



## BETTER HEALTH CARE WITH LESS HEALTH SPENDING

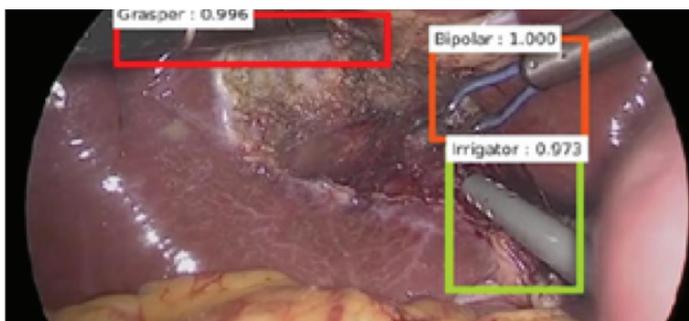
The Stanford Clinical Excellence Research Center (CERC) is discovering new care delivery methods to solve our nation's persisting crisis in the affordability of excellent care.

### NEW PHASE OF CERC AI RESEARCH TARGETS ASSESSMENT OF SURGICAL SKILL

Though surgeons' technical skills vary, no scalable method exists to rate them validly and continuously. Prior research by the University of Michigan demonstrated a tight relationship between ratings of surgeons' technical skills and the frequency of peri-operative complications. Until now, nationally-scaled efforts to rate surgical skills have been confined to multiple-choice tests and oral queries by examiners at multi-year intervals. Improving surgical performance nationally is important clinically and economically. A 2014 analysis performed by the *Patient Safety in Surgery Journal* estimated that 46–65 percent of complications in hospitals occur during surgery.

Recent joint research by CERC and the School of Engineering's Artificial Intelligence Lab offers a fresh solution to securing the quality and efficiency of surgery both in the United States and globally. Last year our research won a Best Paper Award at the international Neural Information Processing Systems conference for the novel use of convolutional neural networks and videos of actual surgical procedures to rate surgical skill.

Intrigued by CERC's discovery, Mary Hawn, MD, MPH, chair of the Stanford Department of Surgery and Mark Ott, MD, cancer surgeon at Intermountain Healthcare, will now oversee the collection of a large archive of laparoscopic surgical videos. Carla Pugh, MD, newly recruited to Stanford as a professor of surgery, will serve as one of the project's principal investigators. The archive will be used by machine learning research teams from the AI Lab and CERC to train a computer algorithm to rate individual surgeons' technical skills based on continuous high-definition video data collected during several thousand surgeries.



Advancing the quality of surgical technical skill through the application of computer vision technology.

If the computer algorithm can be trained to high levels of accuracy, Dr. Hawn intends to propose to the American Board of Surgery and other global surgical training and certifying organizations that this novel application of artificial intelligence be used to evaluate surgeons' technical skills in real time, to vary the length of training for new surgeons based on more objectively rated competence, and to boost the validity of surgery board certification examinations. Due to the integration of computer vision systems into retail stores and driver assistance software, hardware costs are rapidly declining.

## RESULTS FROM FIRST OF TWO TRIALS OF CERC CANCER CARE PIQUE INDUSTRY INTEREST

Publication of results from the first clinical trial of a CERC-designed care innovation for oncology patients with advanced stage cancers, triggered diverse inquiries from large U.S. health insurers, health-care delivery systems, and health-care performance improvement organizations. To support adoption and refinement of its care innovations, CERC provides descriptions for public benefit of each innovation, along with an approach to calculating the percentage of impact on targeted results, and a succinct implementation guide.

Published in one of the highest impact scientific journals of oncology, the trial demonstrated improved patients' experience of health care and a greater than 90 percent reduction in spending by patients and their health insurers for health care during the last month of life. A second randomized trial recently concluded in partnership with Anthem's Caremore division. Its results are now being analyzed and publication will likely occur in 2019. The second trial examines several important additional outcomes such as month-to-month reduction in total health-care spending beginning with the first month after the innovation was deployed, as well as patients' self-rated emotional health.

Since much of the controversial multiplicative growth in cancer drug prices occurred after both trials began, additional pilot tests underway in Illinois and New Jersey will demonstrate whether net savings from the CERC-originated care innovation rise proportionately.



*The care innovation was developed by Manali Patel, MD, MPH.*

## 2018-19 CERC FELLOWS TO DISTILL BEST USE OF DIGITAL INFORMATION AND COMMUNICATION TECHNOLOGIES TO LOWER THE COST OF EXCELLENT HEALTH CARE

Our eighth class of CERC care design fellows arrived August 1. Selected for their likelihood of leading future efforts to lower the cost of high-quality health care, they will dedicate a year of their promising clinical careers to uncovering uses of health information and communications technologies (HICT) likely to safely and substantially lower U.S. per capita health-care spending. As excitement and concern rise over the use of these technologies in daily life and health-care services, their CERC fellowship will provide an opportunity to distill best practices in converting these technologies into better health at a lower cost.

Our fellows will act as one team, with two fellows focusing on applications of HICT to improve hospital-based episodes of care, and two addressing applications to non-hospital care of all types. By design, our incoming fellows bring diverse backgrounds, ranging from urologic surgery, neonatal intensive care, and rehabilitation medicine, to use of mobile devices to improve psychiatric care.



**Natalia Victoria  
Leva, MD**



**Claire Kennedy  
Purvis, PsyD**



**Anoop Rao,  
MD, MS**



**Courtenay  
Stewart, DO**