

# The Role of Information Systems and Analytics in Chronic Disease Prevention and Management

## Special Issue Editors

*Indranil Bardhan*, University of Texas at Dallas ([bardhan@utdallas.edu](mailto:bardhan@utdallas.edu))

*Hsinchun Chen*, University of Arizona ([hchen@eller.arizona.edu](mailto:hchen@eller.arizona.edu))

*Elena Karahanna*, University of Georgia ([ekarah@uga.edu](mailto:ekarah@uga.edu))

**Submission Deadline: August 1, 2017**

## Focus and Motivation for the Special Issue

Chronic diseases (such as diabetes, asthma, heart disease, lung disease, cancer, depression, stroke, hypertension, and Alzheimer's)<sup>1</sup> are responsible for seven of ten deaths each year, and treating people with chronic diseases accounts for 86% of health care costs.<sup>2</sup> With 68% of Medicare beneficiaries suffering from two or more chronic diseases, readmission rates associated with chronic diseases have recently garnered attention from policy makers and healthcare providers due to their high cost burden on the healthcare system. As healthcare experts, care providers and policy makers try to identify new ways to lower healthcare costs while improving care process and delivery, information systems and analytics can play a pivotal role in the effective prevention and proactive management of chronic diseases while lowering costs and improving patient outcomes.

Chronic disease management refers to "an integrated care approach to managing illness which includes screenings, check-ups, monitoring and coordinating treatment, and patient education."<sup>3</sup> Addressing chronic diseases requires new strategies to improve the quality of patients' lives while reducing health care costs by preventing or minimizing the effects of a disease. For example, telehealth applications can offer solutions to address mental and physical challenges of patients with chronic illnesses. Wearable sensors and home devices can play a pivotal role not only in monitoring the status of chronic disease patients and predicting adverse events before they occur, but also in preventing the onset of chronic diseases. Wearables and apps can be designed to motivate patients to adhere to treatment protocols or individuals to lead a healthy lifestyle through, for example, gamification or social support. New business models, such as "med-mediaries," may emerge around tracking, monitoring, and analyzing sensor data related to prevention and management of chronic diseases. Well-designed online patient communities can offer social and informational support to chronic disease patients, empower patients, influence the patient–physician relationship, and generate data that provides new insights into the experience of illness and can be mined for medical knowledge discovery.

Analytics offers the potential to identify cost-effective treatments for chronic diseases by analyzing patient treatment data; to identify patients who can benefit from preventive care and lifestyle changes by analyzing patient profiles; to identify fraud and wastage in the treatment of chronic diseases; to collect and disseminate data on medical procedures that assist patients and providers in identifying clinical protocols that provide the best value; and to profile diseases to predict and prevent adverse events. Payers can also harness the power of analytics to identify adherence to medications and other treatment programs and identify trends that are associated with benefits to population health and wellness.

Design science research can help develop new methods and algorithms for aggregation of multi-scale clinical, biomedical, contextual, and environmental data about each patient and decision support tools to facilitate optimized patient-centered and evidence-based decisions. Other promising information systems design contributions could include developing robust knowledge represen-

<sup>1</sup>Chronic disease is any condition that has a protracted clinical course (typically 3 months or longer as per the U.S. National Center for Health Statistics); requires long term treatment; has no definite cure; and return to a state of pre-disease normalcy is the exception, not the rule (McGraw-Hill Concise Dictionary of Modern Medicine).

<sup>2</sup><http://www.cdc.gov/chronicdisease/>

<sup>3</sup><https://www.healthcare.gov/glossary/chronic-disease-management/>

tations and reasoning algorithms to support inferences based on individual or population health data and designing innovative technology for the secondary use of health data to support assisted and automated healthcare discovery.

**Objectives:** Consistent with *MIS Quarterly*'s trifecta vision of impact, range, and speed, the special issue welcomes submissions from a wide variety of research traditions, including behavioral, design, economics, and organizational perspectives, and methods to tackle significant problems related to the treatment of chronic diseases using information systems and analytics. It will have an interdisciplinary focus intended to profile research that spans multiple disciplines in order to solve pressing needs and extant problems that confront patients, providers, and payers in the current healthcare system. As such it welcomes submissions that bring together research from several disciplines, including but not limited to information systems, medicine, public health, management, operations, psychology, accounting, economics, health informatics, computer science, and electrical engineering.

We seek submissions whose focus and contribution is ***on the role of IS and analytics in addressing chronic disease management and prevention***. Importantly, the research should leverage the ***distinctive characteristics of chronic disease prevention and management***. Areas of interest include, but are not limited to the following:

- Online patient communities for chronic diseases
- Support groups for caregivers of chronic disease patients
- Patient and physician engagement and how IT is changing the patient–physician relationship for chronic disease patients
- Role of mobile devices/wearables in wellness and chronic disease management
- Role of IS in patient data generation as it pertains to chronic disease identification, prevention, or management
- Telehealth applications to manage chronic disease
- Social media applications for chronic disease prevention and management
- Physician adoption and use of clinical decision support for chronic disease management
- New business models for tracking, monitoring, and analyzing sensor data related to the prevention and management of chronic diseases
- Precision medicine
- Preventive, predictive and prescriptive analytics for prediction of adverse events, medication regimens, etc.
- Risk analytics related to chronic diseases
- Real-time analytic capabilities in operations
- Analytics for accountable care organizations; reporting, bundled pricing for chronic disease prevention and management
- Value-based care/pay-for performance models for chronic disease management
- Data analytics on structured and unstructured data for chronic disease prevention and management
- Population health management—clinical and financial impact—related to chronic diseases
- Clinical system integration including data streams and data integration into EHR
- Data quality issues for patient generated data
- Role of data standards (FHIR, inter-operability, etc.) in promoting access to health data
- Integration with EHRs
- New methods and algorithms for healthcare predictive modeling and patient support
- Innovative design of new health information systems and clinical decision support tools

Although the topics listed are deliberately broad to encourage submissions across IS perspectives and methods, and across disciplines, ***only papers whose core contribution is the role of IS and analytics AND that leverage the distinctive aspects of chronic disease prevention and management are a fit with the special issue***. All submitted papers must comply with *MISQ*'s mission as stated on the journal's home page at <http://www.misq.org/mission> and must adhere to *MISQ*'s format and style for papers. We encourage authors who may be unfamiliar with the format and style of *MISQ*'s papers to acquaint themselves by examining published papers in the journal.

### Timeline:

- |   |                  |
|---|------------------|
| • Extended abstract submission deadline | May 1, 2017      |
| • Submission deadline                   | August 1, 2017   |
| • Round 1 decisions                     | November 1, 2017 |
| • Workshop (location TBD)               | January 15, 2018 |
| • Revisions due                         | May 1, 2018      |
| • Round 2 decisions                     | August 1, 2018   |

All authors are required to submit an extended abstract of their paper (2–5 pages) by May 1, 2017. Extended abstracts should be submitted by sending a .pdf file of the abstract to ***MISQChronicDiseaseSI@gmail.com***. The special issue editors will screen the abstracts for fit with the Special Issue. Papers should be submitted following the *MISQ* standard submission process through Manuscript Central (see <http://misq.org/manuscripts/>).