

# 6th Annual Lean in Healthcare Research Symposium



9-4 pm | June 7, 2022



In-Person: The Grand America Hotel, 555 South Main Street, Salt Lake City, UT 84111  
Virtual: Live stream of presentations, web link sent in advance

9:00-9:15

Welcome

Dorothy Y. Hung, PhD, MA, MPH (Director, CLEAR, University of California at Berkeley)

9:15-10:00

**Autonomous Technologies: Driving Digital Lean in Health Care**

Karen Wolk Feinstein, PhD (CEO & President, Pittsburgh Regional Health Initiative - Jewish Healthcare Foundation)

10:00-10:45

**The Effects of Work Environment Barriers on Problem-Solving and Agility: Results from a Canadian Study**

Pierre-Luc Fournier, PhD, MS, P.Eng (Assistant Professor, University of Sherbrooke)

10:45-11:30

**Scrum: The Art of Delivering Twice the Outcomes at Half the Cost in Healthcare**

Jeff Sutherland, PhD (Founder & Chairman of Scrum Inc., Managing Partner of Tesla Investment Holdings LLC)

11:30-12:00

Breakout sessions (In-Person)

12:00-1:00

Lunch (catered)

1:00-1:45

**Using the Lean Healthcare Implementation Self-Assessment Instrument: Experiences from a Large Academic Hospital System in Helsinki, Finland**

Eliina Reponen, MD, PhD (Chief Anesthesiologist, HUS Helsinki University Hospital)

1:45-2:30

**The Canadian Experience of Lean Implementation in Healthcare**

Tom Rotter, PhD (Associate Professor, Queens University)

James Chan, PhD (Director of Innovation, Sault Area Hospital)

2:30-3:15

**Lean Performance Improvement and Facilitators of Outcomes in U.S. Public Hospitals**

Tyler Ramos Roey (CLEAR intern, Loyola University - Chicago)

3:15-4:00

Breakout sessions and networking (In-Person)

## Autonomous Technologies: Driving Digital Lean in Health Care

*Karen Wolk Feinstein Ph.D., President and CEO  
Pittsburgh Regional Health Initiative, Jewish Healthcare Foundation*

A new era of Lean has arrived, deploying digital technologies to relieve clinicians of environmental disruptions, distractions, and threats of harm to themselves and their patients. Advanced operational systems paired with real-time information systems open new opportunities. As autonomous vehicles use advanced analytics, sensors and monitors to transport passengers safely and efficiently, healthcare settings could do the same for their workers and patients. Lean methods worked magic in productivity, efficiency, safety, and reliability in various industries before advanced technologies were available to support this work. In 2022, we can now leverage precise and timely information, artificial intelligence, machine learning, virtual reality, smart wearables, sensors and monitors to anticipate harm, enable rapid corrective action, and create sustainable solutions. Highlighting specific applications of technology-enabled Lean supports will suggest the many opportunities to build better “vehicles” within which our doctors, nurses, pharmacists and others can pursue traditional, problem-solving Lean methods for better care.



Karen Wolk Feinstein is President and Chief Executive Officer of the Jewish Healthcare Foundation (JHF) and its three operating arms, the Pittsburgh Regional Health Initiative (PRHI), Health Careers Futures (HCF), and the Women’s Health Activist Movement Global (WHAMglobal). Under her leadership, JHF and PRHI have become a leading voice in patient safety, healthcare quality, and related workforce issues. When Dr. Feinstein founded PRHI, it was among the nation’s first regional multi-stakeholder quality coalitions devoted simultaneously to advancing efficiency, best practices, and safety by applying industrial engineering principles. Dr. Feinstein founded HCF to assist the region’s healthcare industry in attracting, preparing, and retaining employees. WHAMglobal was established to empower women to lead efforts to advance healthcare systems that are transparent, respectful, accountable, and equitable. Dr. Feinstein is widely regarded as a leader in healthcare quality improvement and frequently presents at national and international conferences. She was a presenter at the 2016 TEDxBeaconStreet event, an independently organized Technology, Entertainment, and Design (TED) event with a global audience. She has served on the faculties of Boston College and Carnegie Mellon University, and taught at the University of Pittsburgh. Dr. Feinstein is the editor of *Moving Beyond Repair*, which explores the conditions required to successfully apply Lean as a system-wide quality improvement philosophy.

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## The Effects of Work Environment Barriers on Problem-Solving and Agility: Results from a Canadian Study

*Pierre-Luc Fournier, Ph.D., M.S., P.Eng  
Assistant Professor of Operations Management  
Université de Sherbrooke Business School*

Healthcare is a high customer-contact environment where providers are faced with high volatility and uncertainty. This reality has been exacerbated by the Covid-19 pandemic and the additional demand it has directed towards healthcare systems. In this context, the ability to rapidly reorganize work to cope with internal and external changes, also called agility, becomes a key driver of performance. While agility can be supported by management tools and practices, it is also a function of the problem-solving capabilities of teams and providers. Solving problems in a high-dynamism environment requires creativity and spontaneity to craft viable solutions to the challenges that are presented. While problem-solving capabilities are influenced by individual and team characteristics, they can also be influenced by organizations through managerial behaviors, systems, and tools, such as the PDSA approach advocated by Lean. However, problem-solving capabilities can also be stifled when organizations do not pay close attention to the barriers that prevent employees from speaking up and from valuable knowledge being shared. Notably, healthcare organizations are known for being environments where employees may not feel safe to suggest solutions to a problem or might fear the negative consequences associated with highlighting problems. These barriers can lead to workplace silence, which prevents problems from being identified, let alone solved, and opportunities from being seized.

Using survey data collected from over 2500 nurses in the Canadian healthcare system, this presentation will discuss the effects of such barriers on the dynamic problem-solving capabilities needed for operational agility and its effect on the quality of care provided to patients.



Pierre-Luc Fournier is a Visiting Scholar at CLEAR and Assistant Professor of Operations Management, Université de Sherbrooke Business School. His research interests include behavioral operations management, continuous improvement and performance management, with a specific focus on healthcare organizations and systems. His most recent works, published in scientific journals such as the International Journal of Production Economics, Production Planning and Control, and the International Journal of Integrated Care, have focused on the drivers of stakeholder engagement and reactions during Lean implementation. He has collaborated for several years with various healthcare organizations in Canada and the United States. Dr. Fournier currently holds various public and private research grants for projects studying how healthcare organizations can quickly adapt to new operational realities in a change saturated context. Dr. Fournier holds a Ph.D. in operations management from HEC Montréal, and is also a professional engineer with M.S. and B.Eng degrees in industrial engineering from the Université du Québec.

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### Scrum: The Art of Delivering Twice the Outcomes at Half the Cost in Healthcare

*Jeff Sutherland, Ph.D.*

*Founder and Chairman, Scrum Inc.*

*Managing Partner, Tesla Investment Holdings LLC*

Virtually all successful companies are implementing an Agile transformation today and 77% of these transformations are based on Scrum, which leverages principles of LEAN rapid cycle improvement that are foundational to success in arenas such as software and product development. Major opportunities exist in health care. For example, one of the largest hospitals in Boston implemented Agile Scrum in their surgery center and cut turnaround time by 50%. This increased the number of surgeries per operating room 20% and opened up a \$700M new annual profit stream within two weeks. Similarly, on a small scale, the speaker opened up an innovative clinic that doubled the number of clients treated within two months of starting Scrum. The driving factors that enable these exceptional gains are LEAN process efficiency, combined with the innovation cycle taught in all U.S. War Colleges. *Scrum adds to this patterns proven to generate hyperproductive teams and the ability to scale to thousands of teams as we see at companies like Microsoft, Apple, Amazon, SAP, and other leading organizations.* The challenge for healthcare is implementing financial incentives to adopt a continuous improvement mind set. This is easiest in healthcare companies paid for number of patients in a plan, rather than fee for service. Keeping people healthy lowers cost per patient and increases profitability, a win-win for both patient and provider.



Jeff Sutherland is one of the creators of the Scrum, a framework for developing, delivering, and sustaining complex products. Together with Ken Schwaber, he contributed to the creation of the Agile Manifesto in 2001. After 11 years as a fighter pilot in the U.S. Air Force where he achieved Top Gun status, Dr. Sutherland joined the faculty of the University of Colorado Medical School where he received his doctoral degree. As Assistant Professor of Radiology, Biometrics, and Preventive Medicine, he co-founded the Center for Vitamins and Cancer Research under the sponsorship of Nobel Laureate Linus Pauling and for eight years was the Principle Investigator of a National Cancer Institute research grant that ran all IT programs and research for the Colorado Regional Cancer Center. He has been VP of Engineering and CTO or CEO of eleven software companies. In these companies he prototyped Scrum, and in 1993, created Scrum as we now see it used in Agile software companies in over 100 countries. In 2006, Sutherland established his own company, Scrum, Inc., now recognized as the premiere source of Scrum Training in the world. His book, *Scrum: The Art of Doing Twice the Work in Half the Time,* describes how he used his background and experience to create the most widely used Agile practice in industry today. He is Founder and Managing Director of Tesla Investment Holdings LLC, which is an investment fund that maximizes impact by investing in agile organizations.

## Using the Lean Healthcare Implementation Self-Assessment Instrument (LHISI): Experiences from a Large Academic Hospital System in Helsinki, Finland

*Elina Reponen, M.D., Ph.D.*

*Chief Anesthesiologist, HUS Helsinki University Hospital*

Lean management is growing in popularity in the healthcare sector worldwide, yet healthcare organizations are struggling with assessing the maturity of their Lean implementation and monitoring its change over time. Most existing methods for such assessments are time consuming, require site visits by external consultants, and lack frontline involvement. The Lean Healthcare Implementation Self-Assessment Instrument (LHISI) was developed by the Center for Lean Engagement and Research in Healthcare (CLEAR) at the University of California Berkeley as a Lean principles-based survey instrument that avoids the above problems. Using data collected from over 6,000 employees of the Hospital District of Helsinki and Uusimaa, Finland, this presentation will discuss the validation of the LHISI in the context of Finnish healthcare. It will also highlight how actionable knowledge collected with the LHISI can be utilized to guide the path towards Lean maturity across organizations.



Elina Reponen is a medical specialist in Anesthesiology and Intensive Care with a doctorate in Medical Science. She has over 15 years of clinical experience and currently serves as Chief Anesthesiologist at HUS Helsinki University Hospital. Dr. Reponen has been involved in implementing Lean management in her position as the Deputy Chief Physician of one of the OR departments at Helsinki University Hospital. In addition to her clinical and administrative work, she has conducted clinical research in perioperative and quality of care. She also conducts research in healthcare management with emphasis on Lean management. Elina joined CLEAR as a Visiting Scholar in 2019 and continues to contribute high-quality studies of Lean in health care

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## The Canadian Experience of Lean Implementation in Healthcare

*Thomas Rotter, Ph.D. – Associate Professor, Queens University*

*James Chan, Ph.D. – Director of Innovation, Sault Area Hospital*

While many healthcare organizations are implementing Lean in the United States, there is not strong evidence of continued spread or maturity of Lean across Canada. This presentation aims to outline Lean implementation in Canadian healthcare using an anthropological and pan-Canadian approach. Drawing on a combination of lived experience and their published as well as grey literature, the authors describe the rise of Lean in Canadian healthcare beginning with an account of implementation activities on the west coast leading up to the largest Lean transformation in the world. Perhaps one of their most salient contributions is the development of an operational definition of Lean in healthcare to help guide implementation and discourse. Specific qualitative and quantitative literature will be summarized to focus the dialogue on techniques used to study Lean implementations. Major implementation of Lean in Canadian healthcare occurred between the years of approximately 2010 to 2020. Lean is still used in pockets of Canadian healthcare. By and large, Lean seems to have been absorbed into the general fabric of health quality departments across the country.

Canada prides itself on its universal healthcare system, however, this system is not immune from the influence of politics on the publicly-funded social welfare state. Following an apparent shift in public opinion regarding Lean implementation in Canadian healthcare, several questions remain for the future of research and practice alike. For instance: Who should conduct investigations of Lean interventions in healthcare – is this the exclusive domain of health services researchers? What role can scientist-practitioners play? The presentation will conclude with a discussion about what we can learn from the Canadian experience overall, and what methods/designs can and should be used to study Lean in healthcare going forward.





Thomas Rotter worked as Chair in Health Quality Improvement Sciences at the University of Saskatchewan from 2012 to 2017. He commenced his new position as Associate Professor with Healthcare Quality Programs at Queen's University School of Nursing and Department of Anesthesiology and Perioperative Medicine in 2017. Dr. Rotter's research focuses on clinical pathways – interventions which are aimed at guiding evidence-based practice and improving the interactions between health services. He has worked on pathway projects in Canada and internationally as a way to standardize care provided for patients with cancer, pediatric asthma, gastroenteritis, heart failure, and chronic obstructive pulmonary disease (COPD). Thomas has developed a multidisciplinary research program of knowledge translation research in quality improvement, including clinical pathways in acute care and primary care settings. He brings expertise in knowledge synthesis, knowledge translation, quantitative research and mixed methods.



James Chan is a senior healthcare leader from Vancouver, British Columbia, Canada. He has held both clinical and management roles in health systems for over 20 years, and has worked in all health sectors to plan programs, improve operations and redesign services. James has a BA (Hons - focus on Industrial/ Organizational Psychology) from Simon Fraser University; a Master's degree in Counselling and Educational Psychology from the University of British Columbia; and a PhD in Health Sciences from UNBC (focus on health system measurement and evaluation). In addition, he has extensive professional background in business and management, and is a certified LEAN Black-belt. His research interests include: Industrial-Organizational Psychology, Quality Improvement, Operations Research, Mental Health and Addictions, and Knowledge Exchange/Transfer. He has published articles, professional reports, and book chapters in the scientific literature. Currently, James is the Director of Innovation at the Sault Area Hospital in Ontario, where he is responsible for Health Records, Registration, Medical Affairs, Data Analytics, and Research departments. He is also sessional faculty in the DeGroote School of Business at McMaster University, and a guest lecturer at the Health Quality Programs at Queens University.

Lean Performance Improvement and Facilitators of Outcomes in  
U.S. Public Hospitals

*Tyler Ramos Roey – CLEAR intern, Loyola University - Chicago*

Public hospitals face substantial pressure to deliver high quality care while operating at lower costs. Prior research shows that Lean can improve some measures of hospital performance, but more study on Lean specifically in public hospitals is warranted. We performed multivariable regressions using data gathered from a National Survey of Lean/Transformational Performance Improvement in U.S. hospitals, linked to publicly available hospital performance data from the Agency for Healthcare Research and Quality (AHRQ) and the Center for Medicare & Medicaid Services (CMS). We examined 11 different outcomes measuring financial performance, quality of care, and patient experience, and their associations with Lean adoption among U.S. public hospitals. We also explored potential drivers of positive outcomes by examining their associations with the extent of Lean implementation, measured as the number of hospital units that had implemented Lean; leader commitment to Lean principles; Lean training and education among physicians, nurses, and managers; and use of a daily management system among C-suite leaders and managers.



Tyler Ramos Roey is a CLEAR intern and junior at Loyola University in Chicago. He is currently majoring in biology and will graduate Loyola with honors in 2023. After volunteering with the Santa Clara Public Health Department during the pandemic, he became interested in examining the impact that Lean has on public hospitals. He is an active member in the Chicago community where he works as a coach for the Chicago City Soccer Club and is the Director of Operations for the All Kids Play x RefugeeOne Program in the Rogers Park neighborhood. Following his graduation, Tyler plans on attending medical school to continue his pursuit of being a doctor.