

Platchek, Terry, Rebitzer, Robert, Zulman, Donna, Milstein, Arnold, 2014 “Better Health, Less Spending: Stanford University’s Clinical Excellence Research Center” *Health Management, Policy and Innovation*, 2(1): 10-17

Better Health, Less Spending: Stanford University’s Clinical Excellence Research Center

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Health care spending growth in excess of national income growth presents a profound challenge for our society as it crowds out other important uses of income such as child care, education and basic research. If current trends continue, the Congressional Budget Office projects federal health spending will consume at least 40% of total federal spending by 2037,¹ with mounting negative effects on federal creditworthiness, interest rates, national economic growth, and wage increases for the middle class.² Estimates of waste in the health care system suggest it accounts for close to \$1 trillion of annual expenditures.³

Most payers, policy makers and providers agree that we must lower the rate at which health care costs are increasing without negatively impacting clinical outcomes.^{4,5} Most approaches to bending the cost curve have focused on public policy interventions to strengthen incentives for cost-conscious behaviors among the two parties with the most influence on health and healthcare – patients and providers. However, despite these substantial efforts, health care costs continue to escalate at an unsustainable rate.

Some have proposed that it is necessary to focus on process innovation across the continuum of healthcare delivery to achieve sustainably lower healthcare costs while simultaneously improving patient outcomes and experience.^{6,7} Unlike the medical device and pharmaceutical industries, where avenues to profitability are well described, motivating transferable healthcare process innovation is challenged by the difficulty of defending patents on innovative business processes. This discourages private investment in healthcare process innovation and hampers the development of healthcare process innovators.

In 2010, Stanford University established the Clinical Excellence Research Center (CERC) to help fill the vacuum. Specifically, CERC aspires to safely “bend the curve”

of unsustainable rates of health spending growth through an academic center dedicated to healthcare process innovation, research, and experiential training.

The skills needed to generate such innovations are generally not taught at medical and other health professional schools; and when they are taught, the emphasis is largely on quality improvement rather than cost-reduction. Without training in the skills and science of cost-reducing innovation, providers may respond to pressures to reduce costs by simply speeding up or otherwise cutting value from their existing approaches to care delivery, generating patient backlash as occurred in response to the U.S. managed care movement in the late 1990s. By providing training in healthcare process innovation, we hope to forge a missing link in society's effort to slow the rise in health care costs and reduce the risk of another backlash.

CERC's mission is the design, demonstration and dissemination of innovative models of health care delivery that will lower annual per capita health care spending in the U.S. while improving health and the patient experience. Formulation of the approach to this mission by a team of Stanford faculty was led by CERC's Director, Arnold Milstein, whose career had focused on such efforts, including the 2005 design and subsequent multi-state demonstration of the "ambulatory ICU" (A-ICU). The A-ICU is a value enhancing bundle of three care process innovations for medically fragile patients that reduces the frequency of costly health crises and concentrates referrals to other providers based on their speed of access, quality and cost-effectiveness.⁸ The CERC approach has also drawn from the human-centered design tradition on the Stanford campus, particularly as adapted by Stanford Biodesign- a program that trains young physicians and engineers to design innovative medical devices which improve clinical outcomes.⁹

Based upon these influences, the main features of CERC's approach to the design and spread of new care models emerge:

1. **Focus on innovation in health care delivery methods:** Rather than discovering new drugs or inventing new medical devices, CERC concentrates on health care delivery redesign and actively seeks ideas from science and practice external to healthcare. Despite headwinds, valuable innovations in care delivery methods are not without precedent in health care. The original intensive care unit (ICU) concept emerged in the 1950s with the hypothesis that outcomes might improve if hospitals consolidated the location of their sickest patients and intensified monitoring and treatment plan adjustment. Subsequent innovation utilized these resourced settings to allow for mechanical ventilation outside of the operating room.¹⁰ The ICU concept was further refined and quickly spread to "adjacent" clinical areas such as neonatal units, burn units, etc.

A focus on innovation in services offers many benefits for the mission of slowing health spending growth. New care models are relatively cheap to develop compared to drugs and devices because their development and testing is faster and cheaper. There are, however, novel challenges beyond weakly defensible intellectual property. For example, new care models are more difficult

to replicate with fidelity at new sites and health care delivery sites vary greatly in their motivation for change and their ability to implement and manage the models.

2. **Strategic selection of targets:** Our new care models are directed at inflection points in the cost of care that offer the best opportunities to safely slow health spending growth. In our first two years we have selected six inflection point targets: chronic kidney disease, poor prognosis cancer, the transition from obesity to morbid obesity, screening for colorectal cancer, stroke prevention and treatment, and the transition to adult care for children with complex, chronic illness. Each target represents a period of unique opportunity to safely slow the growth in health spending. CERC Faculty select targets based on the expert judgment of clinical specialists as well as an intuitive review of the scientific and economic literature for population health spending trajectories. Based on research now underway, we plan to supplement this subjective approach to target selection with quantitative estimates of future lifetime health care spending associated with the coincidence of factors related to population health, health behavior, and social and physical environment of care.

For each target, we seek “grip-holds” that offer major opportunities to improve value through health care delivery and service redesign. In chronic kidney disease, for example, one such grip-hold is the population at imminent risk for renal replacement therapies, since such therapies carry very different implications for quality of life and average total per capita health spending. The discovery and exploitation of such grip-holds are a major focus of the CERC design process.

3. **Intensive design process by teams of diversely educated research fellows:** The design work is carried out by small teams of post-doctoral fellows consisting of a physician, often in the midst of sub-specialty training, an engineer or management scientist, and a social scientist. The teams are given a month long intensive training that includes background on the selected target condition, exposure to a tool kit of potentially relevant emerging science and technology (e.g. patient activation, decision support systems, systems control and analysis, human factors science, comparative effectiveness analysis, telehealth) and the chance to share notes and discuss cases with accomplished innovators in health care and technology.

After training, the teams are tasked with an aggressive goal: develop a new care model for their clinical target that will lower population health care costs by 50% without impairing quality or the patient experience. The teams follow a structured, year-long design process that includes frequent mentoring by CERC faculty and diverse senior advisors drawn from medical, operations engineering, business, and social science disciplines.

The design process begins with a search of medical and industrial publications

for under-recognized care innovations, followed by an evaluation of poorly met needs perceived by patients, families and clinicians. Needs are distilled through direct observation of clinical processes and interviews with stakeholders at diverse care sites, some of which are exemplars of high value care. Once under-recognized existing innovations, unmet needs and opportunities from “adjacent possible” service innovations are clarified and prioritized, a rapid cycle of concept development ensues. During concept development the most powerful potential levers for improving the value of care are distilled and iterated with faculty and mentors. This process concludes with the development of an innovative health care delivery model for each target condition, which is then refined and finalized through discussion with subject matter experts from science and industry.

4. **Testing and spreading the new care models:** Once the designs for new care models are finalized CERC teams help to implement and refine them, and later evaluate their impact on the cost and quality of care. We turn to the most dynamic segments of the health care marketplace – self-insured employers, managed care insurers and care delivery organizations serving HMOs or ACOs that bear, or anticipate bearing, risk for the value of care – to serve as test sites. We approach potential testing organizations with descriptions of our proposed care models and with estimates of the one-year and three-year impacts on the cost and quality of care. To date, twelve test sites have been identified by CERC for new care model implementation. If test results prove positive, we will work with national and regional payers to motivate other providers in their networks to adopt the care models. We are particularly hopeful that ACOs will be motivated adopters of healthcare process innovations as they are designed to benefit substantially from providing medical care in a way that reduces per capita cost without jeopardizing quality or the patient experience.

The preliminary results of our work are promising. Estimates of net per capita health spending reductions from CERC's first 6 new care model designs range from 10% to 30% and in each case we also project improvements in health outcomes and patients' experience of care.¹¹ These CERC model designs and estimations parallel those seen during the development of the model and pilot of the Ambulatory ICU (see Case Example). Enhanced by our setting in a research university with a global reputation for constructive innovation development partnerships with industry, we anticipate a similar path of design, piloting, demonstration and broader adoption for successful CERC models. Already, CERC's early experience with care model design has yielded a number of valuable lessons, including:

1. **Be prepared for pivots:** Even during the brief, one-year design period new research can appear that profoundly alters the direction of the emerging care model. For example, the team working on the transition from obesity to morbid obesity initially focused on ways to improve the value of bariatric surgery based on research showing that such procedures were close to being cost-reducing for the target population. However, mid-way through the design process, new studies

appeared documenting that the starting assumption was flawed and that such surgeries were cost additive under all likely scenarios. At this point, the team switched direction and focused on behavioral solutions.

2. **Observe from many perspectives:** We initially trained our fellows to focus their observations on what patients, providers, caregivers and other stakeholders were saying, doing and feeling during the process of care delivery. We did this to encourage empathic understanding of what people actually experience today as the starting point for designing a higher value method of care. However, as we identified innovation needs from these observations, we noted these observations did not generate sufficiently quantitative information about the cost of different approaches to care delivery. We had effectively trained our fellows to adopt the anthropologist's perspective, but we were missing the engineer's and the economist's points of view. So in subsequent iterations, we augmented our observation method to include high-level process mapping and collection of quantified information about total healthcare resource utilization, service input prices and trade-offs.
3. **Match models to payer characteristics:** Not every new care model will be a good match for every interested payer. For some pilot test sponsors, a target condition may not be sufficiently prevalent to warrant attention. High tech companies with young work forces, for example, may be less interested in chronic kidney disease or colorectal cancer screening, than companies with older employees. Similarly, insurance companies which need to contract widely among the providers may be more reluctant than HMOs with carefully selected provider networks to adopt features of a new care model that substantially threaten the livelihoods of care providers. A case in point is our poor prognosis cancer model, which contains a proposal to move some chemotherapy – upon which as much as 70% of a medical oncologist's income depends - from infusion centers to the home. We learned that we needed to develop an individualized business case for each payer to determine if our models would be a good fit.

Bending the curve of rising health care costs will require innovative models of care delivery that provide better health with less money. To accomplish this goal, clinicians, engineers, social scientists and healthcare managers must receive training in a rigorous methodology for healthcare process innovation. Additionally, innovative care models must be nurtured and tested in environments where incentives align for maximizing health care value. To help solve the seemingly intractable societal problem of rising health care costs, CERC is drawing on the unique resources of a major university and industry partners to train service design innovators, foster pilot tests of its new care models, and assess the ability of the models to improve the affordability of clinical excellence.

Case Example

The Ambulatory ICU (A-ICU) design and testing process foreshadowed the CERC approach. In 2005, CERC's current director selected a diverse team of innovative healthcare providers, systems engineers, professional managers and health services researchers and secured funding from the California Healthcare Foundation and Robert Wood Johnson foundation to design and test the A-ICU model.¹² Like CERC models, the design focused on improving quality of care while profoundly reducing per capita spending. Relevant studies in the academic literature and knowledge of everyday best practice were assessed for key insights. Using an iterative design process, the team developed a care model that uses an information technology enabled, tiered approach to care, thereby maximizing the utility of the lowest cost healthcare provider able to address an identified patient need. A financial estimate of the cost of care and savings associated with the operation of an A-ICU was created. A review panel consisting of subject matter experts provided critiques of the team's model design on the basis of clinical operations, business structure, legal barriers and the financial modeling.

The A-ICU model was piloted by Boeing in 2009¹³ as the Intensive Outpatient Care Program. Consistent with the key elements of the A-ICU care model, the patient's care plan was developed in partnership with the patient and was executed through intensive in-person, telephonic and email contacts in a tiered approach maximizing the utility of each practitioner. The pilot included (1) physician-supervised outreach by an RN who used motivational interviewing to improve patient self-management of chronic conditions and assured rapid access to the A-ICU team; (2) daily team planning huddles to plan patient interactions; and (3) timely and dependable connections to cost-effective specialist and ancillary services. The pilot program enrolled active Boeing employees and pre-Medicare retirees and their adult spouses who participated in Boeing's self-funded, non-HMO medical plans in Seattle. Patients were invited to enroll if they received primary care through one of the three physician groups participating in the pilot test and had a severe chronic illness.

As described in the steering group's Health Affairs' Blog synopsis, evaluation of the pilot results occurred in the spring of 2009, after 276 patients had both participated in the program for at least 12 months and could be matched based on health spending risk factors to non-participating Boeing-insured patients with severe chronic illness. Functional status scores, HEDIS intermediate outcomes scores, depression scores, patients' experience of care scores, and employees' absenteeism scores improved compared to baseline. Compared to the control group, unit price-standardized per capita spending dropped by an estimated 20% net of the supplemental fees paid to participating physician groups, primarily due to lower spending for ER visits and hospitalizations ($p = 0.11$).

Although the Boeing pilot study was not adequately powered for statistical significance, similar results were observed in a pilot study supported by the UniteHere Taft-Hartley Fund's Atlantic City unit for unionized hotel workers. There has been subsequent spread of the A-ICU model by Regence Blue Shield and associated primary care providers in Oregon, Washington and Alaska. The Pacific Business Group on Health, in conjunction with the California Public Employees' Retirement System and the Pacific Gas and Electric Company, fostered spread of the model to Humboldt County in California and more recently to 4 states via a \$19 million Center for Medicare & Medicaid Innovation grant. In all, more than 30 different risk-bearing medical groups are now implementing the A-ICU model.

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