

Rapid Adaptive Control of Epidemic (RACE Network): Accelerating community-wide learning and response to the COVID pandemic

Michael Seid, PhD

Susan Cronin, PhD

$$0.5 \times 0.5 = 0.25$$

McGlynn EA, et al. N Engl J Med 2003; 348:2635–45.

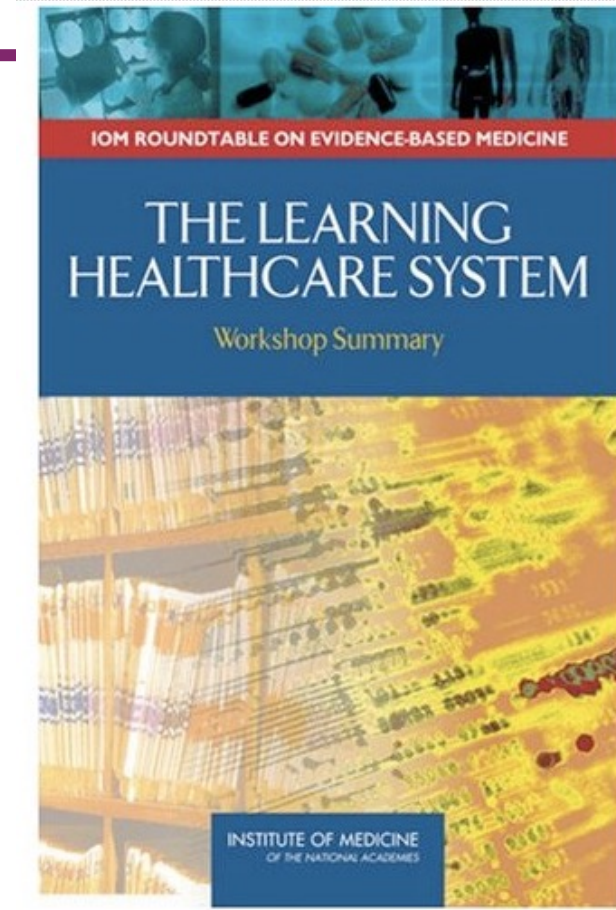
Mangione-Smith R, et al.. N Engl J Med. 2007;357:1515–1523

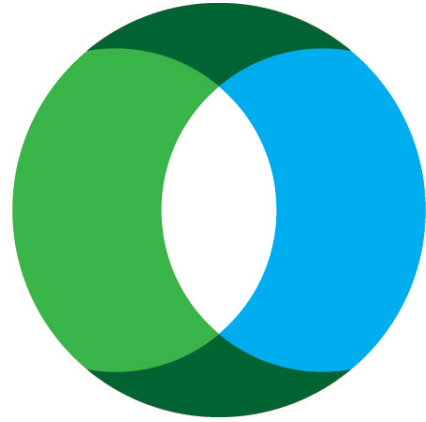
Brown & Bussell Mayo Clin Proc. 2011;86(4):304-314

Learning Health System

(U.S. Institute of Medicine)

- One system for learning and doing (not separate systems for research and clinical care)
- Data is generated at the point of care, is aggregated to become knowledge, which is applied to clinical care, rapidly

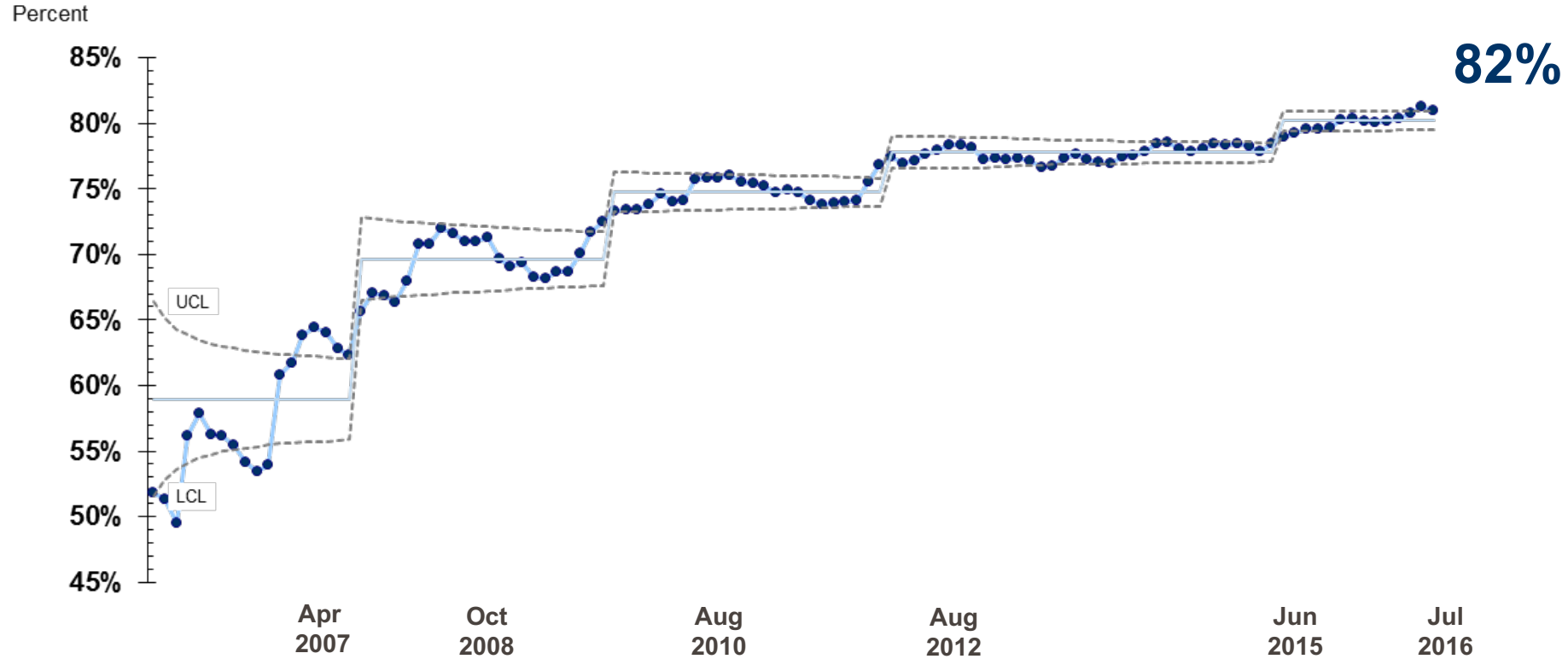




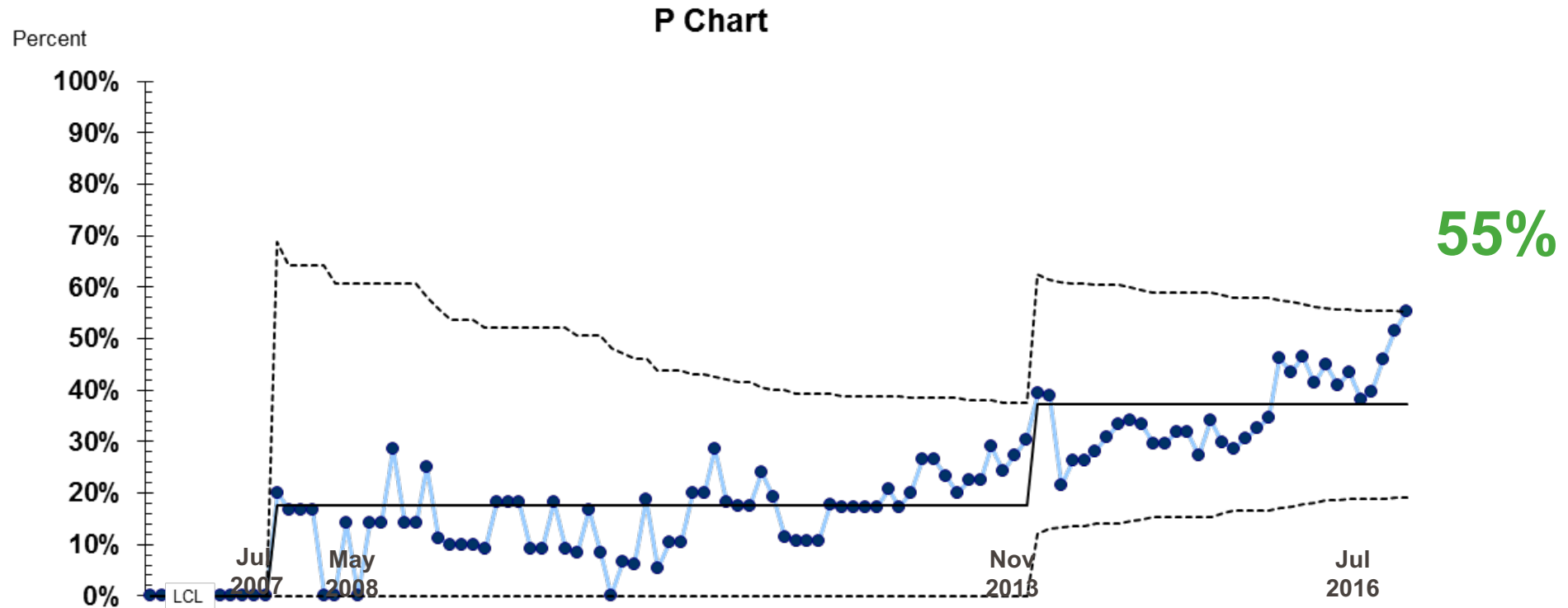
IMPROVE**CARE**NOW

- Pediatric Inflammatory Bowel Disease
 - Crohn's disease and Ulcerative Colitis
- 109 Care Centers
- 950 Pediatric GIs
- 30,000 patients

Clinical remission



Centers with >80% clinical remission rate



Replication in Other Networks

Solutions for Patient Safety Network

- >100 hospitals
- 50% reduction in serious safety events



Ohio Perinatal Quality Collaborative

- All 108 hospitals in Ohio
- 75% reduction in elective pre-term delivery



National Pediatric Cardiology Quality Improvement Collaborative

- 57 hospitals; 90% of patients
- 40% reduction in inter-stage mortality



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BMJ Quality & Safety Online First, published on 5 February 2018 as 10.1136/bmjqs-2017-007219
SPECIAL ARTICLE



OPEN ACCESS

Using a network organisational architecture to support the development of Learning Healthcare Systems

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Carole Lannon,^{1,3} Peter A Margolis,¹ Stephen E Muething,¹
Pamela J Schoettker,¹ Michael Seid^{1,4}



Martin Nowak
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Oystein Fjeldstad
Norwegian Business School
Chair, Dept of Strategy



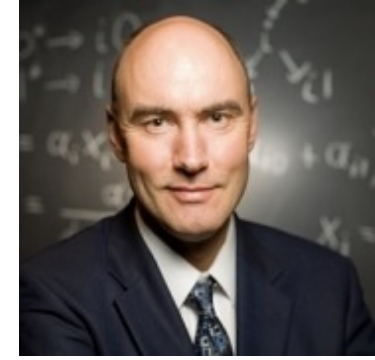
Elinor Ostrom 1933-2012
Economist
Nobel Laureate 2009



David Sloan Wilson
Distinguished Professor
Biological Sciences
and Anthropology
Binghamton University

Published in final edited form as:

Science. 2006 December 8; 314(5805): 1560–1563. doi:10.1126/science.1133755.



Five rules for the evolution of cooperation

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Department of Mathematics, Harvard University, Cambridge, MA 02138, USA

Kin Selection: Cooperate with genetic relatives

Direct Reciprocity: I help you, you help me

Indirect Reciprocity: I help you, somebody helps me

Network Selection: Neighbors help each other

Group Selection: Groups of cooperators (tribes) out-compete other groups

Multi-level selection

Cultural evolution

- Multi-level selection
 - "Selfishness beats altruism within groups. Altruistic groups beat selfish groups. Everything else is commentary"
- Cultural Evolution
 - Evolutionary forces also work on culture and behavior




[Human Nature](#)

..... September 1999, Volume 10, [Issue 3](#), pp 291–310

Multilevel selection and the social transmission of behavior

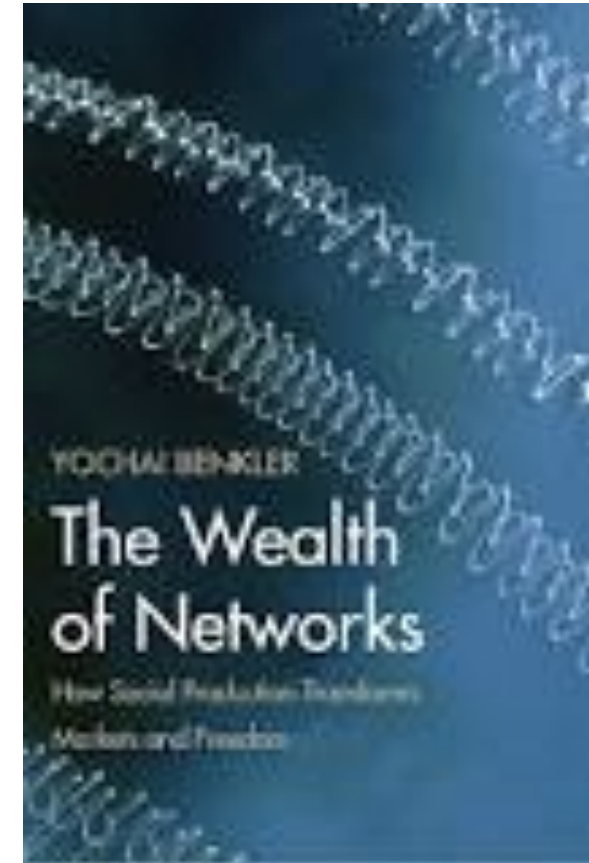
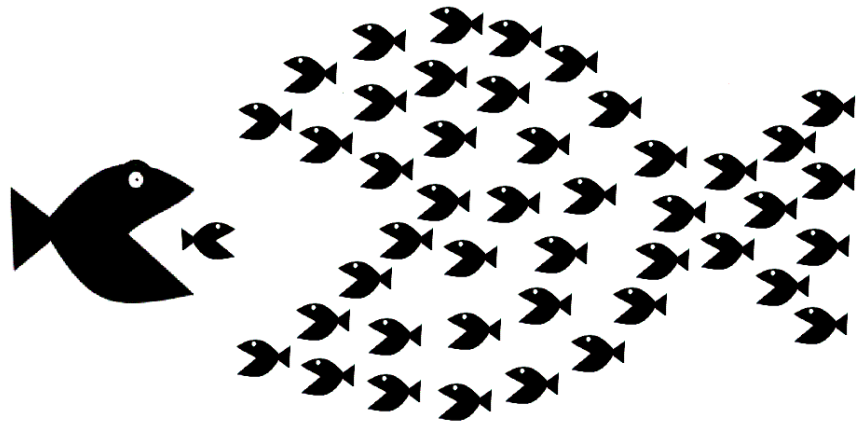
Authors

[Authors and affiliations](#)

David Sloan Wilson , Kevin M. Kniffin

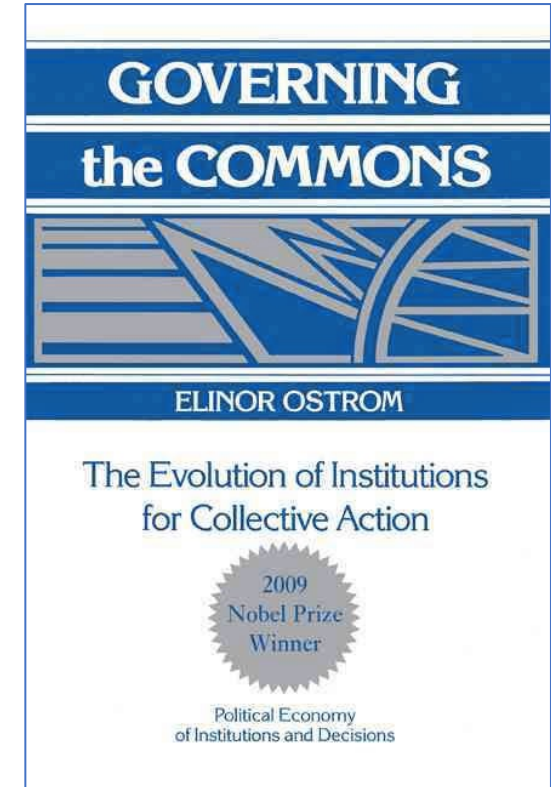
Commons-Based Peer Production

- Distribution of the means of production of information, knowledge, and know-how
- Non-market production
- With the right system, everyone can be part of the solution



Design Principles for Stable Management of Common Pool Resources

- Clearly defined
- Equitable resources and benefits
- Access to decision-making
- Monitoring
- Graduated sanctions
- Cheap and easy conflict resolution
- Self-determination
- Nested governance



The Architecture of Collaboration

- Actor Oriented Architecture

- Actors who have a **shared purpose** and the capabilities and values to self-organize
- Renewable and expandable **commons where the actors accumulate and share resources**
- **Protocols, processes, and infrastructure that enable peer-to-peer collaboration**



Strat. Mgmt. J., 33: 734–750 (2012)

THE ARCHITECTURE OF COLLABORATION

ØYSTEIN D. FJELDSTAD,^{1*} CHARLES C. SNOW,^{2,3} RAYMOND E. MILES,⁴ and CHRISTOPHER LETTL⁵

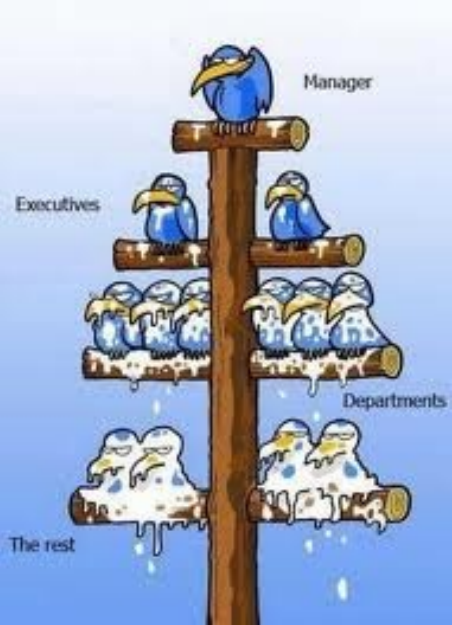
¹ BI-Norwegian Business School, Oslo, Norway

² Smeal College of Business, The Pennsylvania State University, University Park Pennsylvania, U.S.A.

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⁴ Haas School of Business, University of California, Berkeley, Berkeley, California, U.S.A.

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Architecture



Architecture

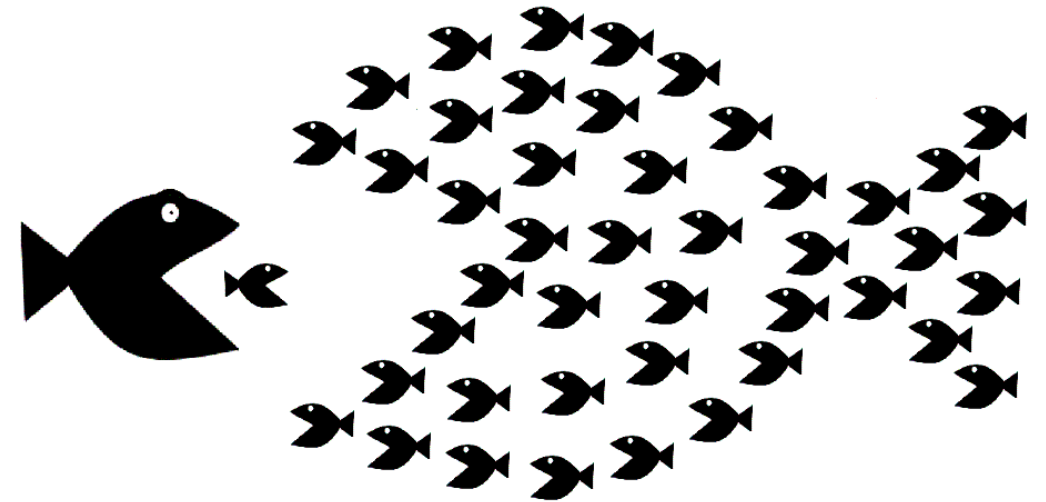


	Marketing	Operations	Finance	HRM
	<i>Marketing Manager</i>	<i>Operations Manager</i>	<i>Finance Manager</i>	<i>HR Manager</i>
Project A (Team Leader)	Marketing Team (A)	Operations Team (A)	Finance Team (A)	HR Team (A)
Project B (Team Leader)	Marketing Team (B)	Operations Team (B)	Finance Team (B)	HR Team (B)
Project C (Team Leader)	Marketing Team (C)	Operations Team (C)	Finance Team (C)	HR Team (C)
Project D (Team Leader)	Marketing Team (D)	Operations Team (D)	Finance Team (D)	HR Team (D)

Architecture



	Marketing	Operations	Finance	HRM
	<i>Marketing Manager</i>	<i>Operations Manager</i>	<i>Finance Manager</i>	<i>HR Manager</i>
Project A (Team Leader)	Marketing Team (A)	Operations Team (A)	Finance Team (A)	HR Team (A)
Project B (Team Leader)	Marketing Team (B)	Operations Team (B)	Finance Team (B)	HR Team (B)
Project C (Team Leader)	Marketing Team (C)	Operations Team (C)	Finance Team (C)	HR Team (C)
Project D (Team Leader)	Marketing Team (D)	Operations Team (D)	Finance Team (D)	HR Team (D)



Actors with the will and ability to self-organize

- All teach, all learn
- Steal shamelessly, share seamlessly
- You can make a difference

‘Words to describe us’
Common Purpose
Generosity and Contribution
Mastery
Continuous Improvement
Learning
Trust
Friendship
Solidarity
Respect

17

A commons to create and share resources

- “Data in once”
 - Research data collected as part of clinical care
- Clinical Tools
 - Pre-visit planning tool for efficient clinic visits
 - Population management tool to identify patients needing more care

[Repository](#) > [PUBLISH](#) > [eGEMs](#) > [Vol. 3 \(2015\)](#) > [Iss. 1](#)

A Digital Architecture for a Network-Based Learning Health System – Integrating Chronic Care Management, Quality Improvement, and Research

[Keith Marsolo](#), *Cincinnati Children's Hospital Medical Center*

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[Peter A. Margolis](#), *Cincinnati Children's Hospital Medical Center*

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...A Commons



Welcome, Michael Seid [\(Logout\)](#)
Improve Care Now: ICN Demo Training

[Home](#) [Registry](#) [Reporting](#) [Anal](#)

Welcome to the ICN Registry

Registry Activities



Data Entry
Enter patient registration and visit information



Registration / Administration
Manage your patients: Register, Edit, Consent, etc... Manage your providers



Visit Tracking
Enter QI data used to measure registry involvement



Electronic Data Transfer
Manage your electronic data transfer files

Automated Reporting



Pre-Visit Planning Reports
View/Download Patient PVP Reports



Population Management Reports
View/Download PM Reports



QI Measure Reports
View/Download QI Measure Reports



Exceptions Reports
View/Download Exceptions Reports



Measure Definitions
View/Download definitions of measures

Research and Analysis



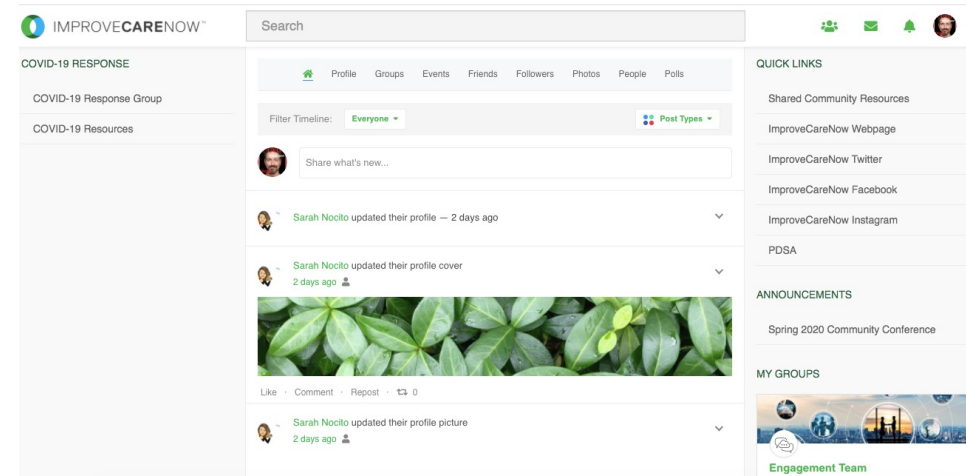
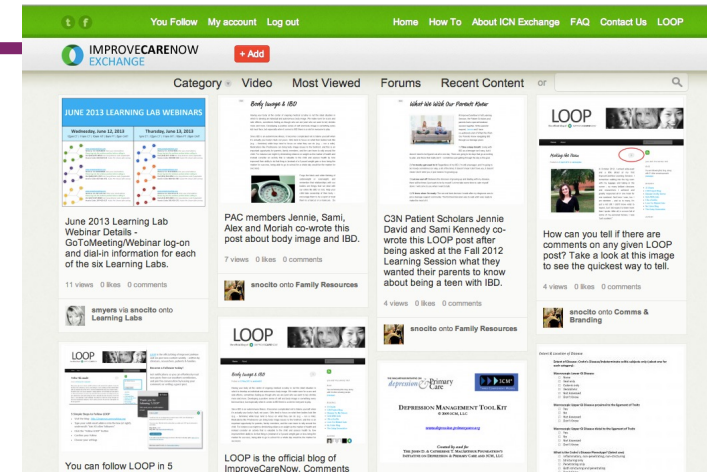
Identify Patients
Use i2b2 interface to derive patient cohorts



Research Studies
Research Studies conducted within the ICN2 Registry

A commons..

- Online
 - Quality Improvement Reports
 - Exchange – sharing how-to knowledge
 - Hive SCIP
- Offline
 - Monthly phone calls
 - Learning Labs (smaller groups)
 - Biannual Learning Sessions



Working with – ‘co-production’

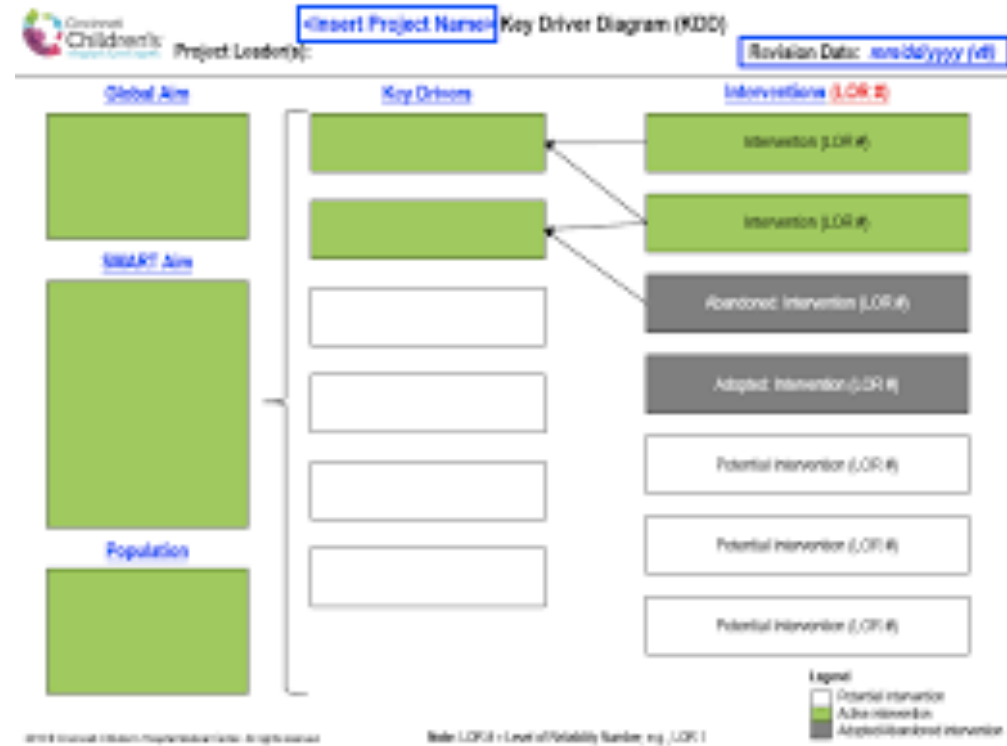
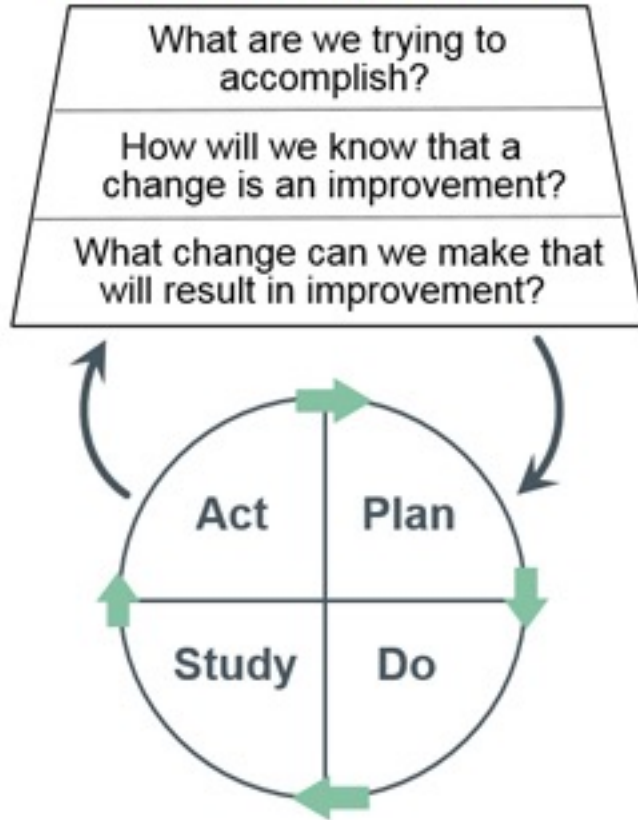
- Health care is not something given from an expert to a customer, it is shared work – requires producing together
- We don't work **for** families as customers
- We work **with** families as partners



The screenshot shows the BMJ Journals website interface. At the top, there is a navigation bar with 'BMJ Journals' on the left, and 'Subscribe', 'Log In', 'Basket', and a search box on the right. Below this is a red header for 'BMJ Quality & Safety' with links for 'Latest content', 'Current issue', and 'Archive'. The breadcrumb trail reads 'Home / Archive / Volume 25, Issue 7'. The main content area features a card for an article titled 'Original research: Coproduction of healthcare service'. The article is marked as open access (OA) and has a PDF icon. The authors listed are Maren Batalden¹, Paul Batalden², Peter Margolis³, Michael Seid³, Gail Armstrong⁴, Lisa Opiari-Arrigan³, and Hans Hartung⁵. There are also icons for 'Article Text' and 'Article Info' on the left side of the article card.

Facilitating multi-actor collaboration

Model for Improvement



Examples: contributions last 2 months

- Pre-visit planning video (Levine)
- Group visit model (CHKD)
- Parents on research committee helping develop research policies and process (Las Vegas)
- Master reliance agreement template (IRB chairs at BCH, CCHMC and CHOP)
- Speak out video (Alex Joffriet - CCHMC)
- Ostomy toolkit (PAC)
- Design for a clinical trial (ICN)

CCTST Optional Module: LHS

- Goal: accelerate research, translation, and implementation of new knowledge into improved outcomes
- Specific Aims
 - Engage stakeholders in co-designing and collaboratively testing interventions to facilitate emergence of LHSs that improve outcomes by integrating clinical/translational research with health care practice
 - Align and integrate functions across the CCTST for training and methodologic support to apply the network architecture that facilitates LHS formation

Original Plan

- Develop, test, and refine interventions that facilitate the formation of a LHS within a major clinical sub-system of the AHC, specifically UC Health's Gardner Neuroscience Institute and CCHMC's Mind, Brain, and Behavior Initiative

...and then COVID-19 arrived.

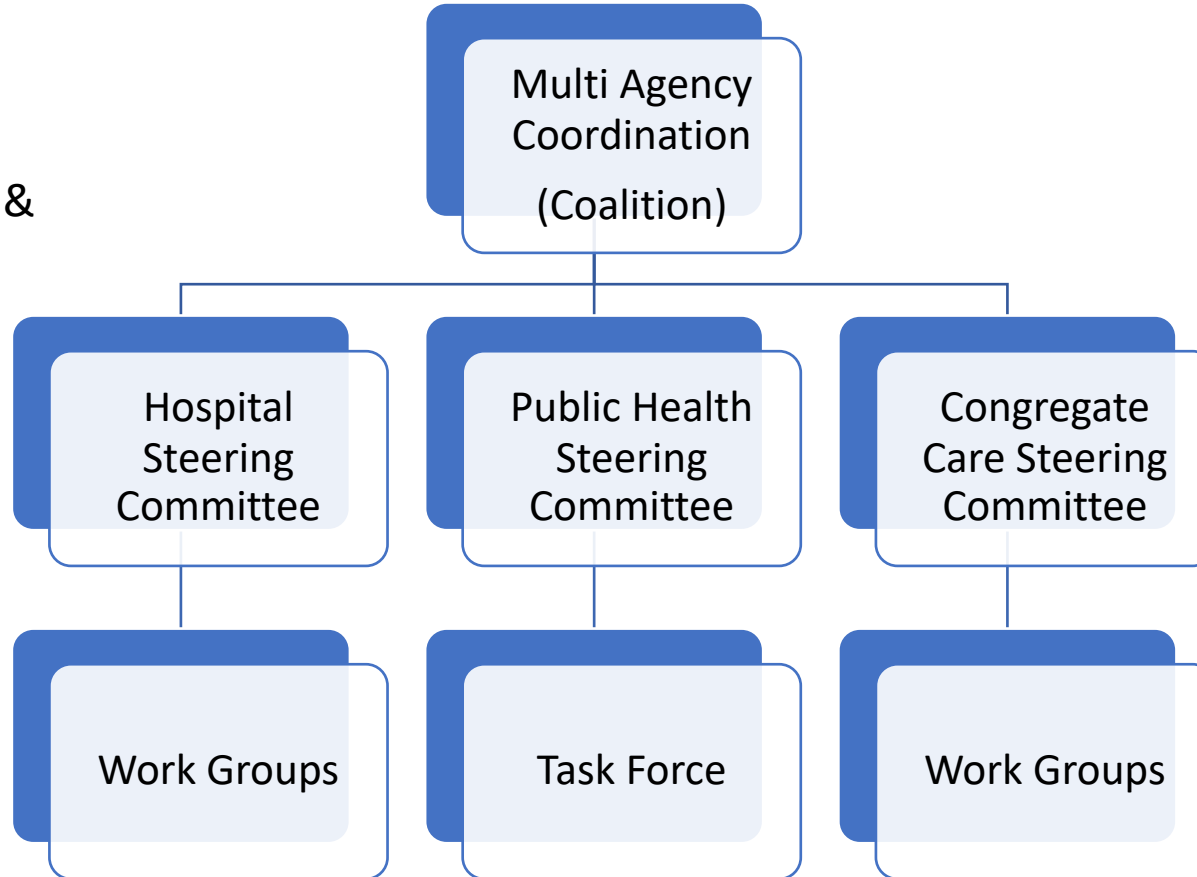
New Plan

- Let no pandemic “go to waste”!
- COVID-19 provides a unique opportunity to build an LHS and contribute to the broader regional mission
- Ultimately arrive at the same place through rapid prototype: *a replicable, tested approach to facilitating the creation of LHSs within the AHC*

Prototype—*An approximation of product, service, component of a system, or system among one or more dimensions of interest*

The Big Picture

Co-Chairs:
Evie Alessandrini &
Steve Davis



The “RACE” Team:

Peter Margolis
Rob Kahn
Andy Beck
David Hartley
Michael Seid
Susan Cronin
Myra Saeed

The “RACE” Team

- Goal: enable Rapid, Adaptive Control of the Epidemic
- Mandate:
 - **Understand real time spread of disease** using data from disease surveillance, diagnostic testing, and reporting systems to ensure that up-to-date information on local spread is available to inform strategy-setting and daily tactical decision-making to MAC sub-committees
 - **Use surveillance data to inform and update model-based forecasts**
 - **Develop measurement and collaborative learning system** to achieve and keep $R_{eff} < 1.0$ through integrated public health, health system, and community interventions

LHS
Module

LHS Update: Month 1

- Developed an aim and theory focused on improving outcomes
- Developed (and continue to refine) a logic model/work plan based on literature and theory of LHS frameworks
- Created a virtual knowledge sharing infrastructure via Hive Networks
- Identified and started collaborating with motivated partners
 - Primary Care
 - Pulmonary Medicine
- Iterated. Iterated. Iterated. Iterated...

Opportunities

- Leverage CCTST expertise to support emerging COVID workgroups where learning needs to take place (e.g., evidence, analytics, research)
 - Hospital, Ambulatory, Neighborhood, Congregate Care, Public Health
- Collaborate with teams addressing “burning questions” related to research/clinical restart
 - Ex: telehealth
 - Ex: community engagement around “crisis standards of care”
 - Ex: testing/tracing strategies
- NIH/NCATS COVID funding opportunities?