Clinical Microsystems Series

Clinical Microsystems, Part 1.
The Building Blocks of Health Systems

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At the end of the day, the quality, safety, and costs of care are created at the front lines of care—in clinical microsystems, the places where patients, families, and care teams meet.[1] This article, Part 1 in a four-part series, building on the original nine-part series on clinical microsystems in health care,[2] summarizes lessons learned to date and addresses second-generation microsystem development.

The subsequent articles in the series will showcase applications of clinical microsystem principles, tools, and techniques to transform the way that health care is delivered. Part 2 will focus on micropractices that have been adapted to provide primary care in ambulatory community settings [L.G.M., J.H.W.]. Part 3 will feature inpatient care and hospital microunits in two strikingly different settings that use similar approaches to apply microsystem knowledge to improve performance [M.M.G., C.N.M., S.E.M.]. Part 4 will describe the adaptation of microsystem methods to create an entirely new outpatient/inpatient integrated care system (a new clinical mesosystem) for patients requiring percutaneous cardiac intervention [K.E.M., S.A.B., A.E.B.]

The series is intended to demonstrate that wherever, however, and whenever health care is delivered—no matter the setting or population of patients—the body of knowledge on clinical microsystems can guide and support innovation and peak performance. *Clinical microsystems* is shorthand for a comprehensive approach to providing value for individuals and families by analyzing, managing, improving, and innovating in health care systems—and can offer senior leaders a strategy and execution framework for competing in an increasingly competitive, data-transparent, and value-seeking medical marketplace.

Clinical Microsystems: A Panoramic View

Since the publication of the original nine-part series, many health care leaders and staff at all levels of their organizations in many countries have adapted microsystem knowledge to their local settings. (Reports of many experiences that are not

Article-at-a-Glance

Background: Wherever, however, and whenever health care is delivered—no matter the setting or population of patients—the body of knowledge on clinical microsystems can guide and support innovation and peak performance. Many health care leaders and staff at all levels of their organizations in many countries have adapted microsystem knowledge to their local settings.

Clinical Microsystems: A Panoramic View: How Do Clinical Microsystems Fit Together? As the patient's journey of care seeking and care delivery takes place over time, he or she will move into and out of an assortment of clinical microsystems, such as a family practitioner's office, an emergency department, and an intensive care unit. This assortment of clinical microsystems—combined with the patient's own actions to improve or maintain health—can be viewed as the patient's unique health system. This patient-centric view of a health system is the foundation of second-generation development for clinical microsystems.

Lessons from the Field: These lessons, which are not comprehensive, can be organized under the familiar commands that are used to start a race: On Your Mark, Get Set, Go! . . . with a fourth category added—Reflect: Reviewing the Race. These insights are intended as guidance to organizations ready to strategically transform themselves.

Conclusion: Beginning to master and make use of microsystem principles and methods to attain macrosystem peak performance can help us knit together care in a fragmented health system, eschew archipelago building in favor of nation-building strategies, achieve safe and efficient care with reliable handoffs, and provide the best possible care and attain the best possible health outcomes.

included in this series can be found on the Web at http://www.clinicalmicrosystem.org, Stories from the Field.) We use a question-and-answer format to provide a brief yet panoramic view of clinical microsystems in the context of a health care system. Because of space limitations, the answers are brief rather than exhaustive. More specific information, provided in the context of specific health care organizations, can be found elsewhere.[1,3,4]

WHAT DO PEOPLE WANT AND NEED FROM A HEALTH CARE SYSTEM?

Patients, families, payors, health care professionals, health system leaders, and communities all want the same thing—a health system that works well for everyone. Of course, what works well for "everyone" depends on *who* one is. In general, however, all parties would agree that a health system that works well must find ways, over time and forever, to produce better outcomes for patients and populations; to produce better operating performance for the health care organizations that are in business to provide care; and to attract, develop, and retain caring and competent health care professionals who are engaged in their work.

WHAT NEEDS TO HAPPEN FOR A HEALTH SYSTEM TO WORK WELL?

A short answer, offered by Nolan, is that a health system needs to be excellent in three domains—will, ideas, and execution: the will to provide ever better care and services, a constant flow of ideas on ways to improve and innovate care and services for better outcomes at lower costs, and the ability to execute tests of change and to implement plans and to operate a smooth-flowing and effective delivery system.[5] Given the importance of will, ideas, and execution, Batalden and Davidoff suggest that a fourth necessary component is for everyone in the health system to be actively engaged in helping to achieve the three fundamental needs—better patient outcomes, better system performance, and better professional development[6] (Figure 1, right).

HOW CAN WE VIEW A HEALTH SYSTEM AND WHAT ARE ITS BASIC BUILDING BLOCKS?

A health system can be viewed in many ways, but one important vantage point is the patient's perspective. According to patient-centered care, which reflects the patient's perspective, a person has a health need and may choose to (or be taken to) see a health care provider. As soon as a patient is in a relationship with a health care provider—and information about the
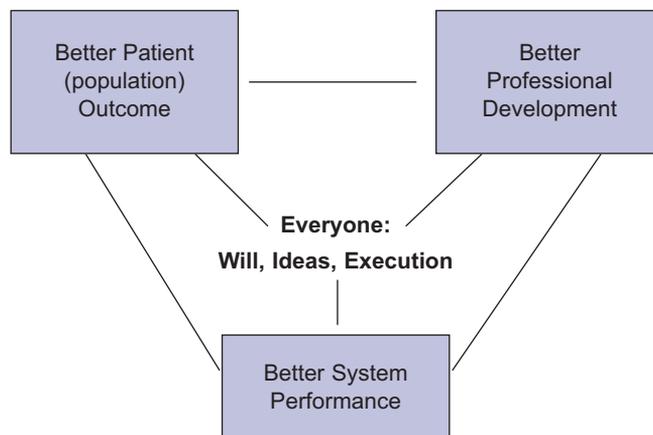
Fundamental Needs of a Health System

Figure 1. *A necessary component for a health system to work well is for everyone in the health system to help achieve better patient outcomes, better system performance, and better professional development. Adapted from Batalden P., Davidoff F.: What is "quality improvement" and how can it transform healthcare?* Qual Saf Health Care *16:2–3, Feb. 2007.*

patient and the patient's health need is exchanged with the provider—a clinical microsystem is formed. This small system has inputs, processes, outputs, and feedback loops, and the members of the system have a shared aim: to protect, restore, or promote the patient's health. Most frequently, however, there is not a single patient but rather a population of patients and families, and instead of a solo practitioner there is a set of providers (physicians, nurses, and so on) and support staff who work together to provide care for a population of patients in specific geographic locations. These clinical microsystems are the basic building blocks of all health systems.

HOW DOES A CLINICAL MICROSYSTEM DO ITS WORK?

One way of seeing how a clinical microsystem functions is to continue using the perspective of the patient who is moving forward over time on a health care journey. For example, focus on a 62-year-old man, "Dan Vitale," who makes an appointment to see his general internist, "Mary Odell," whom he has seen for five years (he is under treatment for hypertension and hyperlipidemia). He checks in with the receptionist and is roomed by a medical assistant; he tells her that he is a little worried because at times during the past month he has had sharp pains in his arm accompanied by sweating and indigestion and that he thought he better see Dr. Odell to get her opinion. Dr. Odell sees Mr. Vitale; she hears his chief complaint, assesses his condition, orders some diagnostic tests, provides treatment rec-
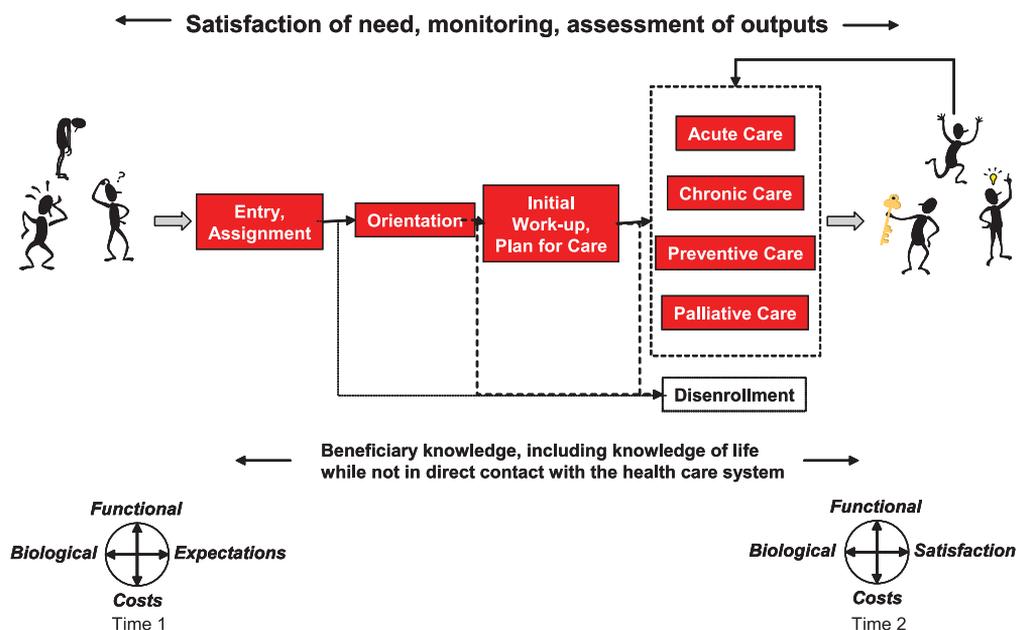
The Physiology of a Clinical Microsystem

Figure 2. *This figure illustrates the dynamics of the caregiving process in frontline clinical microsystems.*

ommendations, and arranges for a follow-up visit once the diagnostic test results are in.

Figure 2 (above) illustrates what is sometimes referred to as the physiology of a typical clinical microsystem because it illustrates the dynamics of the caregiving process in frontline clinical microsystems. In general, a person leaves his or her home or community with a given health status at Time 1 and enters into a clinical microsystem, where linked steps take place involving registration, orientation, assessment, treatment, and follow-up over time, which contribute to health status at Time 2. This general flow can be adapted to virtually any clinical microsystem—a doctor's office, an emergency department, a coronary catheterization lab, or an inpatient care unit. In addition, the functioning of the microsystem will be better or worse depending on the following:

■ Intelligent use of data

■ Gaining detailed knowledge of individual patients and populations of patients served

■ Quality of its connections to other related microsystems

■ Engaging everyone in the microsystem *on doing their work and improving their work*

How Do Clinical Microsystems Fit Together?

As the patient's journey of care seeking and care delivery takes place over time, he or she will move into and out of an assortment of clinical microsystems, such as a family practitioner's office, an emergency department, an intensive care unit, a surgical suite, an inpatient care unit, a cardiologist's office, a cardiac rehabilitation program, a nutritionist's office, and home-based nursing care from a visiting nurse. This assortment of clinical microsystems—combined with the patient's own actions to improve or maintain health—can be viewed as the patient's unique health system. This patient-centric view of a health system is the foundation of second-generation development for clinical microsystems. The patient needs these different and distinct, yet related, small systems to fit smoothly together as if they were a single health system designed just for the specific patient and tailored to his or her special needs. Making this so represents the move from being a first-generation to becoming a second-generation microsystem that "wraps around" the patient's and family's evolving needs and knits care together to form a seamless health system for this particular patient.

Imagine that Dan Vitale, despite good, evidence-based care, went on to have a heart attack at his workplace six months later. Mr. Vitale received initial care from the emergency medical technicians (Figure 3, page 370). Along the way, the emergency department, the coronary catheterization laboratory, and the

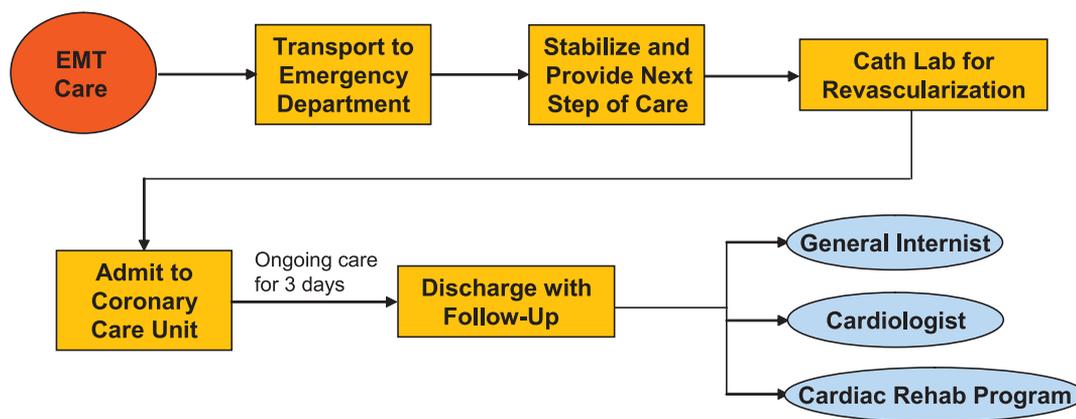## Dan Vitale's Acute Myocardial Infarction (AMI) Journey in Health Care

Figure 3. *This process flowchart shows the patient's progression through a collection of inter-related clinical microsystems and clinical support microsystems, which comprise a unified health system. EMT, emergency medical technician; Cath, catheterization; Rehab, rehabilitation.*

coronary care unit relied on diagnostic services from radiology and pathology, medication services from the pharmacy, and nutrition services from the dietary department, which are clinical support systems (as they provide needed inputs to the patient as his care journey progresses). The patient's case flowchart reflects a collection of interrelated clinical microsystems and clinical support microsystems (for example, radiology, pathology, pharmacy, dietary) that comprise a unified health system from the patient's view if they work together, over time, to do what's needed to help Dan Vitale progress on his health care journey to living the kind of life he desires. A collection of interrelated microsystems that provide care to a shared population of patients (for example, cancer, cardiovascular, obstetrics) can be referred to as a *mesosystem* (for example, providing connections between the related microsystems serving a group of patients). One role of the mesosystem is to actively guide the dialogue between related microsystems to achieve desired outcomes for patients. The mesosystem reflects the participation from all related microsystems in feeding information forward and backward.

First-generation microsystems, which work together more or less, are engaged in handoffs (or exchanges) of (1) the patient, (2) information about the patient or relevant to the patient, and (3) clinical and support services to benefit the patient. Recognition of the role and contributions of the different microsystems that form the mesosystem is important because they together produce the outcomes (including quality, safety, and costs) of care for patients who share a certain health condition (such as pregnancy or back pain) or illness (such

as cardiovascular disease), as to be illustrated in Part 4 of the series—"ProvenCare™ at Geisinger Health System" (http://www.geisinger.org/provencare/).

The quality and value of care will be determined by what happens within each contributing microsystem and what happens in the coordination between the contributing microsystems.

The quality of care for a patient or a population of patients with a given health condition (such as acute myocardial infarction) will be determined by what happens within each microsystem and what happens with the handoffs and exchanges between them to get the best results—to improve results over time—requires perfecting care both within and between all the contributing microsystems and making a unified health system for each individual patient.

What is needed are not disconnected "archipelagos"—collections of islands sitting next to each other in close proximity but not connected—but rather a unified nation—a place with different geographical features that are all connected and part of the same whole. This means moving from first- to second-generation microsystems to customize care for individuals and, in effect, forming a personal, patient-centric health system.

How Do Clinical Microsystems Fit into a Larger Health System?

Simply put, clinical microsystems are embedded in larger health systems—smaller systems are embedded in larger systems (Figure 4, page 371). They are by definition "patient-centric" but not necessarily able (using today's first-generation
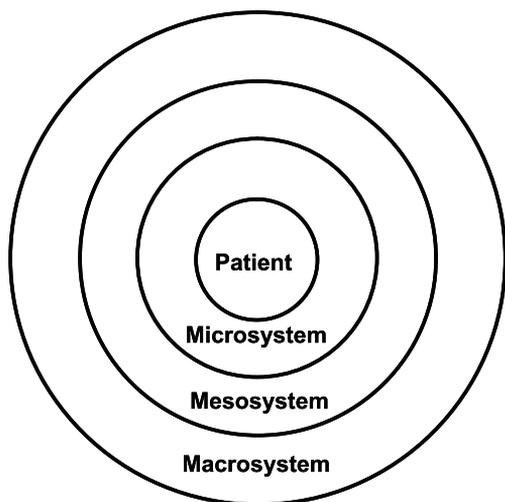
Embedded Provider Units in a Health System

Figure 4. *Clinical microsystems are embedded in larger systems and are by definition patient-centric.*

design) to customize care to the individual and the patient's values, preferences, and changing needs. So, we have the patient and the family as the smallest provider unit in the health system; they join with providers and staff to form clinical microsystems, which come together in collections to form mesosystems, the clinical programs and centers that often are part of larger organizations. The mesosystem may be empowered and held accountable by the overarching macrosystem, such as a hospital, multispecialty group practice, or integrated health system. Thus, a larger health system (a macrosystem) operates with its microsystems and mesosystem to attempt to create a seamless, satisfying journey for a given patient.

HOW CAN CLINICAL MICROSYSTEMS BE CONTINUOUSLY IMPROVED?

(We've saved the really big question for last). There are no quick fixes, silver bullets, or magic potions that can do the job. One thing is certain: It is impossible to have a great health system without having excellent clinical microsystems. Increasing the capability of microsystems to do work, to perfect handoffs, to improve work, and to innovate is, we believe, the best strategy to achieve sustainable high performance organizationwide. More will be said to answer this question in the next section, but we provide a brief answer to this question. (For further information, see *Execution of Strategic Improvement Initiatives to Produce System-Level Results.*[5])

To improve clinical microsystems consider taking these actions:

1. Set expectations for all staff and leaders that they have two jobs—to do their work and to improve their work.
    a. Second generation: Improve connections and coordination with other microsystems.
2. Provide all staff and leaders with the basic knowledge and skills that form the foundation of modern improvement and safety science and develop internal improvement expertise of supervisors and middle and senior leaders as part of their leadership development path.
3. Provide all staff the opportunity, time, and space to put their improvement knowledge, skill, and will to work by encouraging efforts to improve and innovate as part of daily work, special strategic projects, and focused performance improvement programs.
    a. Second generation: Improve mesosystems within which microsystems are embedded to keep all microsystems coordinated and focused on creating and testing changes around a common objective.
4. Back up the expectations and the encouragement (to do both jobs) with recognition, rewards, and an active information environment that includes balanced measures of key quality, cost, and performance outcomes.
5. Create supporting infrastructural conditions for engagement in improvement and innovation by aligning them with the organization's mission, vision, strategy, operating plans, and, most importantly, with leadership's authentic passion, attention, and interest.
    a. Second generation: Invest in infrastructure to allow multiple clinical microsystems to design a coordinated journey for patients.

We now turn to lessons from the field based on the observations of scores of health systems in the United States and abroad.

Lessons from the Field

A dialogue among the authors of this four-part series produced a valuable set of lessons learned. These lessons, which are not comprehensive, can be organized under the familiar commands that are used to start a race: On Your Mark, Get Set, Go! . . . with a fourth category added—Reflect: Reviewing the Race, as presented in Table 1 (pages 372–375). These insights are intended as guidance to organizations ready to strategically transform themselves. Action steps, goals, and examples are offered to support strategic planning. The Microsystem-Mesosystem-Macrosystem framework (Table 2, pages

	Principle	Action	Examples
1. On Your Mark	All models are wrong; some are useful[1]	Adopt System Change Framework.	■ Nolan,[2] Kotter,[3] Baldrige,[4] Bossidy and Charan[5] (Parts 3, 4)
	Blend improvement into the basics	Don't "add on" quality—build quality into infrastructure for lasting organizational change.	■ Weave improvement and accountability in strategy, operations, budgets, metrics, and human resources policy ■ Formal oversight system[2] (Parts 3, 4)
	Leaders need to support front lines	Leaders at all levels of the organization need to be deeply attentive, curious, and supportive of the front line where care and services are delivered.	■ 100% of leaders participate or asked to step aside[2] ■ Leader walk-arounds throughout the organization ■ Organizationwide patient satisfaction surveys ■ Leaders attend team meetings ■ Town hall meetings ■ Monthly improvement reviews[2] (Part 3)
	Measures and knowledge matter	Create a rich information environment.	■ Link measurement to operations and reflection ■ Data walls[6] ■ Internal Web sites ■ Balanced scorecards[7] ■ Clinical Value Compass measures[7] ■ Cascading measures from "top" to "bottom" ■ Electronic health records (Parts 3, 4)
2. Get Set	"Know how" needed	Educate staff at all levels of the organization to master and use improvement knowledge. Frontline staff need deep knowledge, mid-level need knowledge, and senior leaders need less improvement knowledge.	■ Tracers to heighten awareness of need for education to assess and improve[8] ■ Manager/leader development programs with a focus on improvement, such as Geisinger Quality Institute, CCHMC I2S2 program ■ Facilitating benchmarking visits supports curiosity in improvement and helps to identify "gaps" in current state. ■ Arranging external experts and coaching can provide "improvement and theory bursts" to stimulate curiosity and interest. (Parts 3, 4)
	Learning programs promote systems to reach peak performance	Structure programs and internal collaboratives for building "know how" to learn and improve.	■ M3,[6] CDH Microsystem Development Series, Geisinger Quality Institute, CCHMC I2S2 ■ IHI (http://www.ihi.org) or other professional group collaboratives can provide knowledge, networks, and sharing. ■ Link "evidence" to processes, systems, and outcomes in the local context. ■ Focus on "flow" of care, information, patient/family needs. (Parts 2, 3, 4)
	Put patients and staff first	Aim to improve patient outcomes, family engagement, and staff pride and joy in work and efficiency.	■ Patient/family activation (Institute for Family Centered Care–http://www.familycenteredcare.org) ■ Shared decision making ■ Human resources value chain[9] ■ Intentionally build relationships between patients and clinicians, between families and caregivers who share a common aim. (Parts 3, 4)

	Principle	Action	Examples
	Share leadership	Expect shared leadership at all levels of the organization to enable multiple simultaneous changes while dispersing and accentuating improvement across the organization.	■ Lead M.D./R.N. in microsystems[10] ■ Interdisciplinary leadership teams and collaboration across microsystems, mesosystems, and the macro-organization (Parts 2, 3, 4)
3. Go!	Start where they are	Work with frontline staff on their terms vis-a-vis time commitment. Balance the regular work of care and services and improvement work and time.	■ Huddles, checkouts ■ Breakfast, lunch, dinner sessions ■ Phone-based conferences ■ Journal clubs off site ■ Web site blogs, chat rooms ■ Methods to fit into work/life routines to create improvement time and space ■ Link operations and learning at the site where the work is done. (Parts 2, 3, 4)
	Use leverage	Small changes can have big effects when they are smart, high-leverage elements that reliably change processes and outcomes. Establish ownership of the processes between microsystems.	■ 90- to 120-day improvement cycles linked to organization strategic plan[2] ■ Plan-Do-Study-Act cycles[2,6,7] ■ Coaches assist redesign and testing of changes in daily patient care and services. ■ Efficiency and reliability designed into improvement (Parts 2, 3, 4)
	Smell the coffee	Balance change that comes from the "top down" with changes that are instigated from "the bottom up." It is essential to dedicate some of the dedicated improvement time and resources to solve local real problems.	■ Stimulate and link local change to organizational strategy. ■ Support improvements that "matter" to the work of the front line. ■ CCHMC "catch ball" (Parts 2, 3, 4)
	Longitudinal action learning	Effective improvement learning programs are planned to take place over time and to promote taking action on one's own work processes and system. Real learning tends to take place in the context of real work and pushes into real problems or challenges worth solving. Link operations and learning at the site where care/services are provided. Follow the patient journey, especially between and into "other" microsystems.	■ Dartmouth Microsystem Improvement Curriculum internal interactive collaborative learning series for interdisciplinary frontline teams for 6–9 months[6] ■ CDH, CCHMC, Geisinger Health System ■ Micropractice virtual learning (Part 2) ■ IHI collaborative series (www.ihi.org) and other professional collaboratives. (Parts 2, 3, 4)

	Principle	Action	Examples
4. Reflect: Reviewing the Race	Change catalysts matter	Engage patients and families in improvement. Measure performance and results—balanced measures of outcome that reflect multiple, important dimensions—and visually display them. Transparency of results help to see the gaps between patient needs and actual performance.	■ Institute for Family-Centered Care strategy to engage patients and families in improvement ■ Regular publicly reported measures "top down" and "bottom up" (transparency) (Parts 3, 4)
	Trying your best is *not* good enough.	Improvement takes two kinds of knowledge; subject matter and improvement knowledge leads to "profound knowledge," which is needed for improvement.[11]	■ Work smarter, not harder. Become a student of improvement science to blend with knowledge of patient care to result in significant improvements. ■ Develop a workforce that realizes they have two jobs: provide exceptional care and improve outcomes.[6] (Parts 2, 3, 4)
	Ownership promotes engagement	Clinical teams and support teams must "own" the process to make significant improvement. Leaders at all levels need to create the conditions to support front lines to own microsystem improvements. Link strategy, operations, and people needed for successful execution, using cultural support and changes required to become a health care system capable of measurably improving the quality, reliability, and value of care at the front lines.	■ Acknowledge frontline ownership, set goals and targets, and provide education to enable all staff to own process improvement. ■ Challenge everyone to become personally engaged in safeguarding and improving care. ■ M3 for structure and review[6] (Parts 1, 2, 3, 4)
	Spread is not automatic	Memorable stories and positive spins peak curiosity to lead to intentional learning and adapting of key improvement processes.	■ Engage in storytelling at board meetings, executive leader meetings. Facilitate multimedia communication of staff engaged in improvement including poster sessions, Quality Days, videos, intranet. (Parts 2, 3, 4)
	Social movement theory	Create the conditions to share aims and activities with and between microsystems to provide support to people interested in the primary goal and ideas. Leverage emotions to increase collective actions—overwhelmed, frustration and hopeless—channeled to action and improvement.	■ Storytelling, networks (formally and informally) support social sharing and conversation related to improvements and opportunities to help improve the "vitality" of the frontline team from the place where care is delivered. ■ Connect the organization's work to staff core values, professional development and formation, and personal growth of all. ■ Internal collaboratives and networking (Parts 1, 2, 3, 4)

	Principle	Action	Examples
Table 1. Lessons from the Field: "On Your Mark, Get Set, Go! Reflect"* (continued)			
	Complexity theory and nonlinear gains	Clinical systems are complex social systems responding to system changes and requirements.	■ Provide a few simple rules, bold aims, information, and the tools to engage/support frontline systems to be able to respond to internal and external pressures and feedback. ■ Link realities the organization is currently facing with the daily work of frontline microsystems. (Parts 3, 4)

* CCHMC, Cincinnati Children's Hospital Medical Center; I2S2, Intermediate Improvement Science Series Course Plan; M3, Micro-Meso-Macro Framework; CDH, Cooley Dickinson Hospital; IHI, Institute for Healthcare Improvement; M.D., physician; R.N., registered nurse.

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376–377) is also provided to guide implementation of microsystem thinking. It features specific actions to build will, generate ideas, and fortify execution at each level of the organization.

Challenges

Challenges, like weeds, are abundant and unwanted yet may have medicinal value if viewed with intelligence. They are summarized under three headings: will, complexity, and resources.

WILL . . . TO EXCEL AND TO IMPROVE CONTINUOUSLY

Several factors related to the will to excel and to improve represent challenges to microsystems' attainment of peak performance. Most people within clinical microsystems have the inherent cultural characteristic to excel in providing patient care, but one impediment to superior performance is information. The actual performance gap of clinical microsystems is often hidden from view because of a lack of metrics, data, or benchmarking information to reveal whether or not everything is done every time in the right way at the right time in the best way for best-possible results. The desirability and difficulty of linking activity to information and intelligent action was highlighted by Quinn in his concept of the smallest replicable unit.[7] Continuous nurturing of a service system to be information rich is essential in every microsystem, and technology-aided information services can help staff and leaders achieve this. A more fundamental and personal difficulty is the disconnect between personal growth and engagement in improvement with staff's identity and core values, which can only be overcome when individuals change and reshape what it means to learn to become a health professional.[8]

COMPLEXITY . . . TO MASTER DOING THE WORK AND IMPROVING THE WORK AS BASIC WORK

Clinical microsystems are by nature complex, dynamic, and adaptive systems. Some people have difficulty grasping systems thinking and others, having gotten the idea, eschew personal responsibility, proclaiming that the system "made me do it." Blaming the system is in league with a feeling of helplessness

Table 2. Micro-Meso-Macro (M3) Framework*

Clinical Microsystem Awareness and Transformational Development
Microsystems Developmental and Organization Transformation Journey: The Stages

1. Create awareness of flow of work and the clinical unit as an interdependent group of people with capacity to make change.
2. Test some changes to address some of the "embarrassing stuff."
3. See ones' selves as a system of care.
4. Respond to strategic challenges and invitations.
5. Measure performance.
6. Learn to integrate multiple improvement cycles while taking care of patients.
7. Unending curiosity about and pursuit of "best known" world class processes and outcomes.

Microsystem Level "Inside Out"	Mesosystem Level "Creating the Conditions"	Macrosystem Level "Outside In"
0–6 months pre-work: Visit http://www.clinicalmicrosystem.org. Read Parts 1, 8, 9[†] of series; watch Batalden streaming videos[‡]		
■ Form interdisciplinary lead team (patients/families). ■ Dartmouth Microsystem Improvement Curriculum ■ Learning to work together using effective meeting skills ■ Rehearsing within studio course format ■ Practicing in clinical practice ■ Daily huddles, weekly lead team meetings, monthly all staff meetings ■ Learning sessions (monthly) ■ Conference calls (between sessions)	■ Link strategy, operations, and people—"Make it Happen." ■ Support and facilitate meso-/microsystem protected time to reflect and learn. ■ Identify resources to support meso-/microsystem development, including information technology and performance measure resources. ■ Develop measures of microsystem performance. ■ Address roadblocks and barriers to micro-/mesosystem improvement and progress. ■ Set goals/expectations. ■ Link improvement with "evidence." ■ Advocate for the microsystem and the macrosystem.	■ Develop clear vision for meso-/microsystems. ■ Set goals for improvement. ■ Make clear distinctions between what the system will do and what it will not do. ■ Design meso-/microsystem manager and leadership professional development strategy. ■ Engage board of trustees with improvement strategies. ■ Expect all senior leaders to be familiar and involved with meso-/microsystem improvement. ■ Expect all staff to engage in learning and improvement. ■ Provide regular feedback and encouragement to meso-/microsystem-level staff. ■ Articulate the contributions of the clinical microsystems and how they advance the organization-worthy aim and enhance the well-being of the whole enterprise. ■ Create an appreciation for the regulatory environment of health care and the reimbursement mechanisms and how these external forces influence all levels of the health care system: micro, meso, and macro.
6–12 months		
■ Staff reinforcement by leadership ■ Colleague reinforcement ■ New habit development through repetition ■ Improvement science in action ■ Add more improvement cycles ■ Build measurement into practice ■ Measures/dashboards/data walls ■ Playbooks and storyboards ■ Relationships between microsystems (linkages) ■ PDSA-SDSA Improvement ■ Best Practice using Value Stream Mapping/Lean design principles	■ Convene meso-/microsystems to work on linkages and handoffs. ■ Focus on the patient journey within and between microsystems. ■ Focus on the "flow" of care, information, and patient and staff needs. ■ Facilitate system coordination. ■ Link with electronic medical records. ■ Link business initiatives/strategic plan to microsystem level. ■ Attract cooperation across health professional discrepancy traditions. ■ Track and tell stories about improvement results and lessons learned at meso-/microsystem levels. ■ Include improvement as regular agenda item.	■ Expect improvement science and measured results from meso-/microsystems. ■ Develop whole system measures and targets/goals. ■ Attract cooperation across health professional discrepancy traditions. ■ Design review and accountability quarterly meetings for senior leaders. ■ Track and tell stories about improvement results and lessons learned at meso-/microsystem levels. ■ Develop budgets to support and develop strategic improvement. ■ Ensure resources to support meso-/microsystem (e.g., IT). ■ Plan time in schedule (develop the habit) to round at meso-/microsystem levels to observe where learning, improvement, and change must happen.

Table 2. Micro-Meso-Macro (M3) Framework * (continued)		
Microsystem Level "Inside Out"	**Mesosystem Level** "Creating the Conditions"	**Macrosystem Level** "Outside In"
12–18 months		
■ Continue "new way of providing care, continuously improving and working together." ■ Actively engage more staff involvement. ■ Multiple improvements occurring ■ Network with other microsystems to support efforts ■ Coach network and development ■ Leadership development ■ Annual review, reflect, and plan retreats ■ Quarterly system review and accountability meetings to Meso-Macro leadership	■ Link performance management to daily work and results. ■ Support and coach microsystem leadership development. ■ Provide resources to support microsystem development. ■ Provide feedback and encouragement to microsystem. ■ Encourage and support search of "best practice."	■ Develop professional development strategies across all professions. ■ Design HR selection and orientation process linked to identified needs of macro-/microsystems. ■ Link performance management to daily work and results. ■ Align recognition, incentives, and rewards for individuals and groups to foster accountability for improving and maintaining quality, efficiency, and flexibility. ■ Create system to link measurement and accountability at micro/meso/macro levels. ■ Develop "quality college" for ongoing support and capability building throughout organization.

* PDSA–SDSA, Plan-Do-Study-Act–Standardize-Do-Study-Act; IT, information technology; HR, human resources.

† Nelson E.C., et al.: Microsystems in health care: Part 1. Learning from high-performing front-line clinical units. *Jt Comm J Qual Improv* 28:472–497, Sep. 2002; Huber T.P., et al.: Microsystems in health care: Part 8. Developing people and improving work life: What front-line staff told us. *Jt Comm J Qual Saf* 29:512–522, Oct. 2003; Batalden P.B.: Microsystems in health care: Part 9. Developing small clinical units to attain peak performance. *Jt Comm J Qual Saf* 29:575–585, Nov. 2003.

‡ Batalden streaming videos at http://dms.dartmouth.edu/cms/materials/videos/ (last accessed May 15, 2008).

that many people experience when they work in larger entities or in a rigid, hierarchical workplace that does not value learning and innovation. It is often confusing to launch multiple, dispersed improvement initiatives simultaneously in the midst of taking care of patients, not to mention to master and to sustain high performance and continuous improvement, which require multiple players to fulfill essential roles (such as obtaining data, making decisions, forging novel relationships with patients and families, tracking patients' needs and proactively matching them with services, and coordinating care outside of one's clinical program) that are needed to attain peak performance.

RESOURCES . . . TO ENGAGE AND AID FRONTLINE STAFF

A third set of challenges come under the broad heading of *resources*. There are many obstacles in this domain, such as the perverse incentives under fee-for-service payment that lack support for service improvement and innovation and the difficulty of involving private practice physicians who are not employed by a health care organization that needs their engagement for improvement. Moreover, it is often difficult to secure the time

and resources to teach frontline staff "how to improve it" and to develop and deploy skilled coaches who can support individuals and improvement groups working within and between microsystems. It may be difficult to get the chief financial officer "on the improvement bus,"[9] and, once on the bus, he or she may set dollar targets for improvement that can distort the need to work on fundamental processes and underlying systems.

Conclusion

Beginning to master and make use of microsystem principles and methods to attain macrosystem peak performance can help us knit together care in a fragmented health system, eschew archipelago building in favor of nation-building strategies, achieve safe and efficient care with reliable handoffs, and provide the best possible care and attain the best possible health outcomes. This will require overcoming the challenges posed by will, complexity, and resources and developing an active information environment with dashboard utility, fast feedback loops, and data/knowledge repositories to advance science and to support best practice. There is broad agreement that a great need exists for patients to enjoy both better health outcomes

and for health care staff to master providing care and improving care. Yet progress is being made in the United States and abroad, as will be illustrated by the case examples in the remainder of this series. **J**

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