

IMPROVING QUALITY AND SAFETY WHERE PATIENTS, FAMILIES, AND CARE TEAMS MEET — THE CLINICAL MICROSYSTEM

Gautham Suresh, MD, MS

Associate Professor of Pediatrics and Community & Family Medicine

Medical Director, Intensive Care Nursery

Program Director, Neonatal-Perinatal Medicine Fellowship

The Dartmouth Institute for Health Policy and Clinical Practice

Geisel School of Medicine, Hanover, NH

Dartmouth-Hitchcock Medical Center, Lebanon, NH

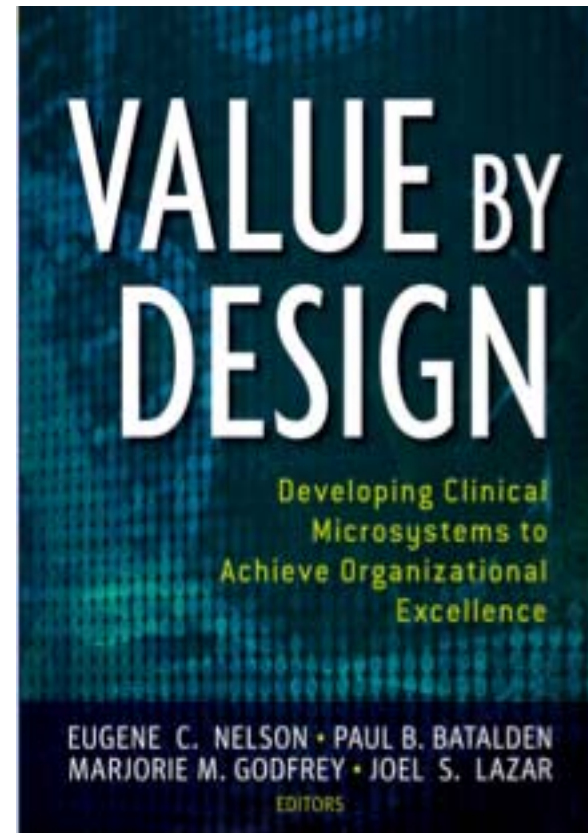
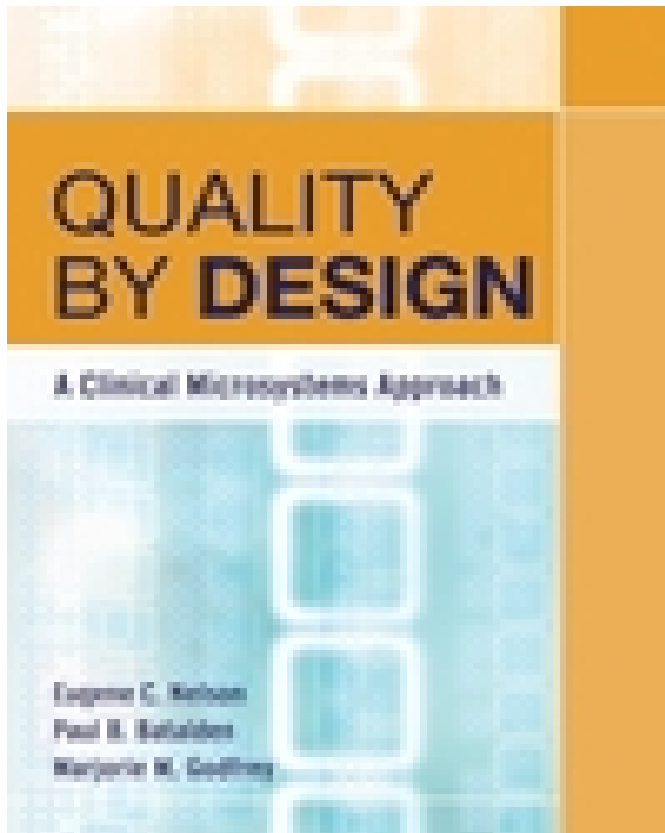
Boston, August 14, 2012

Acknowledgements

Concepts, work and Slides

- Paul Batalden
- Eugene Nelson
- Mark Splaine
- Margie Godfrey
- Tina Foster
- Joel Lazar

Books



Clinical Microsystems

[About Us](#)

[Materials](#)

[Events](#)

[Tool Kits](#)

[International](#)

[Wiki](#)

[Resources](#)

[Contact Us](#)

Purpose, Patients, Professionals, Processes and Patterns



The Place That Works

patients, families and careteams

The Dartmouth Institute • Dartmouth Medical School • Dartmouth-Hitchcock Medical Center • Dartmouth College

Copyright © 2008 Trustees of Dartmouth College

[Feedback](#)

→ **Models**

→ **Methods**

Measures

Institute of Medicine

Crossing the Quality Chasm

- “Health care today harms too frequently and routinely fails to deliver its potential benefits”
- “Tens of thousands of Americans die each year from errors.....”
- “...publications..serious quality shortcomings”
- “The current system cannot do the job. Trying harder will not work. **Changing systems of care will.**”

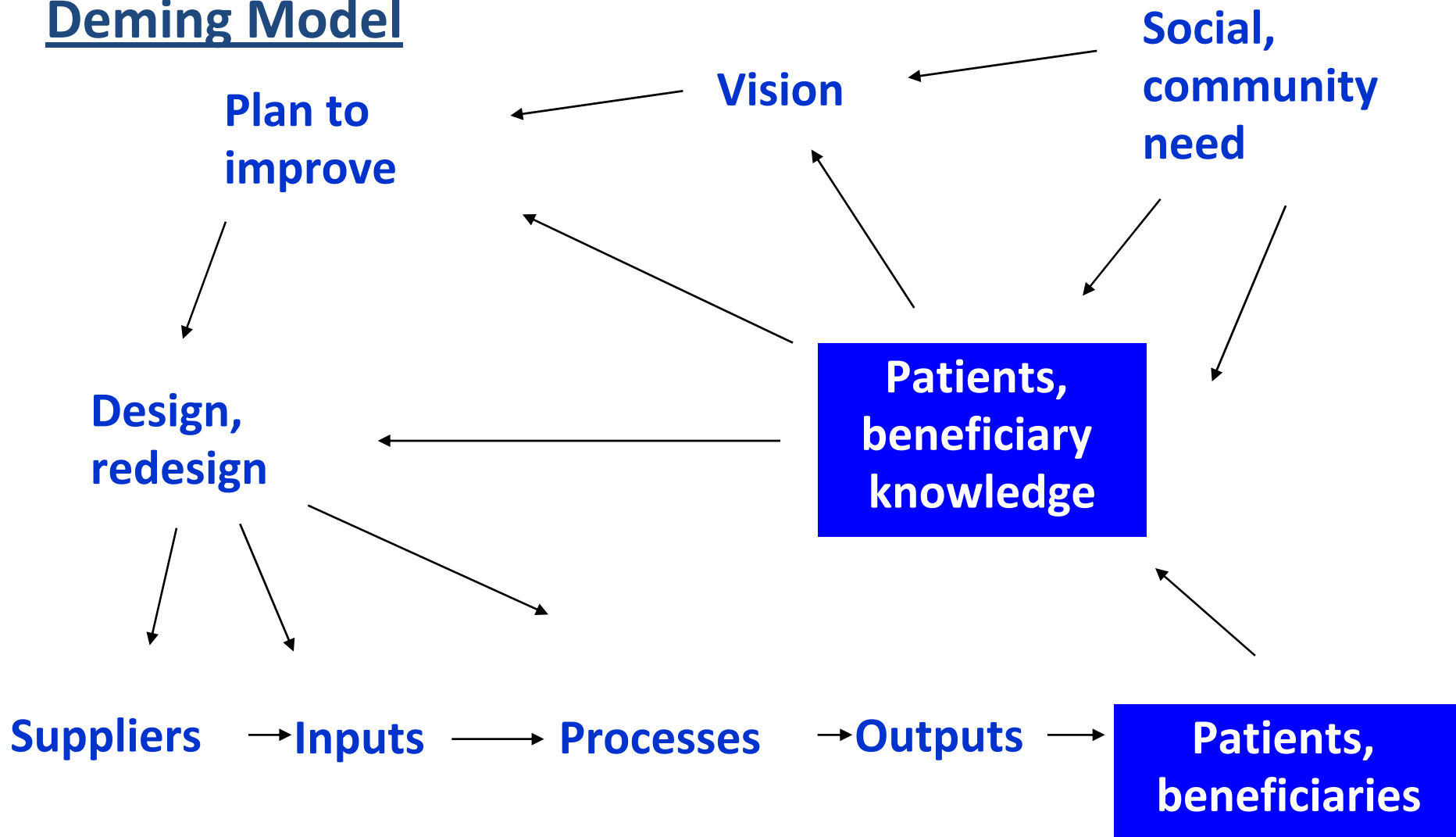
“To do things differently, we must see things differently. When we see things we haven’t noticed before, we can ask questions we didn’t know to ask before.”

John Kelsch, Xerox

A way to operationalize changing systems of care

- The Clinical Microsystems Approach
- Builds on systems thinking as described by
 - Deming
 - Senge et al
 - Wheatley
 - Others
- Influenced by complexity science, complex adaptive systems, chaos theory

Deming Model



Think of patients as “customer” in Deming sense



Lawrence J. Henderson

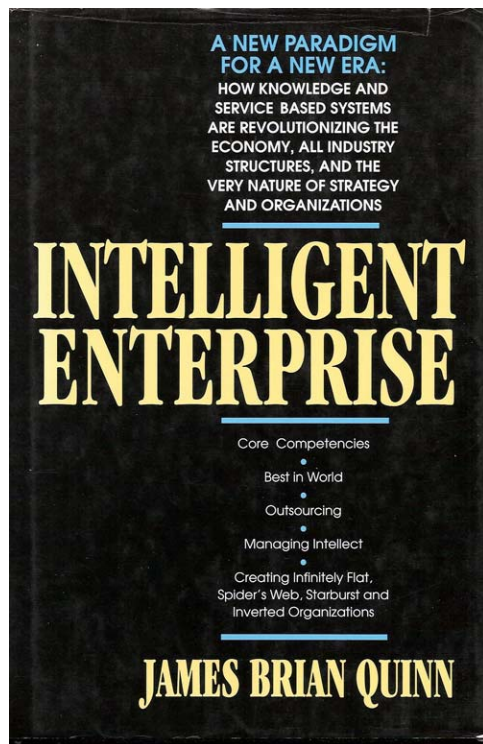
“[Health professionals] and patients are part of the same system.”

LJ Henderson

NEJM, 1936

Prof. Brian Quinn, Tuck Business School:

“Why are some service organizations enjoying explosive growth and margins?”



1992

Organized around, and continually engineered the **front-line interface relationship** that connected the organization's core competency with the needs of individual customers.

'Smallest replicable unit' or 'minimum replicable unit' – where service was delivered, true value transfer occurred

Intelligent Enterprise

“MACRO results produced in MICRO-UNITS”

- Value and loyalty created in SRUs
- Focused on SRUs’ design and improvement for
 - Quality, efficiency, service excellence, innovation
 - Data systems, information-rich environments and information flows
 - Performance measurement and monitoring

Health care SRUs: Microsystems

- Concept developed by Batalden, Nelson, others
- Studied by Mohr and Donaldson, 2000
- RWJ foundation-funded study by Nelson et al, Dartmouth Center for Evaluative Clinical Sciences, 2002

Dartmouth Study 2002

Eugene C. Nelson, DSc, MPH

Paul B. Batalden, MD

Thomas P. Huber, MS

Julie J. Mohr, MSPH, PhD

Marjorie M. Godfrey, MS, RN

Linda A. Headrick, MD, MS

John H. Wasson, MD

THE JOINT COMMISSION

The series of articles on microsystems is intended to provide useful ideas and methods that can be used in diverse clinical settings—outpatient, inpatient, skilled care, and home care—to create the conditions for sustained improvement in clinical quality and value in a way that is appreciated by patients and exciting to the front-line staff who serve them.

MICROSYSTEMS IN HEALTH CARE

Microsystems in Health Care: Part 1. Learning from High- Performing Front-Line Clinical Units

EUGENE C. NELSON, DSc, MPH
PAUL B. BATALDEN, MD
THOMAS P. HUBER, MS
JULIE J. MOHR, MSPH, PhD
MARJORIE M. GODFREY, MS, RN
LINDA A. HEADRICK, MD, MS
JOHN H. WASSON, MD

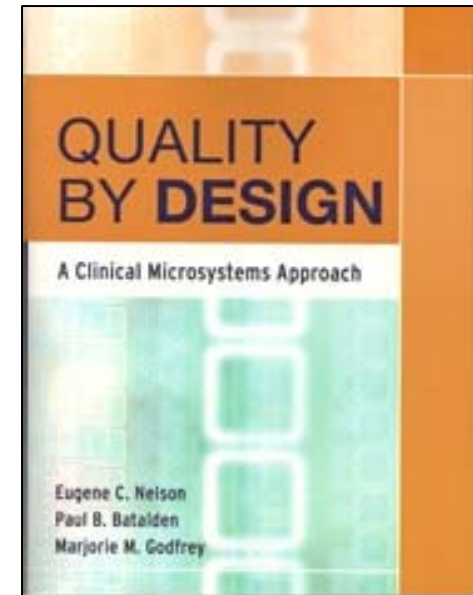
The health care system in the United States can, under certain conditions, deliver magnificent and sensitive state-of-the-art care. It can snatch life from the jaws of death and produce medical miracles. The case of Ken Bladyka (Sidebar, p 475), is one

example of the health care system's stellar performance. Yet the system is often severely flawed and dysfunctional. The Institute of Medicine's recent report—*Crossing the Quality Chasm: A New Health System for the 21st Century*—makes the point of system failure clear.¹

Eugene C. Nelson, DSc, MPH, is Director, Quality Education, Measurement and Research, Dartmouth-Hitchcock Medical Center, Lebanon, New Hampshire. **Paul B. Batalden, MD**, is Professor and Director, Health Care Improvement Leadership Development, Dartmouth Medical School, Hanover, New Hampshire. **Thomas P. Huber, MS**, is Project Manager, Dartmouth Medical School. **Julie J. Mohr, MSPH, PhD**, formerly Assistant Professor, Schools of Public Health and Pharmacy, The University of North Carolina, Chapel Hill, North Carolina, is now Director of

Quality and Safety Research for Pediatrics, University of Chicago, Chicago. **Marjorie M. Godfrey, MS, RN**, is Director, Clinical Practice Improvement, Dartmouth-Hitchcock Medical Center. **Linda A. Headrick, MD, MS**, is Professor of Medicine, Center for Healthcare Research and Policy, MetroHealth Medical Center, Case Western Reserve University, Cleveland, and a member of The Joint Commission Journal on Quality Improvement's Editorial Advisory Board. **John H. Wasson, MD**, is Director, Center for Aging, Professor for Community and Family Medicine and of Medicine, Dartmouth Medical School.

Copyright © 2002 by The Joint Commission on Accreditation of Healthcare Organizations



Clinical Microsystem Definition

A small group of people who work together on a regular basis to provide care to discrete subpopulations of patients. It has clinical and business aims, linked processes, shared information environment and produces performance outcomes. They evolve over time and are (often) embedded in larger organizations. They are complex adaptive systems.

As any living adaptive system, the microsystem must: (1) do the work, (2) meet member needs, (3) maintain themselves as a functioning clinical unit.

Microsystems are the building blocks that come together to form Macro-organizations

Examples

- An Emergency Care Center
- Rheumatology office
- Day Surgery Center
- A Nutrition Clinic
- A Neonatal Intensive Care Unit
- Infectious disease service
- Palliative care service
- Blood bank

“The only way to get quality, and value and flexibility (to innovate and to meet this patient’s needs right now) is to organize the frontline using microsystem methods that have been developed in the best-in-class service organizations”.

James Brian Quinn, PhD
Professor Emeritus
Tuck School of Business Administration
Dartmouth College
December 2004

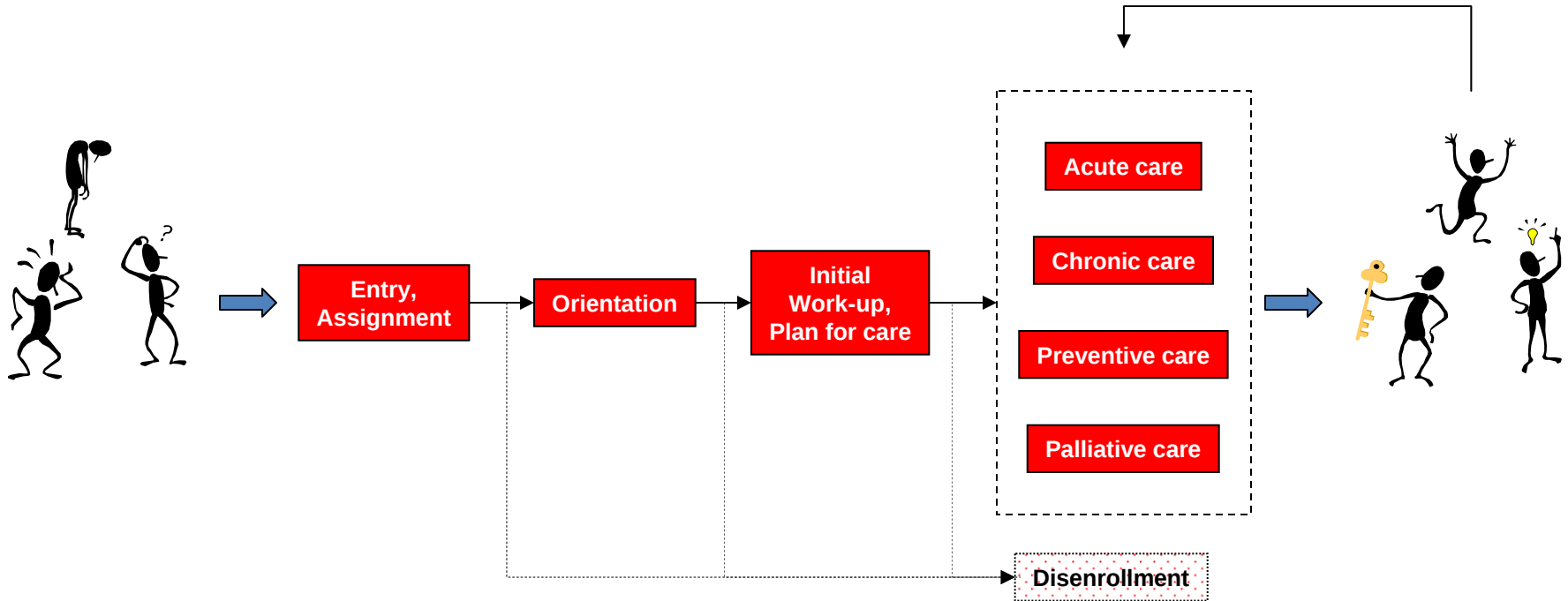


Before the Shot by Norman Rockwell

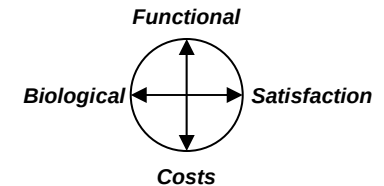
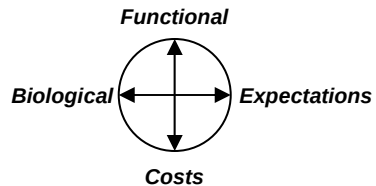


A “Generic” Clinical Microsystem model

← Satisfaction of need, monitoring, assessment of outputs →

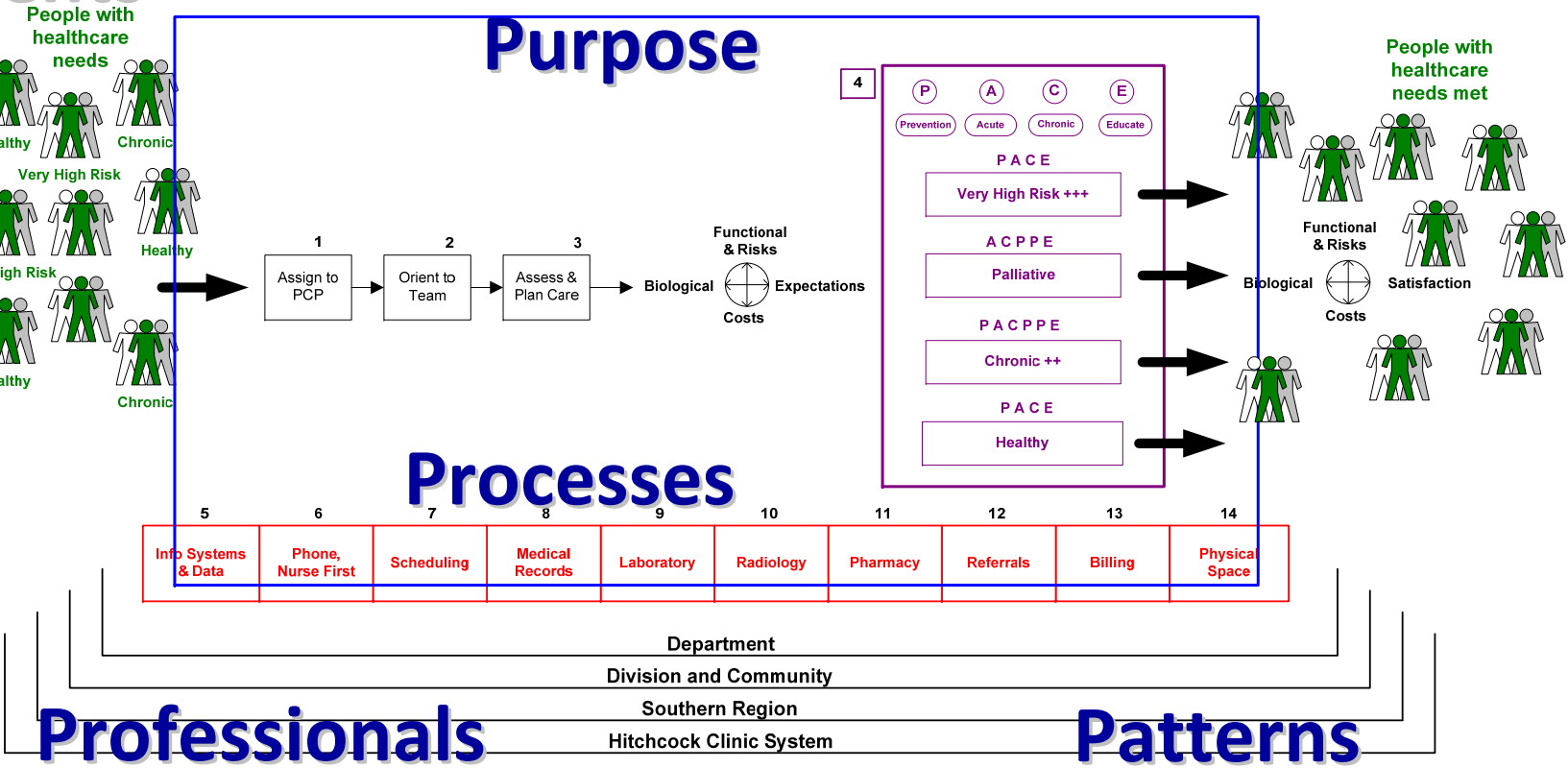


← Beneficiary knowledge, including knowledge of life while not in direct contact with the health care system →



Patients

Building a Team to Manage A Panel of Primary Care Patients
 Mission: The Dartmouth-Hitchcock Clinic exists to serve the health care needs of our patients.



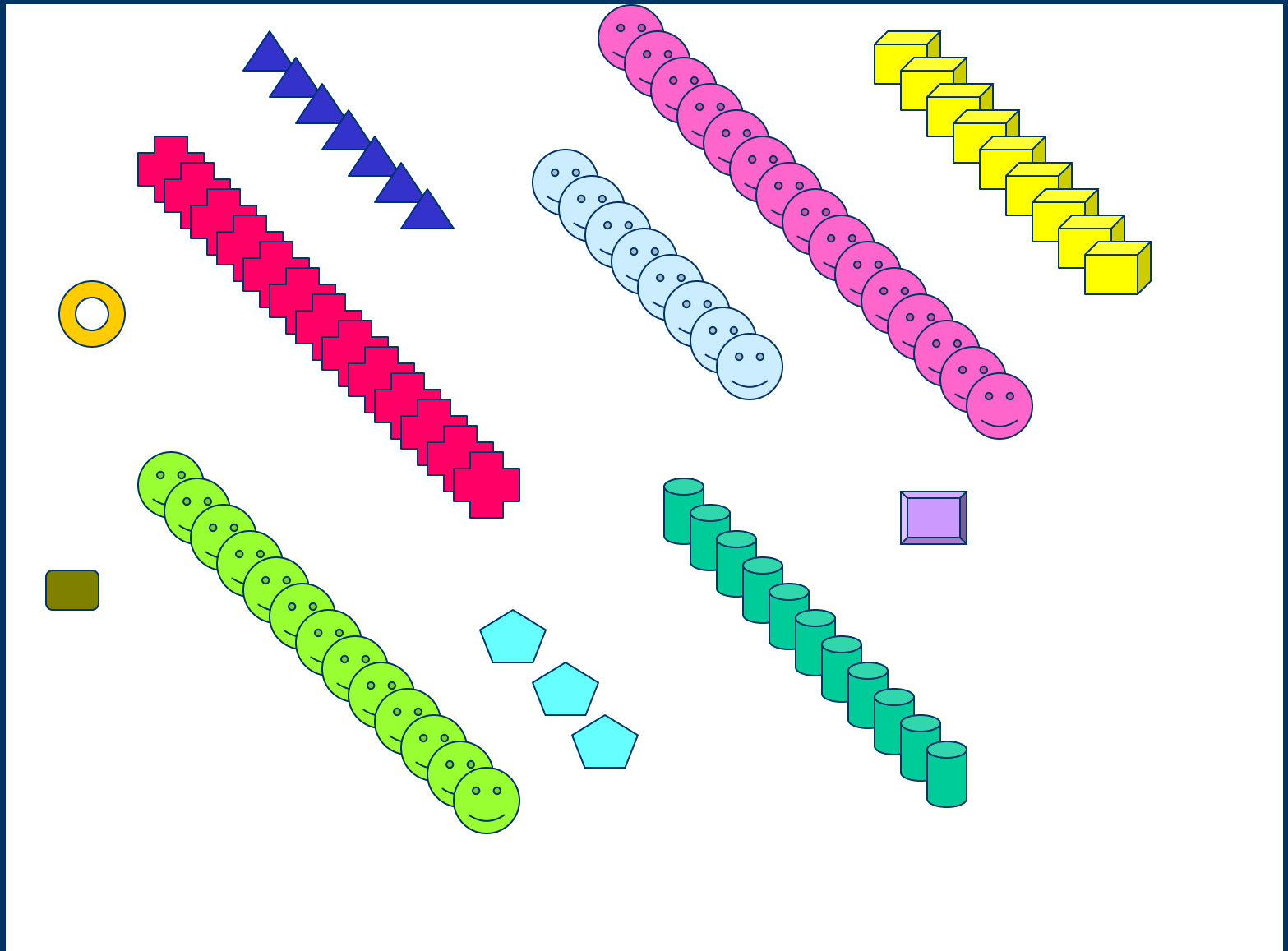
TEAM MEMBERS:		
Nashua Internal Medicine		
Sherman, MD	Missy, RN	Amy, Secretary
Leslie, MD	Diane, RN	Buffy, Secretary
Joe, MD	Katie, RN	Mary Ellen, Secretary
Deb, NP	Bonnie, LPN	Kristy, Secretary
Ron, PA	Carole, LPN	Charlene, Secretary
Erica, RN	Nancy, LPN	
Laura, RN	Mary Beth, MA	
Maggi, RN	Lynn, MA	
Skill Mix: MDs <u>2.8</u> RNs <u>6.8</u> NP/PAs <u>2</u> MA <u>4.8</u> LPN <u> </u> SECs <u>4</u>		

Measuring Team Performance & Patient Outcomes and Costs					
Measure	Current	Target	Measure	Current	Target
Panel Size Adj.			External Referral Adj. PMPM-Team		
Direct Pt. Care Hours: MD/Assoc.			Patient Satisfaction		
% Panel Seeing Own PCP:			Access Satisfaction		
Total PMPM Adj. PMPM-Team			Staff Satisfaction		

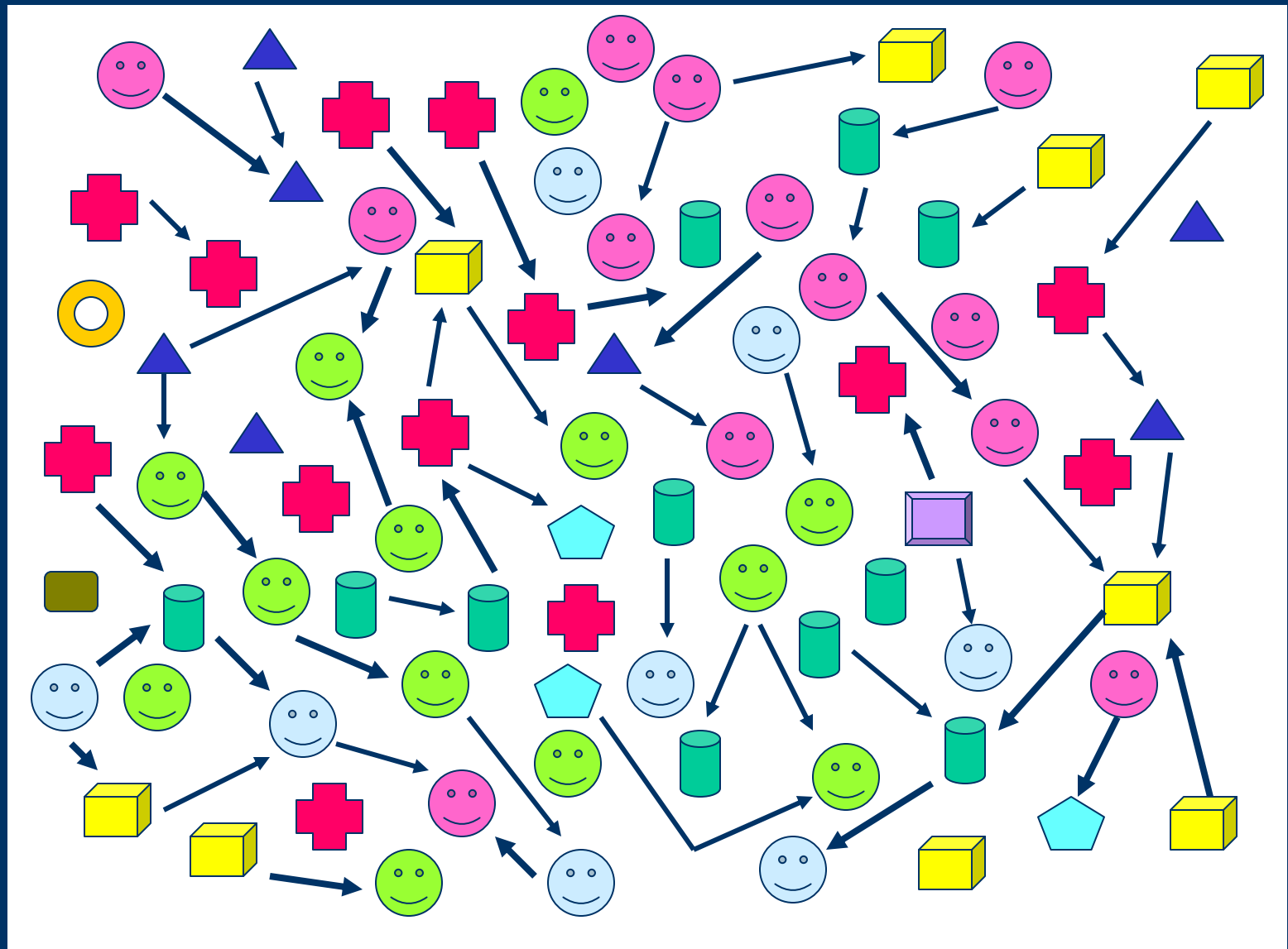
System Definition

“A system is a set of interdependent elements interacting to achieve a common aim. The elements may be human and non-human.”

MICROSYSTEM: COMPONENTS



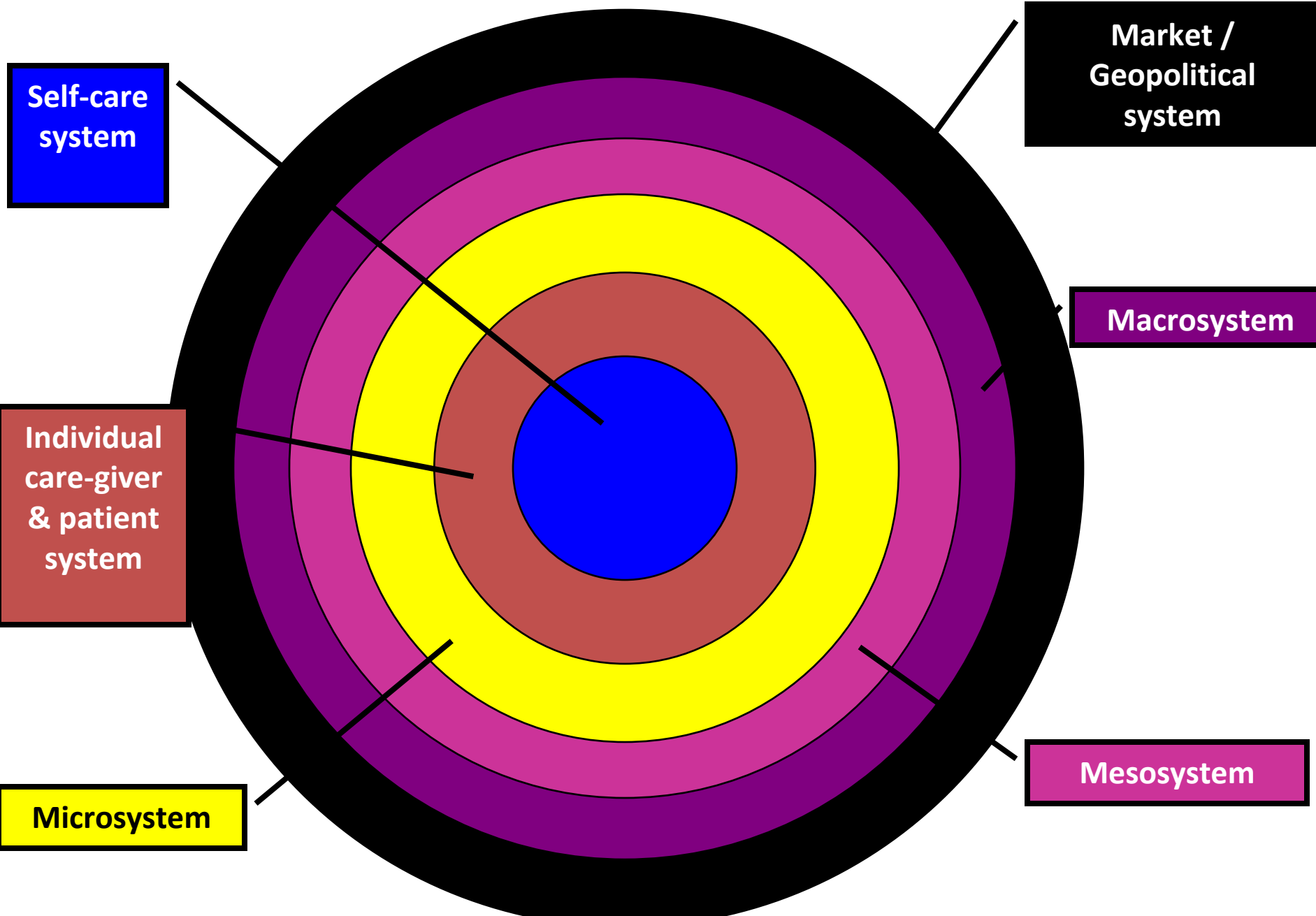
MICROSYSTEM: INTERACTIONS



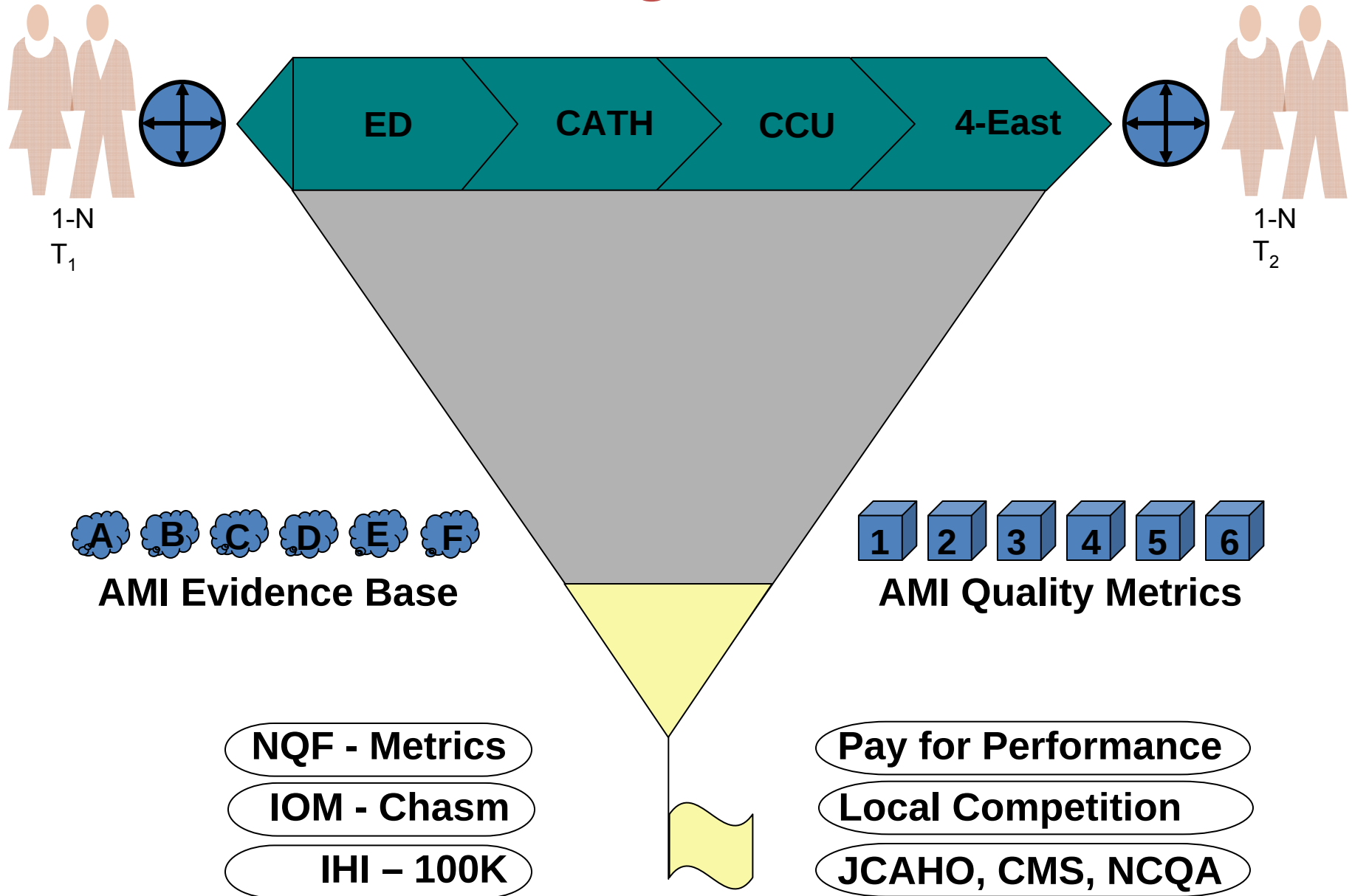
They function as a small system which has...

- A common *aim*.
- A subpopulation of members: *patients/beneficiaries*.
- Shared work *processes* and interdependencies.
- Shared *information* environment.
- A *larger organizational* environment, sometimes manifest as another microsystem, sometimes as a “mesosystem,” sometimes as a “macrosystem” ...
 - that *enables/handicaps* the functioning of the small system.

Systems of practice, intervention, measurement, policy



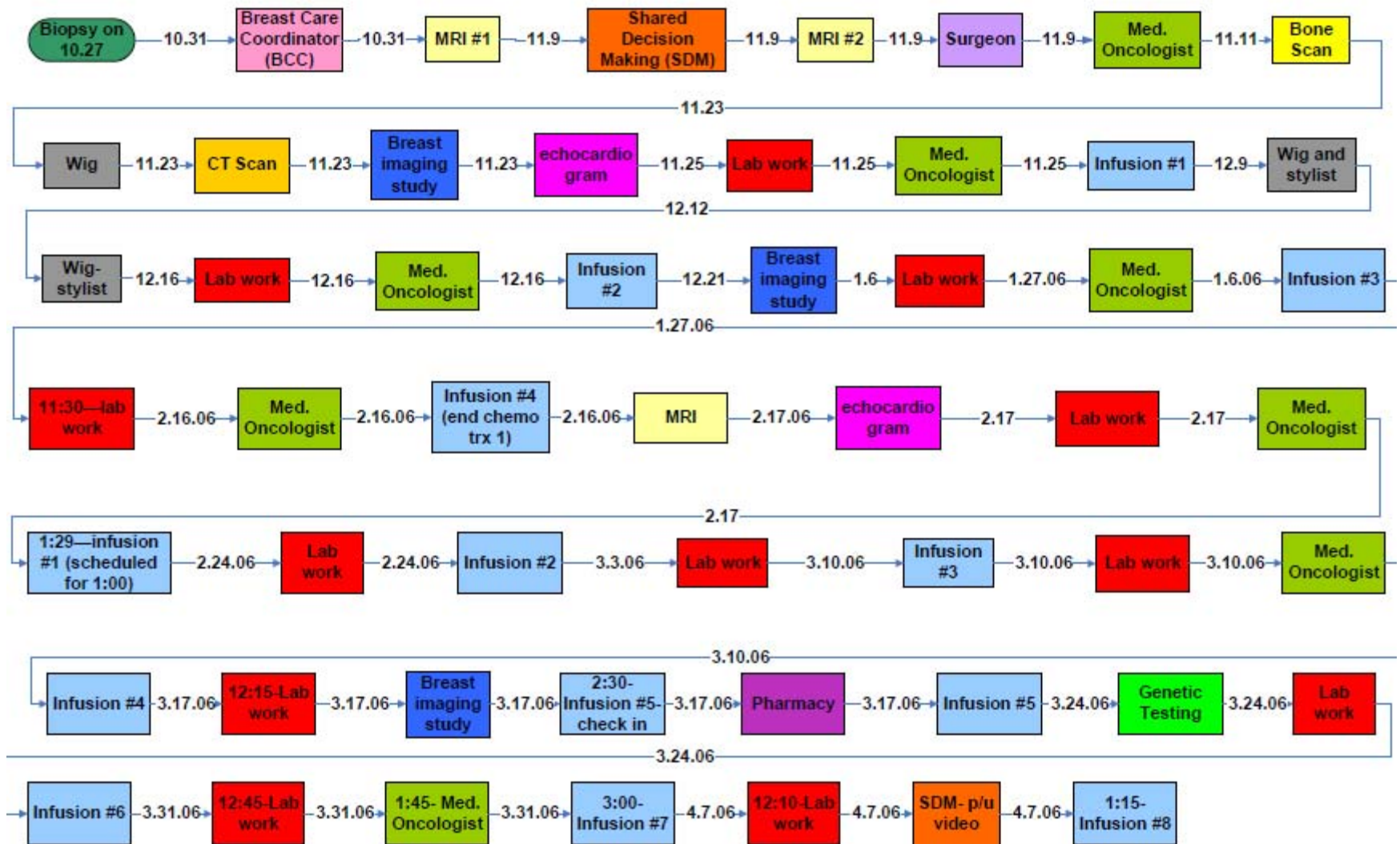
The Big Picture



Microsystems Are The *Building Blocks* That Come Together To Form **Macrosystems**



Breast Cancer patient's journey through multiple microsystems



6 months, 14 different microsystems, 21 visits

Transformation Equation

$$Q_{HS} = Q_{M1} + Q_{M2} + Q_{M3} + Q_{MN}$$

Note: Quality (Q) of the whole healthcare system (HS) is equal to the quality of care for individual patients within each microsystem (M_1 to M_N) that cares for the patient plus the handoffs that occur between microsystems (+, +, +) that are involved in the care of each individual patient.

Institute of Medicine: The 'Chain of Effect' in Improving Health Care Quality

I Patient and the Community



II Microsystem

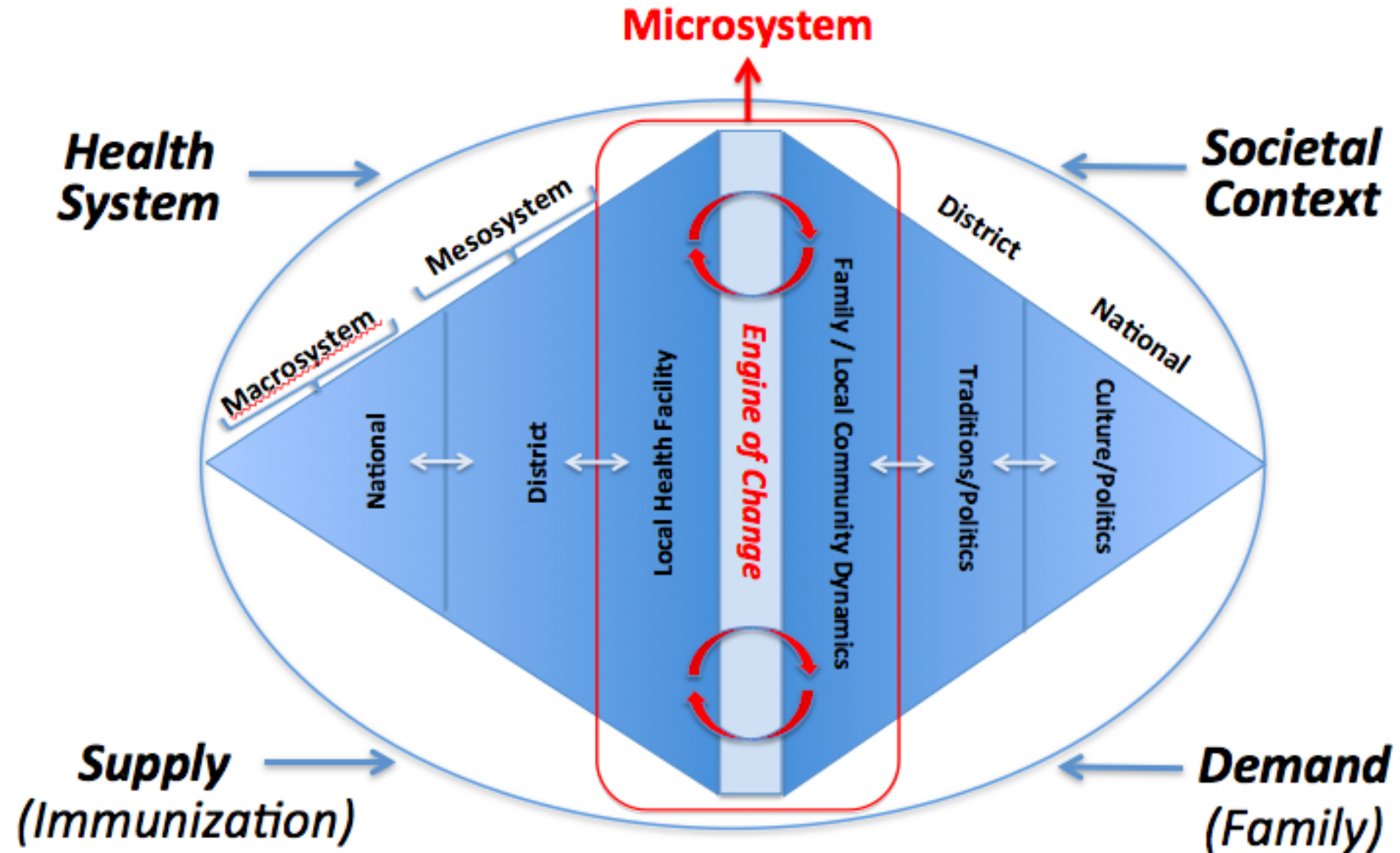


III Organizational context



IV Environmental Context

The Two Triangles Model



Using Different System Lenses to See, Understand a Particular Microsystem

Biologic System

- Emergence
- Coordination/synergy
- Structure, Process, Pattern
- Vitality

Economic System

- Inputs/Outputs
- Cost/Waste/Value/Benefits
- Customers/Suppliers

Political System

- Power
- Governance
- Citizenship
- Equity

Sociologic System

- Relationships
- Conversations
- Interdependence
- Loose-tight coupling
- Meaning/sense

Anthropologic System

- Values
- Culture/Milieu

Mechanical / Physical System

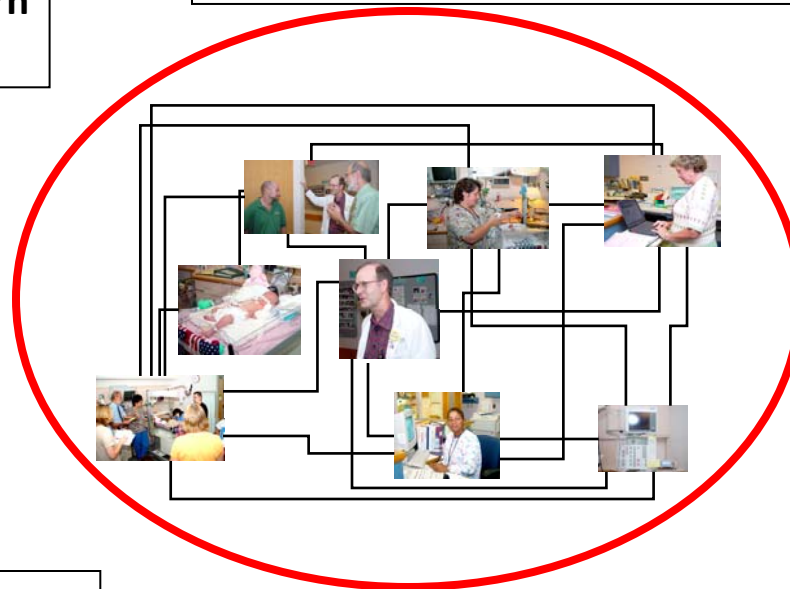
- Flow
- Temporal Sequencing
- Spatial Proximities
- Logistics
- Information

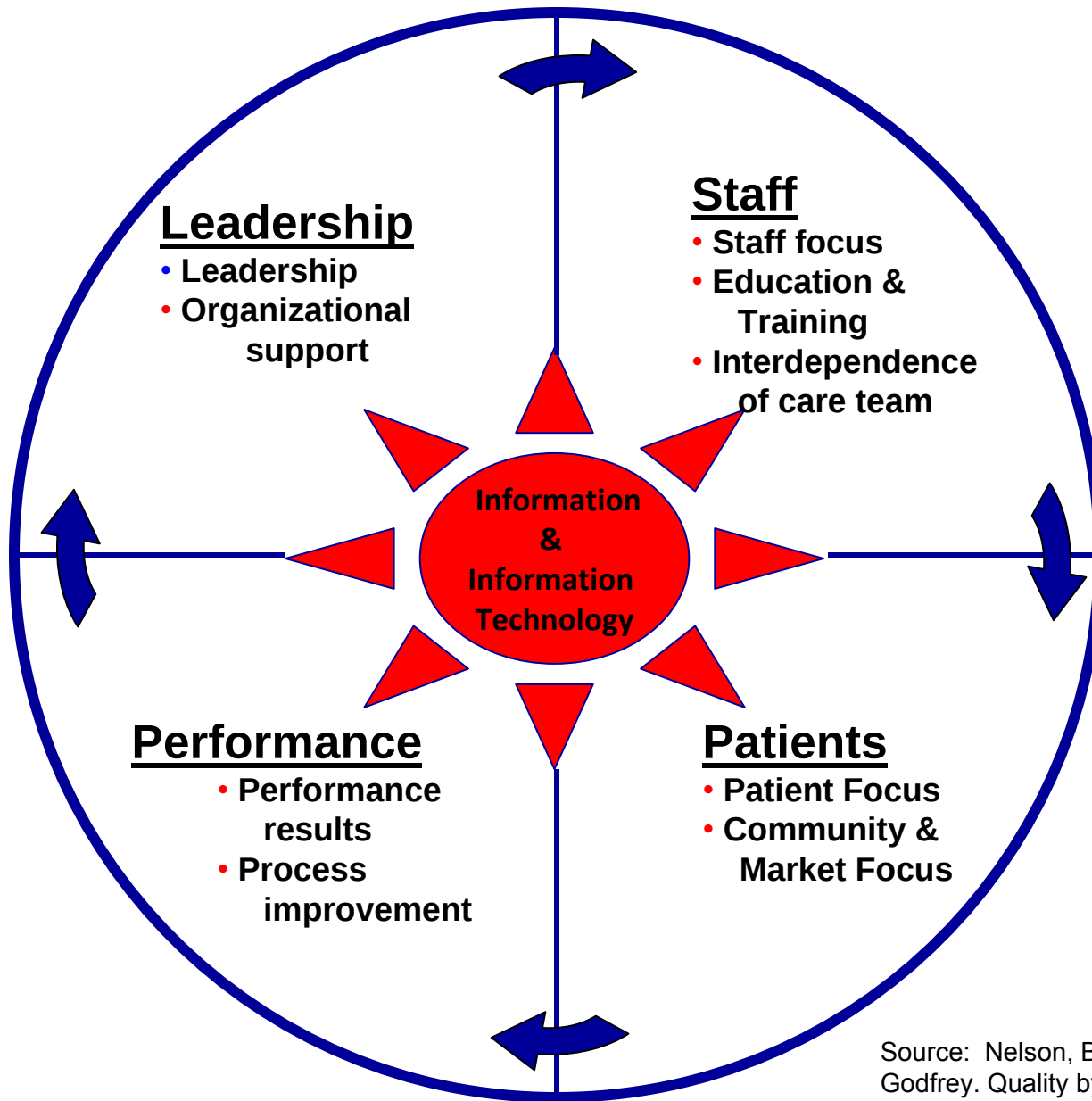
Psychological System

- Organizing
- Forces Field
- Ecological / Behavior Settings

Information System

- Access
- Speed
- Fidelity/ utility
- Privacy / security
- Storage



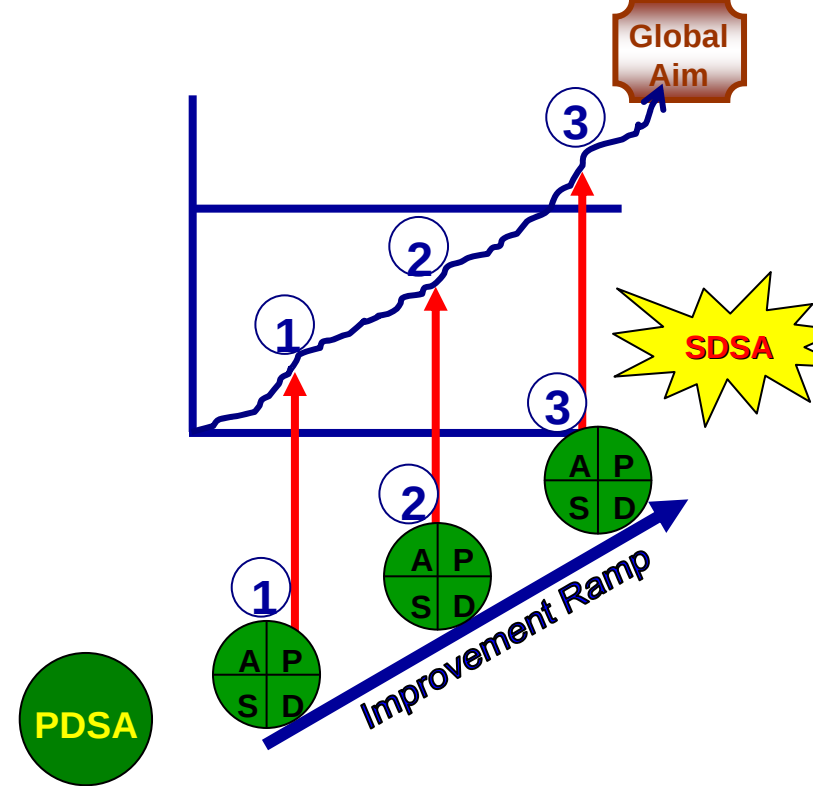
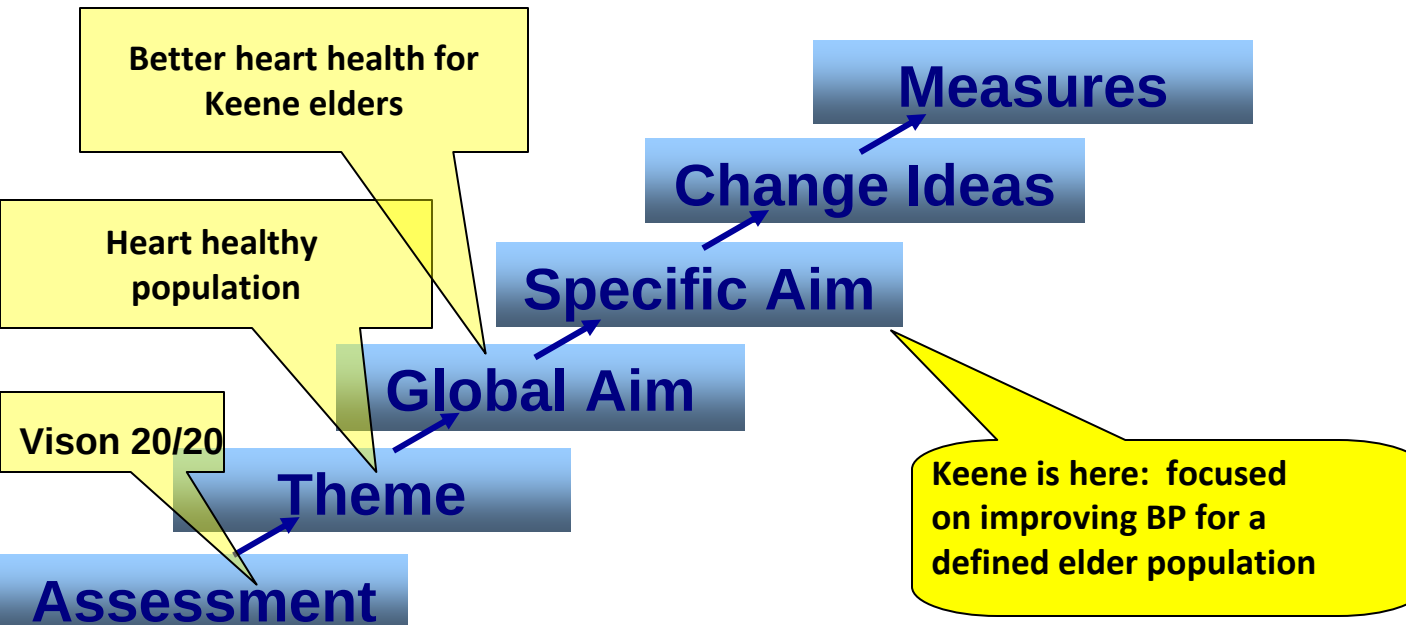


Source: Nelson, Batalden, and Godfrey. Quality by Design, 2007. Figure 1.5, page 21.

“Every system is perfectly designed to get the results it gets.”

- Paul Batalden, MD

Dartmouth Microsystem Improvement Curriculum



The 5 P's of Micro-systems include ...

- **Purpose** - Our aim and mission.
- **Patients** - Our reason for doing our work.
- **Professionals** - Our staff who work in the trenches to take care of patients.
- **Processes** - Our system of inter-related events that constitute the microsystem.
- **Patterns** - Our way of doing our work, culture, Measurements, Data, Run Charts

5 P Overview

Bukeeri

Function: A Health Centre III facility should be found in every sub-county in Uganda. These centres should run a general outpatient clinic, a maternity ward, and a laboratory.
 • Parish has 14 villages

PURPOSE

The primary goal of UNEPI is to ensure that all children under one year of age and Women of Childbearing Age are reached with high quality and effective vaccines against target vaccine preventable diseases by:

- Increasing access to immunisation services;
- Ensuring availability of potent, safe, and effective vaccines;
- Increasing demand for immunisation services;
- Building capacity for delivery of immunisation services.
- Monitoring disease incidence, trends and programme performance.

(Immunisation Practice in Uganda, 2007)

PEOPLE: 8,000-9,000 pop, 170 households w/5-6 children each



RI PROCESS



PROCESS EXAMPLES



PERSONNEL/COMMUNITY

VHT:

- Volunteer position, elected by Village Council
- Trained as Village Health Worker
- Teach community about Iz, food, health, sanitation, counseling
- Some have other jobs

Mobilizers:

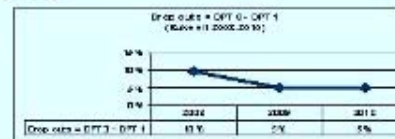
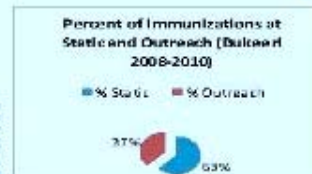
- **Leadership Council:** Nominated to position
- Form of village government
- 10 members represent many villages

HUMC:

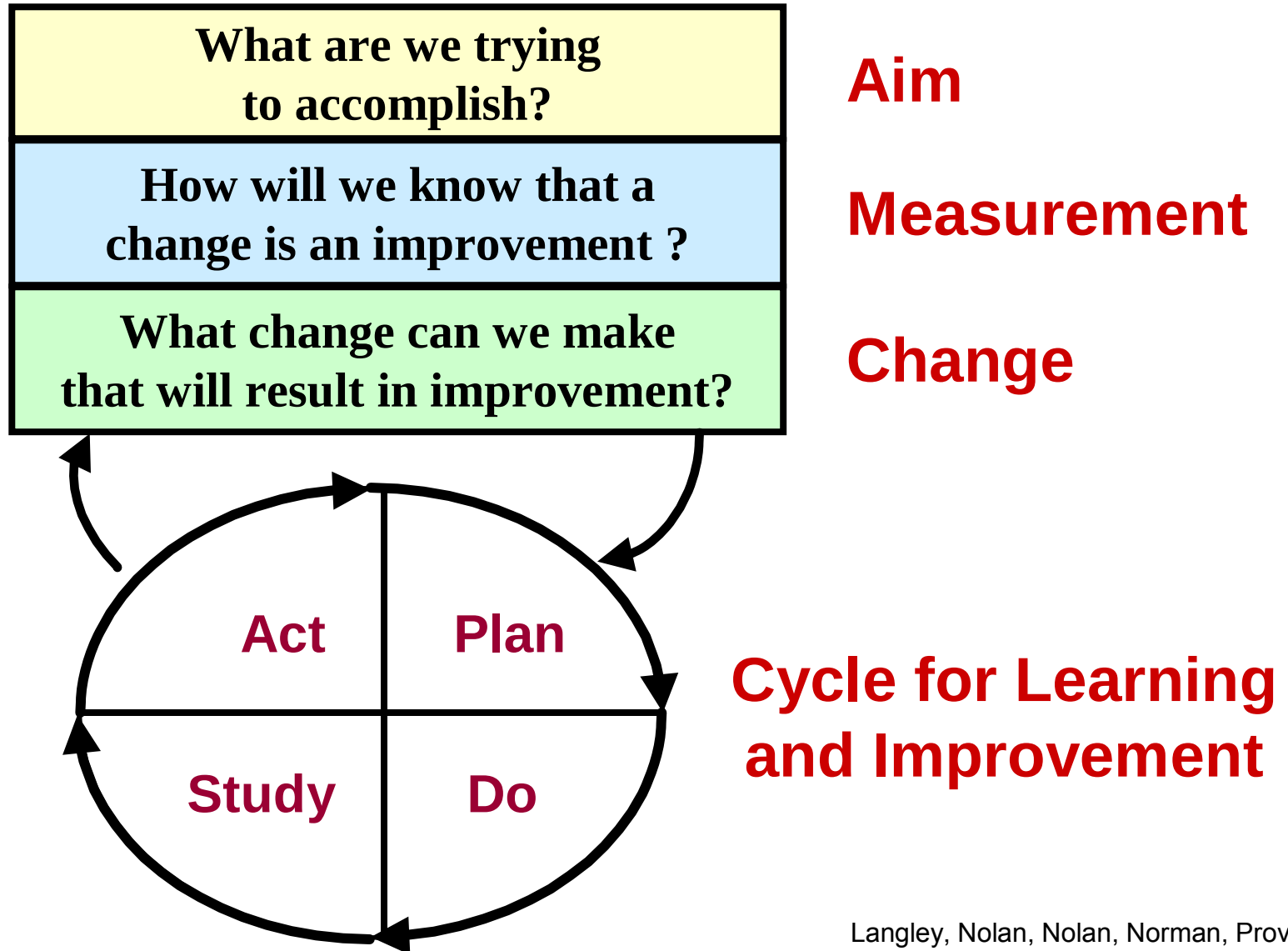
- 7-member committee (1 V/C, 1 staff, 5 community members)
- Some administrative functions. Liaison to community (communication)
- Members nominated by village, sub-county committee reviews, appointed by DHO
- Includes members active in their community
- V/C is secretary

PATTERNS

- Static Iz on Wed. Outreach on Thurs- good sched
- Use of Exercise Books v. Iz cards
- Emphasize completing full Iz series
- Integrated outreach (w/ OPD)
- Schools requires Iz for matriculation
- VHTs are busy
- Meet monthly to discuss problem of unreached.
- Community involved
- Staff lack transportation for outreach
- Community members can't afford transport to clinic



The Model for Improvement



“quality improvement”

The combined and unceasing efforts of everyone
– health care professionals, patients and their
families, researchers, payers, planners,
administrators, educators – to make changes that
will lead to better patient outcome, better
system performance, and better professional
development.

THREE CONCEPTUAL IMPERATIVES

1. Engage Everyone in Improvement

**Better outcome
patient, population**

(↓ *illness burden*)

**Better professional
development**

(*competence, pride, joy*)

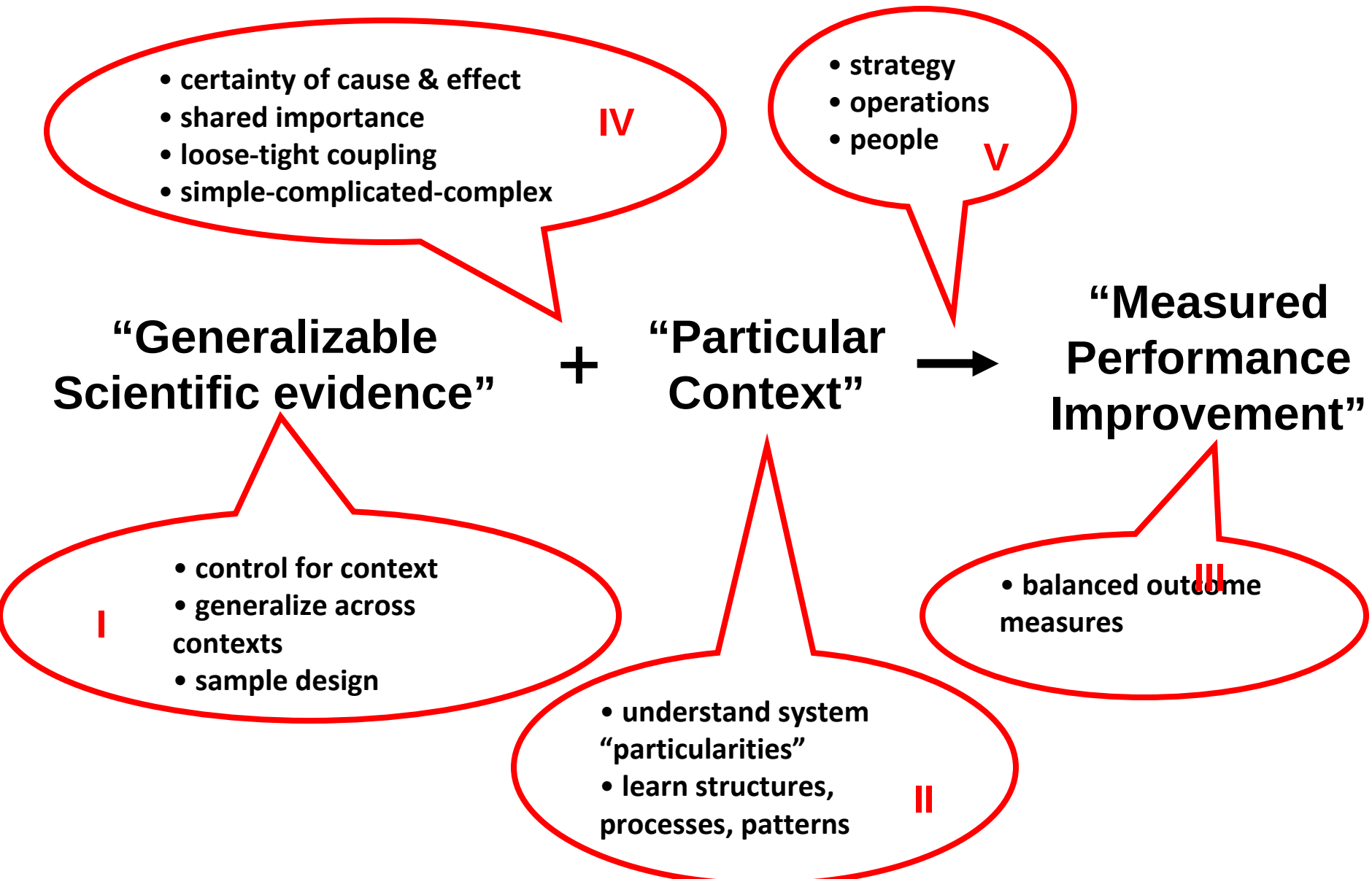
Everyone

**Better system
performance**
(*quality, safety, value*)

**Sustainable
efforts in
real settings
require
inextricable
linkages...**

“Everyone in health care really has two jobs: to do the work and to improve the work”

2. The Improvement Equation



3. Frame Problems and Solutions as Simple, Complicated, Complex

Simple Following a recipe	Complicated Sending a Rocket to the Moon	Complex Raising a Child
Recipe essential.	Formulae critical, necessary.	Formulae are limited.
Test recipe for easy replication.	One rocket increases assurance that next OK.	Raising one gives experience, no assured success with the next.
Expertise not required. Cooking expertise increases success rate.	High expertise in a variety of fields necessary for success.	Expertise can contribute but is neither necessary nor sufficient to assure success.
Recipes → standardized products.	Rockets are similar in critical ways.	Every child unique. Must be understood as an individual.
Best recipes: good results every time.	High degree of outcome certainty.	Uncertainty of outcome remains.

Simple “Yes/No”	Complicated “If, then...”	Complex “? Maybe”
Known elements	Elements are knowable	Elements partly known, but they can change...
Predictable outcome	Largely predictable outcome	Essentially unpredictable
Checklist (or other forcing function)	Algorithm-driven structured orders, decision-making	Shared aim, relationship
Oxygenation status, smoking cessation, culture before antibiotic, antibiotic in 4 hours.	Antibiotic tolerance/intolerance	Co-morbidities, social situation
Low provider autonomy	Variable provider autonomy	High provider autonomy
Aim: reliability	Aim: reliability	Aim: resiliency



Thank You

Questions?