INFORMS Roundtable Fall Meeting Agenda
October 13-14, 2012
Hyatt Regency Phoenix
Theme: "Healthcare Analytics"

Saturday, October 13th

11:30AM	*Day at the Races*	*Turf Paradise*

Which horse will win the INFORMS Roundtable race?

Join us for a fun-filled day at the races. We'll meet in the hotel lobby around 11:30 and depart at noon sharp for Turf Paradise. http://www.turfparadise.com/ (Late arrivers can join us at the Turf Club if you make arrangements with Mike Grant ahead of time.) Outing will include a Homestead Lunch Buffet and Betting 101 talk to answer questions and explain handicapping and how to bet. We plan to depart back to the hotel around 4:00 pm.

5:00PM	*Reception*	*Curtis*

6:00PM   *Roundtable Meeting Kickoff*

6:15PM	*Roadmap to High Value Healthcare*	*Regency Ballroom D*

Robert K. Smoldt, Emeritus Chief Administrative Officer, Mayo Clinic; Associate Director, Arizona State University Health Care Delivery and Policy Program

Healthcare delivery in the United States is characterized by extremely variable patient outcomes and cost. A current buzz phrase in Washington DC is that we need more value, not volume in healthcare. That is true. But how do we get there. This presentation will describe how we ended up where we are and how we can get to a better destination – not the cheapest healthcare in the world, but the highest value healthcare.

Robert K. Smoldt is Emeritus Chief Administrative Officer of Mayo Clinic. He served as a member of Mayo Clinic Board of Trustees and Mayo Clinic Executive Committee from 1990 through 2007. He presently serves as Associate Director of Arizona State University's new Health Care Delivery and Policy Program.

Mr. Smoldt earned the B.S. degree from Iowa State University and the M.B.A. degree from the University of Southern California. He has been involved in health care administration for over 30 years — both with the U.S. Air Force and Mayo Clinic. Mr. Smoldt also has been active in Medical Group Management Association. He has chaired the organization's research and marketing committees and has acted as moderator of its international conference in London, England. Most recently, he was a member of the Medical Group Management Association National Awards Committee, which honors those who make significant leadership contributions to health care administration.

Mr. Smoldt serves on the Board of Trustees of Catholic Health Initiatives, the second largest Catholic hospital system in the U.S.

A copy of the book, "Roadmap to High-Value Healthcare Delivery," by Denis A Cortese, MD and Robert K Smoldt, MBA will be given to attendees.

7:30PM   *Dinner*   *Curtis*

8:00PM   *Overview & Roundtable Introductions*

Sunday, October 14th

7:00AM   *Continental Breakfast*   *Gilbert*

8:00AM   *Operations Research at Mayo Clinic*   *Regency Ballroom D*

Janine R. Kamath, Division Chair of Systems and Procedures, Mayo Clinic Rochester and Dr. Tom Rohleder, **Professor of Health Care Systems Engineering, Mayo Clinic and the Division of Health Care Policy and Research, Mayo Clinic**

Mayo Clinic has a long history of applying systems and management engineering along with advanced analytics to enable its strategic and operational priorities. These priorities cover patient care, research, education, administration and business development. Our presentation will show how this history and culture of transformation at Mayo Clinic integrates the use of operations research and systems engineering to address particularly challenging problems. We will discuss a variety of applications of operations research and the role that an internal business consulting group, Systems and Procedures, plays in ensuring project success. We will also present the vision for how operations research will continue to assist with several major transformations at Mayo Clinic in areas such as the outpatient practice, inpatient mortality, and primary care. Finally, the role of the newly formed Mayo Clinic Center for the Science of Healthcare Delivery in creating and

implementing practices that will lead to high value patient-centric care delivery will be discussed.

Janine R. Kamath is the Division Chair of Systems and Procedures, the internal business consulting and systems engineering group, at Mayo Clinic Rochester. The strategic and management consulting resources in this division are responsible for systems analysis, design, and implementation, reengineering and improvement of core processes, assisting with business strategy and planning, project management, and supporting various business transformation initiatives. Systems and Procedures provides business consulting and systems engineering support for the Clinical Practice, Research, Education and Administration.
Janine received a Masters in Business Administration from the Carlson School of Management, University of Minnesota, in Information and Decision Sciences, a Masters in Personnel Management and Industrial Relations from Tata Institute of Social Sciences in Bombay, India, and a Bachelors in Economics, Psychology and Statistics from Stella Maris College, University of Madras in Madras, India.

Dr. Tom Rohleder is a Professor of Health Care Systems Engineering at Mayo Clinic where he joined the Division of Health Care Policy and Research at the Mayo Clinic in 2009. Before coming to Mayo Clinic, Dr. Rohleder spent 18 years at the University of Calgary, as a Professor of Operations Management. In 2011, Dr. Rohleder was appointed as Associate Scientific-Director of the Health Care Systems Engineering Program in the newly formed Center for the Science of Health Care Delivery at Mayo Clinic. He has a Ph.D. in Business Administration, and B.S.B. in Finance from the University of Minnesota. Before obtaining his doctorate, Dr. Rohleder worked in the financial services sector for ITT Commercial Finance Corp., and Northwestern National Life Insurance Co.

Dr. Rohleder has over 40 publications in respected academic journals such as the Journal of Operations Management, Production and Operations Management, and Health Care Management Science. Dr. Rohleder has received over $450,000 in research funding from a variety of sources including the Natural Sciences and Engineering Research Council of Canada and several major health care organizations.

9:00AM   *An Integrated Operating Room Scheduling System*   Regency Ballroom D

Dr. Haiyan Wang, HP Labs

The data resulting from widespread deployment of EMR systems are starting to provide an important foundation to improve operational efficiency. The operating room (OR) is a critical resource in the hospital, and OR scheduling is a challenging and critical problem that affects patient throughput, revenue, medical outcomes, as well as patient and staff satisfaction. We report on a joint project with Lucile Packard Children's Hospital (LPCH) to develop an OR planning and scheduling system, which is based on optimization and simulation models and has the capability to predict the usage of each resource, and hence gives the ability to plan for anticipated bottlenecks before they

actually occur. Aligned with scheduling process followed by most hospitals, we propose an integrated hierarchical OR planning and scheduling system that consists of block scheduling module at the strategic level, surgery booking module at the tactical level and surgery sequencing module at the operational level. We have developed a suite of optimization models to address each level of decision making problem taking into account the uncertain surgery durations, uncertain consumption of critical resources, scarcity of shared expensive resources, as well as conflicting preferences among different stakeholders.   In particular, we have built a prototype of surgery sequencing module that is useful for the scheduling decisions made on the day before surgery, where a list of procedures to be performed next day is given and the sequence to be performed as well as the assignment of staff and medical equipment and supplies must be determined. Based on patient data over a period of two years in LPCH, our initial tests indicate that the system can lead to significant improvements in peri-operative key performance indicators over the current state of practice.

Dr. Haiyan Wang joined HP Labs in January 2011 as a Member of Technical Staff. Her expertise lies in large-scale optimization, combinatorial optimization, modeling of complex real world problems, and algorithm design. She has published her research on logistics, supply chain management and inventory optimization. Her most recent research focuses on healthcare with particular emphasis on operating room scheduling, Comparative Effectiveness Research and live information analytics aimed at significantly improving hospital operation efficiency and healthcare quality. She received her PhD from Olin Business School in Washington University in St. Louis, MPhil degree in Operations Research from Hong Kong University of Science and Technology, and dual bachelor degrees from Shanghai Jiao Tong University.

10:00AM   *Break*

10:15AM   *Meaningful use of Electronic Medical Record Data with a Framework of Knowledge-based Temporal Analytic Methods*   *Regency Ballroom D*

Dr. Wei-Nchih Lee, Internal Medicine Specialist, HP Labs
Healthcare institutions are turning to electronic medical records to keep pace with the information demands of medicine. The new patient care data contained within electronic medical records provides the computational foundation to build the rapid learning healthcare system, in which the delivery of healthcare with an entire institution improves dynamically by transforming the data into knowledge about which clinical practices are most effective. A crucial component of the rapid learning healthcare system is an understanding of clinical practice variations in medicine. Taking across entire population, practice variations offer valuable insight into the behaviors and beliefs of an institution. I present a set of methods that uses a knowledge-based temporal analytics framework to study clinical practice patterns from the electronic medical record data. I will show how this framework can be implemented to make meaningful use of clinical data through temporal abstraction, search of guideline based patterns of care, and discovery of patterns of care within an institution. Taken together, these methods offer valuable tools from

which temporal complexities in medicine can be explored. By analyzing patterns of care from clinical data, we can further the goals of quality of care and comparative effectiveness research.

Dr. Wei-Nchih Lee is an Internal Medicine specialist with more than 15 years of experience practicing and teaching medicine, and conducting health services related research. He recently completed his Ph.D. Biomedical Informatics at Stanford University in which he made novel contributions to the field of temporal data-mining as they apply to clinical practice variations in medical record data. Dr Lee completed MD in Medicine from Mount Sinai School of Medicine, NYU and MPH in Epidemiology from Columbia University, New York. Currently, he is a research scientist at HP labs, where he will continue his work in developing computational methods for studying clinical practice variations from electronic medical records.

11:15AM   *Framework for Detection of Clinical States and Disease Onset Using Electronic Health Record (EHR) Data*   *Regency Ballroom D*

Dr. Juergen A. Klenk, Principal with Booz Allen Hamilton

This case study describes the application of predictive analytics to the detection of disease onset and clinical states through the use of electronic health records (EHR). The framework presented aims to improve prediction of a patient's risk for developing severe sepsis and septic shock through a risk score generated as a function of measurements of patient vitals over time. A risk score threshold of 0.71 was found to yield the highest sensitivity while minimizing false negatives in the patient database. This predictive model can also be generalized to predict outcomes of other application domains.

Dr. Juergen A. Klenk, a Principal with Booz Allen Hamilton, has over 20 years of professional experience in the public and commercial Health market. His professional work spans fields such as Big Data Analytics, Scientific Computing, Healthcare Quality Analytics, Health Preparedness and Surveillance, Resource Analysis and Optimization, Regulatory Compliance, and Financial Integrity. Dr. Klenk is a leader in Booz Allen's Cloud Analytics Center of Excellence, focused on providing advanced analytics services such as statistics, data mining, predictive modeling, and simulation in conventional and Cloud based environments to government, non-profit and commercial clients to enable data-driven planning and decision making. Dr. Klenk holds a Ph.D. in Mathematics and a M.S. in Physics and Mathematics from Tuebingen University, and he holds a Six Sigma Green Belt and an IBM MicroMBA certification. He spent his academic career at Tuebingen University, Yale University, and the Australian National University.

12:15PM   *Lunch*   *Gilbert*

1:15PM   *Advancing Healthcare on Multiple Fronts*   *Regency Ballroom D*

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Dr. Eva K. Lee, **Professor, H. Milton Stewart School of Industrial and Systems Engineering at Georgia Institute of Technology and Director of the Center for Operations Research in Medicine and Health Care**

The time for major transformation is ripe. The historic health care overhaul legislation gives millions of Americans access to health care, but beyond that, the legislation is designed to promote significant advances in health care delivery. Besides health insurance reform, the bill focuses on many issues in quality and affordable healthcare for all Americans. It demands improving the quality and efficiency of healthcare, and encourages development of new patient care models. There is special emphasis on increasing access to clinical preventive services and novel management and treatment of chronic disease. Patient safety training and education of health professionals is highlighted. Public health innovation that asks for research on optimizing the delivery of public health services are stated, and patient-centered outcomes research and comparative effectiveness studies are reinforced. On the biological and clinical side, there is a push for biological advances and improving access to innovative medical therapies.

In this talk, we will share some of our experiences in which operations research and decision analytics methodologies have been applied successfully to problems in healthcare and medicine. In particular, the talk will cover 3 topics in healthcare services and delivery: i) modeling and optimizing the clinic workflow; ii) reducing medication errors, and iii) predicting readmission and resource allocation for cost-effective care.

Dr. Eva K. Lee is a Professor in the H. Milton Stewart School of Industrial and Systems Engineering at Georgia Institute of Technology, and Director of the Center for Operations Research in Medicine and HealthCare, a center established through funds from the National Science Foundation (NSF) and the Whitaker Foundation. The center focuses on biomedicine, public health, and defense, advancing domains from basic science to translational medical research; intelligent, quality, and cost-effective delivery; and medical preparedness and protection of critical infrastructures. She is also the Co-Director of the Center for Health Organization Transformation, an NSF Industry/University Cooperative Research Center. Lee partners with hospital leaders to develop novel transformational strategies in delivery, quality, safety, operations efficiency, information management, change management and organizational learning. In 2009-2011, she was the Senior Health Systems Professor for the U.S. Department of Veterans Affairs. In this role, she provides health delivery systems evaluation and redesign consultation for the VA medical centers and health systems network. Lee is leading the design of an information software enterprise and exchange that supports the community of clinical and translational researchers by providing smooth and secure communications among different electronic medical record systems across multiple facilities. She is the principal investigator of the online interoperable information exchange and decision support system for mass dispensing, emergency response, and casualty mitigation.

Lee earned a Ph.D. at Rice University in the Department of Computational and Applied Mathematics. In 1996, she received the NSF CAREER Young Investigator Award for

research on optimization and parallel algorithms and their applications to large-scale logistics and medical applications. She is the first and only IE/OR recipient for the prestigious Whitaker Foundation Biomedical Grant for Young Investigators, awarded for her work on novel biological imaging and combined optimal treatment design for prostate cancer. In 2005, she receives the INFORMS Pierskalla Best Paper Award for research excellence in HealthCare Management Science for her work on emergency response and planning, large-scale prophylaxis dispensing, and resource allocation for bioterrorism and infectious disease outbreaks. Together with Dr. Marco Zaider from Memorial Sloan-Kettering Cancer Center, they were named winners of the 2007 Franz Edelman award for their work in operations research advances cancer therapeutics. In 2009, Lee was selected by the National Academy of Engineering to serve on the organizing committee and to lead the "Engineering the Healthcare Delivery System" cluster for the 2009 NAE Frontiers of Engineering Symposium for outstanding young engineers. In 2011, Lee and collaborators' work on "Systems biology approach predicts the immunogenicity of the yellow fever vaccine in humans" was selected Paper of the Year by the International Society of Vaccines, In 2012, Lee and the Centers for Disease Control and Prevention team was named the finalist for the Franz Edelman award on advances in public health and medical preparedness. She has since received seven patents on innovative medical systems and devices.

2:15PM   *Challenges and Opportunities in Applying OR/MS Tools to Improve Healthcare Delivery*
                                                                                          Regency Ballroom D

Professor Amy Cohn, Associate Professor and Thurnau Professor, Department of Industrial and Operations Engineering, University of Michigan College of Engineering; Associate Director, University of Michigan Center for Healthcare Engineering and Patient Safety; Affiliate of the MIT Global Airline Industry Program

With more than 17% of the U.S. GDP going to healthcare expenditures, quality-of-care lagging behind every other developed nation in the world, and an aging population putting increase demands on the system, it is clear that our current healthcare system is in crisis. This is not a uniquely U.S. problem; adequate healthcare delivery poses one of the most critical challenges faced by any nation. A seminal report issued jointly in 2005 by the Institute of Medicine and the National Academy of Engineering recognizes this challenge, outlines six major goals for the U.S. healthcare system (safe, effective, timely, patient-centered, efficient, and equitable), highlights obstacles to be faced in meeting these goals, and emphasizes the importance of "a vigorous new partnership" between engineering and healthcare to overcome these challenges.

The OR/MS community is well positioned to take a leading role in this new partnership, with our systems perspective and our ability to translate complex real-world problems into mathematical models that can be analyzed and optimized. But there are many unique aspects to working in healthcare that must be taken into consideration to be effective. In this talk, I will discuss the importance of: (a) becoming "bi-lingual" so as to effectively

communicate with healthcare providers; (b) identifying and deeply understanding critical challenges in the healthcare system; (c) developing innovative solutions, often requiring the creation of novel models, algorithms, and simulation-based tools; (d) overcoming barriers that limit the implementation of these solutions; and (e) educating both OR/MS practitioners and healthcare providers so as to foster ongoing and widespread successful collaborations. Examples will be taken from my work as the Associate Director for the University of Michigan Center for Healthcare Engineering and Patient Safety.

Professor Amy Cohn is an Associate Professor and Thurnau Professor in the Department of Industrial and Operations Engineering at the University of Michigan College of Engineering. She is also the Associate Director of the University of Michigan Center for Healthcare Engineering and Patient Safety, as well as an Affiliate of the MIT Global Airline Industry Program. Her primary research interest is in robust and integrated planning for large-scale systems, predominantly in healthcare and aviation applications. Current projects include: (1) developing methods to reduce passenger delays associated with the inherent stochasticity in the passenger aviation system; (b) designing and analyzing new policies to ensure adequate hands-on experience for cardio-thoracic transplant surgeons-in-training while complying with residency work hour limits; and (c) assessing the flow of pediatric asthma patients through the emergency department (ED) and comparing asthma treatment protocols within the ED versus hospital admission.

3:15PM   *Break*

3:30PM   *Roundtable Business*   *Regency Ballroom D*

Bill Browning, INFORMS Roundtable President-Elect

Bill will provide an update on Roundtable business affairs.

4:00PM   *Roundtable Meeting with the INFORMS Board*   *Regency Ballroom D*

Traditional meeting of the Roundtable and the INFORMS Board to discuss relevant topics and issues for the society and the practice of operations research and management science.

- Board Member Introductions
- INFORMS Strategy Around Analytics: Anne Robinson, President-Elect
- Breakout sessions (4 groups, 10 minutes)
  - What are the top three trends you're seeing with analytics in your company?
  - What, if anything, should INFORMS be doing to respond to those trends?
- Breakout Sessions Report
- INFORMS Analytics Certification: Jack Levis, Vice President/Practice Activities
- Continuing Education: Rina Schneur, Past President

5:00PM   *INFORMS President's Reception for the Roundtable*   *Sundance*

<u>Monday, October 15th</u>

6:30PM *Informal Networking Dinner (Dutch Treat)* *1130 Restaurant*

Participants should meet in the lobby at 6:30 pm. The reservation is under "INFORMS Roundtable".

1130 Restaurant
http://www.1130therestaurant.com/

Roundtable Suite *Hyatt 326*

The **Roundtable Suite** is available 24 hours a day from 3PM on Friday, October 13th until 12Noon on Wednesday, October 17th. It is intended for Roundtable members and their guests to use as a lounge during the Roundtable and INFORMS meetings. It is great for small group discussions or a quiet place to take a break during your busy conference schedule. See Melissa or Mike for room keys.

Important telephone numbers:

Hyatt Regency Phoenix	(602) 252-1234
Turf Paradise	(602) 942-1101