Foreword

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Biographical notes: Abe Zeid is a Professor of Mechanical and Industrial Engineering at Northeastern University. His research interests include database and information systems in manufacturing, the use of mobile agents to facilitate information access in manufacturing environments. Currently his research is focused on scalable nanomanufacturing and engineering education. He has published over 200 papers and secured research grants over 3 million dollars.

Sagar Kamarthi is an Associate Professor of Mechanical and Industrial Engineering at Northeastern University. His research interests are in the areas of machine learning, process monitoring and diagnosis, advance manufacturing, and personalised healthcare. He has published more than 170 articles in internationally reputed journals and has secured several grants, totalling over 3 millions, from the National Science Foundation.

Vino Sahney is a Professor of Mechanical and Industrial Engineering at Northeastern University and an Adjunct Professor of health policy and management at the Harvard School of Public Health. He is a senior fellow of the Institute for Healthcare Improvement and an elected member of both the Institute of Medicine and the National Academy of Engineering. In the past he served as Senior VP and Chief Strategy Officer of Blue Cross and Blue Shield of Massachusetts and as Senior VP at the Henry Ford Health System. His current scholarship focuses on solving the healthcare crisis by using the principles of systems engineering to improve treatment, patient safety and quality of care.

Delivery of operationally and economically efficient healthcare is becoming one of the national priorities in the USA. The healthcare experts universally agree that there is much room for the US healthcare delivery system to become more efficient, responsive, and cost effective to improve the performance indicators such as infant mortality, life expectancy and life-long healthcare costs per capita. The experts also suggest that participation of individuals in their care to transform healthcare systems from reactive to preventive, from clinic-centric to patient-centric, and from disease-centred to wellness centred is important to improve the population health and quality of life. The much talked about smart health and well-being programs promotes safe, effective, efficient, equitable, and patient-centred health and wellness services through research and innovations.

Patient-centric healthcare needs the creation of baseline data for each and every individual separately. Application of population based specifications to a specific individual may lead to wrong diagnosis and treatment particularly when the individual differs from the population due to various factors such as genetics, environment and socioeconomic conditions, and medical history. Patient-centric healthcare requires continuous monitoring and assessment to create individualised baselines and to offer customised feedback on the health and behaviour of individual by leveraging sensor, communication, and information technologies. The patient-centric healthcare facilitates optimal care decisions by taking into account all relevant evidence pertaining to a particular patient at the point of care, anywhere and anytime.

The Institute of Medicine, the National Academy of Engineering, the Agency for Healthcare Research and Quality, and the National Science Foundation have been strongly advocating the application of industrial and systems engineering tools to improve the healthcare delivery system. The application of industrial and systems engineering principles and tools to model, analyse, optimise, and design patient-centric healthcare delivery systems including services for diagnosis, treatment, and care can bring significant and lasting improvements to the system in the form of improved information and patient flow, operational effectiveness and efficiency, and quality of care.

This special issue focuses on research issues that support patient-centric healthcare delivery systems that are modular, dynamically configurable, distributed, responsive, expansive, flexible, and resilient. The special issue captures research contributions that address computational, algorithmic, and systemic issues related to patient-centric healthcare delivery. Research contributions are from diverse communities including industrial engineering, systems engineering, management science, and health services.