

Dissecting the PCAST Report
Better Health Care and Lower Costs:
Accelerating Improvement through
Systems Engineering

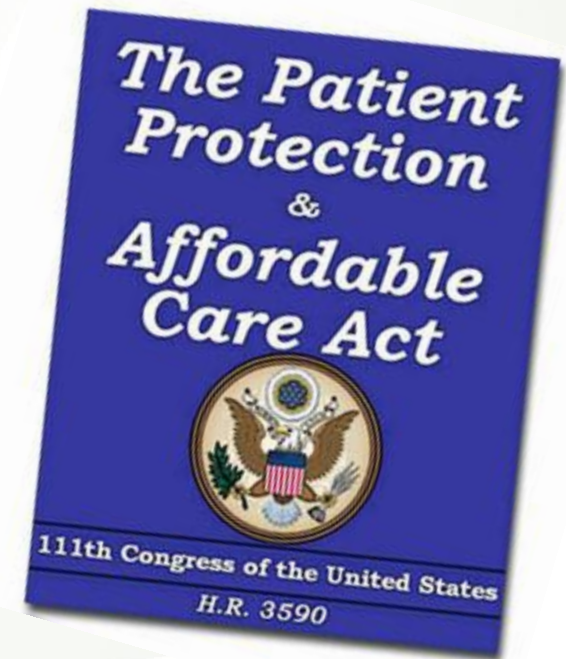


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Why Was the Report Written?

- PCAST reports are directed by the President
- According to the report:
 - Health-care costs now approach 1/5 of the U.S. economy
 - Much of that is reportedly “unnecessary”
 - Expanded access (due to the ACA) places greater demands on the health-care system





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What is PCAST?

President's Council of Advisors on Science and Technology



PCAST is an advisory group of leading scientists and engineers appointed by the President that develop policy recommendations based upon the domains of science, technology, and innovation.

PCAST Systems Engineering in Health Care Working Group

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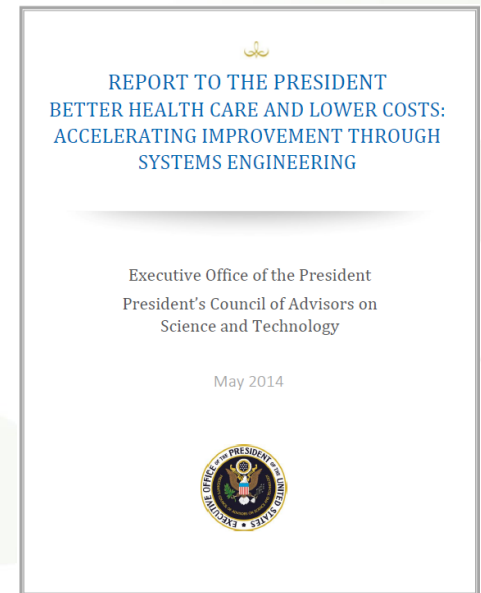
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President's Council of Advisors on Science and Technology

Organization of the Report

- Introduction and Motivation for Improvement
- Successful Use of Systems Engineering in Other Industries
- Promise of Systems Engineering for Health and Health Care
- Factors Limiting Dissemination and Spread of Systems-Engineering Principles
- Goals (1-6)
 - Recommendations (1-7)
- Appendices
 - Systems Engineering Overview
 - Selected Examples of Systems Engineering in Health Care
 - Illustrative Examples on Ways to Build HHS Data Leadership



Successful Use of Systems Engineering in Other Industries

U.S. commercial airlines



- Reduced fatalities from hundreds in the 1960s to almost zero
- Leveraged tools such as alerts, redundancies, checklists, and systems that adjust for the human factor

And other industries, including:



- Manufacturing
- Space exploration
- Education

Promise of Systems Engineering for Health and Health Care



- Used the Toyota Production System to redesign its entire operations
- Mapped out operations and found significant waste
- Reduced deep-vein thrombosis and pulmonary embolism by 80% via Lean techniques



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- Identified detection and treatment of sepsis as an opportunity for improvement
- Leveraged rapid-cycle pilot testing before scaling solutions
- Increased detection 3x and reduced mortality by 1/2

While there are excellent examples, systems methods and tools are still not used on a widespread basis through health care.



Factors Limiting Dissemination and Spread of Systems-Engineering Principles

- Lack of quality and performance measures
- Misaligned incentive structure (Fee-For-Service)
- Lack of resources (especially for small practices)
- Current leadership and culture
- Siloed nature of the health system
- Technical challenges
- Workforce capability shortfalls
- Limited knowledge about success cases

Identified Goals

- 1. Accelerate alignment of payment systems with desired outcomes**
- 2. Increase access to relevant health data and analytics**
- 3. Provide technical assistance in systems-engineering approaches**
- 4. Involve communities in improving health-care delivery**
- 5. Share lessons learned from successful improvement efforts**
- 6. Train health professionals in new skills and approaches**

(The seven detailed PCAST recommendations are provided in the backup slides)

How would you pursue these goals?



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Discussion on Goal 1

Accelerate Alignment of Payment Systems with Desired Outcomes

- Background:
 - Fee-For-Service is seen as a major barrier

Discussion on Goal 2

Increase Access to Relevant Health Data and Analytics

- Background:
 - Limited availability of clinical, administrative, and operational data due to lack of technical interoperability as well as HIPAA constraints

Discussion on Goal 3

Provide technical assistance in systems-engineering approaches

- Background:
 - Many health care professionals are not trained in systems thinking and/or systems solutions
 - Assistance is especially important for small practices that lack resources to hire additional personnel

Discussion on Goal 4

Involve communities in improving health-care delivery

- Background:
 - Communities (not just health providers) can sustain health, promote healthful behaviors, assist in prevention, and support management of chronic conditions

Discussion on Goal 5

Share lessons learned from successful improvement efforts

- Background:
 - Successful examples exist, but knowledge about their application is not widely shared

Discussion on Goal 6

Train health professionals in new skills and approaches

- Background:
 - Health care professional training curricula are time constrained and often lack sessions on systems science and/or systems engineering



My Concerns

- Where's the customer?!
- Not exploiting the existing value-based models
- Expecting data will solve systems problems
- Glossing over the need for culture change
- Assuming leadership and effective communication will emerge





My Actions

- Created Health Solutions Division of GCorp
- Joined INCOSE Healthcare Working Group
- In discussion with health professional curricula developers



PCAST Links

- **PCAST Website**
<http://www.whitehouse.gov/administration/eop/ostp/pcast>
- **Full Report**
http://www.whitehouse.gov/sites/default/files/microsites/ostp/PCAST/pcast_systems_engineering_in_healthcare_-_may_2014.pdf
- **White House “Fact Sheet”**
http://www.whitehouse.gov/sites/default/files/microsites/ostp/PCAST/pcast_systems_engineering_in_healthcare_fact_sheet_-_may_2014.pdf
- **PCAST Meeting Slides (May 2014)**
http://www.whitehouse.gov/sites/default/files/microsites/ostp/systems_engineering_and_healthcare.pdf
- ***Journal of the American Medical Association Viewpoint***
<http://jama.jamanetwork.com/article.aspx?articleid=1889028>

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Thank you!



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Recommendation 1

Accelerate the alignment of payment incentives and reported information with better outcomes for individuals and populations.

- 1.1 Health and Human Services (HHS) should convene public and private payers (including Medicare, Medicaid, State programs, and commercial insurers) and employers to discuss how to accelerate the transition to outcomes-based payment, promote transparency, and provide tools and supports for practice transformation. This work could build on current alignment and measurement-improvement efforts at the Center for Medicare and Medicaid Services (CMS) and HHS broadly.
- 1.2 CMS should collaborate with the Agency for Healthcare Research and Quality (AHRQ) to develop the best measures (including outcomes) for patients and populations that can be readily assessed using current and future digital data sources. Such measures would create more meaningful information for providers and patients.

Recommendation 2

Accelerate efforts to develop the Nation's health-data infrastructure.

2.1 HHS should continue, and accelerate, the creation of a robust health-data infrastructure through widespread adoption of interoperable electronic health records and accessible health information. Specific actions in this vein were proposed in the 2010 PCAST report on health information technology and the related 2014 JASON report to the Office of the National Coordinator for Health Information Technology (ONC).

Recommendation 3

Recommendation 3: Provide national leadership in systems engineering by increasing the supply of data available to benchmark performance, understand a community's health, and examine broader regional or national trends.

3.1 HHS should create a senior leadership position, at the Assistant Secretary level, focused on health-care transformation to advance information science and data analytics. The duties for this position should include:

- Inventory existing data sources, identify opportunities for alignment and integration, and increase awareness of their potential;
- Expand access to existing data through open data initiatives;
- Promote collaboration with other Federal partners and private organizations; and
- Create a more focused and deep data-science capability through advancing data analytics and implementation of systems engineering.

3.2 HHS should work with the private sector to accelerate public- and private-payer release of provider-level data about quality, safety, and cost to increase transparency and enable patients to make more informed decisions.

Recommendation 4

Increase technical assistance (for a defined period—3-5 years) to health-care professionals and communities in applying systems approaches.

4.1 HHS should launch a large-scale initiative to provide hands-on support to small practices to develop the capabilities, skills, and tools to provide better, more coordinated care to their patients. This initiative should build on existing initiatives, such as the ONC Regional Extension Centers and the Department of Commerce's Manufacturing Extension Partnership.

Recommendation 5

Recommendation 5: Support efforts to engage communities in systematic health-care improvement.

- 5.1 HHS should continue to support State and local efforts to transform health care systems to provide better care quality and overall value.
- 5.2 Future CMS Innovation Center programs should, as appropriate, incorporate systems-engineering principles at the community level; set, assess, and achieve population-level goals; and encourage grantees to engage stakeholders outside of the traditional health-care system.
- 5.3 HHS should leverage existing community needs assessment and planning processes, such as the community health-needs assessments for non-profit hospitals, Accountable Care Organization (ACO) standards, health-department accreditation, and community health-center needs assessments, to promote systems thinking at the community level.

Recommendation 6

Recommendation 6: Establish awards, challenges, and prizes to promote the use of systems methods and tools in health care.

6.1 HHS and the Department of Commerce should build on the Baldrige awards to recognize health-care providers successfully applying system engineering approaches.

Recommendation 7

Build competencies and workforce for redesigning health care.

- 7.1 HHS should use a wide range of funding, program, and partnership levers to educate clinicians about systems-engineering competencies for scalable health-care improvement.
- 7.2 HHS should collect, inventory, and disseminate best practices in curricular and learning activities, as well as encourage knowledge sharing through regional learning communities. These functions could be accomplished through the new extension-center functions.
- 7.3 HHS should create grant programs for developing innovative health professional curricula that include systems engineering and implementation science, and HHS should disseminate the grant products broadly.
- 7.4 HHS should fund systems-engineering centers of excellence to build a robust specialty in Health-Improvement Science for physicians, nurses, health professionals, and administrators.