades, how to meaningfully and creatively use the massive amount of data available to add value to our current knowledge is an urgent challenge. Health informatics becomes attractive to enterprise and researchers because this approach can, both conceptually and realistically, help practitioners and administrators to use evidence-based treatments and strategies in their practice and management of patient-centred care. Although the current practices have demonstrated successful applications of health informatics across different disciplines, predictive analytics remains underdeveloped because systematic theories and methods to advance its utility in the real world have not yet been established

Health informatics is an interdisciplinary subject that includes knowledge from computer science, information science, database management, statistics and methodology. Owing to rapid development across an increasing number of disciplines, it has been specialised into medical informatics, biomedical informatics, public health informatics, biological informatics, pharmaceutical informatics, radiological informatics, and consumer health informatics. It is widely believed that the scope of informatics is still evolving and will likely expand into additional fields.

Health informatics is data-driven. The quantity and quality of data available determines the quantity and quality of information generated by analysts. A large quantity of clinical, pharmacy, lab, genetic as well as health services data (including uses and outcomes) is routinely collected and used for deductive analysis and hypothesis testing. In informatics research, the data is also being used for inductive research and management and business intelligence. The capacity for generating new evidence-based knowledge has been the focus of health informatics. Data mining, text mining, machine learning and data visualisation methods have been used to analyse massive or big data. Although the external validity appears to be high, the validity of the results is limited to the design and sampling of the data.

The rapid development of software and hardware has significantly supported the advancement of informatics and health informatics. Data mining and data warehousing technologies have made informatics analytics possible. Meanwhile, the current software and hardware are not powerful enough to meet the requirements of the increasing amounts of data gathered. The bottleneck of analytic methods, speed and storage capacity, may limit the performance of health informatics. The breakthrough in new clustering and storage technologies both on local servers and clouds show great potential to support R&D needs.

In order for technology to keep up with health informatics development, innovative and creative uses of data will become critically important. The future of health informatics will lead to more pragmatic trials, observational studies, and unstructured data to replace costly randomised trials and to engage patients' perceptions into clinical and medical decision making. Optimisation and automation of decision support and health technology systems has the potential to make the current healthcare system safer, more efficient, and more effective.

There are five innovative and inspirational papers included in this special issue. They focus on multiple perspectives of health informatics applications including electronic health records (EHR), health information technology, quality improvement, patient safety, cost saving, cloud computing, and data mapping. The first paper addresses the level of EHR adoption and quality and cost of vascular care by using National Inpatient Sample and AHA EHR implementation survey data. The study found that EHR adoption is more likely to be associated with the cost of patient care than with improving quality indicators and clinical outcomes. The second paper addresses meaningful use of EHR and adherence to asthma treatment for children in a hospital setting. EHR uses are not found to be associated with quality measures. The third paper analyses the adoption of a range of healthcare information technologies and resultant patient safety using national HMISS data. The fourth paper discusses the advantages of cloud computing as a new technology and how its applications advance management in healthcare industries. The last paper introduces web GIS and its creative uses in health and social services. A case study based on San Diego county information is presented and surveys support the utility of the system.

In conclusion, this special issue signifies the concerted effort of researchers and scholars in improving analytical frameworks, data modelling, and validation in order to generate evidence-based strategies and decision support systems for enhancing the quality and efficiency of healthcare delivery.