

VALUE BY DESIGN

Developing Clinical
Microsystems to
Achieve Organizational
Excellence

EUGENE C. NELSON • PAUL B. BATALDEN
MARJORIE M. GODFREY • JOEL S. LAZAR

EDITORS

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Foreword by Elliott S. Fisher

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FOREWORD

Elliott S. Fisher

The problems confronting the U.S. health care system are widely recognized: a rising burden of chronic disease;¹ limited capacity to deliver safe, reliable, and effective care (even when the evidence for specific treatments is strong);^{2,3} fragmented and poorly coordinated patient care that is frequently impersonal, insensitive to socioeconomic, cultural or ethnic contexts, and poorly aligned with patients' preferences;⁴ and rising costs that threaten individual, corporate, and government budgets.^{5,6}

As our recognition of the scope of the problems has grown, so has our understanding of the underlying causes of these problems. Although some of the responsibility for poor care rests with our still inadequate health insurance coverage, most policy experts recognize that expanding insurance coverage will do little to address the underlying causes of poor quality and rising costs that afflict even those with excellent insurance. The critical underlying causes include:

- **Unclear Aims:** failure to be clear about the aims of health care (Is health care a commodity and thus just about making money? Or about better care and better health?);
- **Limited Information:** inadequate information systems and inadequate information on the risks and benefits of common treatments and the performance of local health systems and providers;
- **Disorganized Care:** a fragmented and disorganized delivery system that is limited in its capacity to learn or to measurably improve care;
- **Flawed Incentives:** a payment system that reinforces fragmentation and fosters little or no accountability for the quality and costs of care.

The United States now has an unprecedented opportunity to address these problems. The National Priorities Partnership, a broad multistakeholder coalition including all the major federal health agencies, employers, provider organizations, and consumer groups, has achieved consensus on aims, making explicit the need to improve care, improve health, and reduce costs.⁷ The American Reinvestment and Recovery Act (2009) made major policy and funding commitments to improving health information systems, performance measures, and comparative effectiveness research. And the recently passed Affordable Care Act (2010) includes numerous provisions intended to foster delivery system and payment reform. These include: the requirement that the Secretary of Health and Human Services develop a national quality strategy; the creation of a new Center for Medicare and Medicaid Innovation to identify, develop, and

test new models of care and payment; authorization and funding to test a broad array of pilot programs (ranging from use of decision-aids to support informed patient choice to the creation of “Health Innovation Zones”); and the creation of a new payment model under Medicare (Accountable Care Organizations) under which physician groups and other providers can take responsibility for defined populations—and be rewarded financially for improving quality and lowering costs. These provisions will set in motion a marked change in the organizational structure, performance measures, and payment methods of the U.S. health care system.

The success of reform, however, will depend upon whether clarity of aims or changes in organization, policy, and payment methods can lead to actual improvements in the health and function of patients, in their experiences of the care, and in the affordability of health care. Policy alone can’t change practice: health care professionals must change how they care for patients. The success of reform thus depends upon changes at the front lines of practice—where patients are touched by their clinicians—and in the organizations and systems that support those frontline clinicians.

This book is essential reading for everyone who wants to improve the care that they provide, whether a nurse in the emergency room frustrated by patient flows, a physician in a small office practice trying to improve care for diabetic patients, or a leader of a major health system considering how to become an Accountable Care Organization.

The authors build on decades of work applying scientific principles of improvement to health care and add a key insight drawn from the research of James Brian Quinn:⁸ value in health care is produced in small functional units—clinical microsystems—where one or more health professionals work with patients (and their families) to produce a specific health outcome. Microsystems have clinical aims (effective treatment of primary care patients with diabetes), business aims (maintaining income, covering expenses), and shared technology and information. Most importantly, microsystems have inputs, processes, and outputs (including clinical outcomes) that allow their performance to be measured and improved.

Building on this conceptual foundation, the authors describe how health professionals can work with patients, families, and team members within a microsystem to systematically improve performance. The first half of the book focuses on general principles: the theory of microsystems (Chapter 1); engaging patients as partners (Chapter 2); improving reliability (Chapter 3); creating the needed information environment (Chapter 4); and developing plans for how patients traverse a microsystem (Chapter 5). The next four chapters describe specific examples across the care continuum. Finally, Chapter 10 provides a spectacular discussion of how health care leaders can build effective, high-performing delivery systems on the foundation of high functioning clinical microsystems.

Better value is what we badly need in health care. *Value by Design* can help us get there.

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IMPROVEMENT AT THE FRONT LINE OF CARE

- Discussion of health care reform has grown ubiquitous in our nation's and states' capitals, in our newspapers, on our television, on the Internet, at the office water cooler, and, of course, within our homes. There is good reason for such discussion and for the deep concerns that prompt it: whether we are employers, politicians, payers, patients, families, or health care professionals, we are also participants in a health care system that too often fails to deliver the quality, safety, and *value* of care we individually and collectively require. But although government policies, community resources, and payer pressures will increasingly shape a health care environment that is more conducive to quality improvement and value creation, the great share of this improvement work must occur at the front line of health care itself in what we call the clinical microsystems, the place where patients, families, and caregivers actually meet. Within these microsystems, clinical needs are most directly linked to clinical resources. Within these microsystems, quality, efficiency, timeliness, service excellence, and innovation can (and must) be built into frontline work processes themselves. The following principles promote quality within clinical microsystems: active attention to quality, safety, and value is no longer an option in health care, but an imperative.
- Quality must be delivered to the right person *by* the right person, at the right place, and at the right time every time.
- Safety must be conceived not merely as a priority in health care design, but as a precondition or prerequisite.
- Value, which can be described as the relationship of quality and safety and outcomes divided by costs over time, requires that we direct our attention to continual removal of unnecessary costs and to using work processes that are (in this era of necessarily limited economic resources) not only effective but also optimally efficient.

Moreover, we must not be content in modern health care to guarantee only clinical quality or only safety or only patient satisfaction or only cost reduction. Instead we must design and manage health systems that are capable of achieving all of these goals all of the time. We will need to do this, finally, in a manner that also increases pride and joy in work of physicians, nurses, and all health professionals who, for the most part, entered this line of work because they wanted to help people and to make a difference.

We have written this book, *Value by Design*, to offer specific guidance on building and improving clinical microsystems. We direct our attention especially to the front line of care because this is where clinical service is actually rendered, success is measured, health care teams learn from experience and modify their work appropriately, patients

and families develop their loyalty to the health care system, and patients hopefully recover, maintain, or even generate health. The clinical microsystem is the locus of value creation in health care.

The timing of this book's publication is fortuitous. We believe a *cultural shift* is taking place in the health care quality and safety movement. Until recently, this field was led by a small and tightly linked community of authors and leaders who knew each other well. Only a limited number of high-quality publications were circulated, and new events and developments were communicated quickly and easily among thought leaders in the field and among their colleagues, associates, and acquaintances. This small community was richly connected by shared interests and by collaborative projects and friendship networks that created a generative and enabling context and a fidelity to shared principles, concepts, and methods. The focus of work was on patients, populations, and health professionals.

More recently, however, the culture of the quality movement has shifted. Robust demonstrations of health care improvement are now widely dispersed across multiple sites that are delivering care, conducting research, and educating the next generation of health professionals. Multiple journals and scores of Web sites and blogs now address questions of quality and safety. These provide myriad portals into numerous topics, themes, and programs, both nationally and internationally. Although the primary focus remains on patients, populations, and health professionals, active efforts now align health care delivery with public and community health promotion. Keeping up-to-date in this burgeoning field requires a vigilance that may not be attainable among even well-intended quality practitioners.

We believe the time is therefore right to consolidate, in a single volume, some of what we have learned about *what works* to improve value in health care. We wish to explore durable concepts and methods that have proven useful to clinical microsystems endeavoring to effect meaningful change in diverse real-world settings. We wish to share, as well, a practical framework that has successfully stimulated learning and improvement in microsystem participants and in students who aspire to enter the growing community of quality leaders and practitioners.

The Dartmouth Institute's Clinical Microsystems Course

In a sense, we (Batalden and Nelson) have been working on this book for more than fifteen years. In 1994 Paul Batalden left the Hospital Corporation of America (HCA) to rejoin forces with Eugene Nelson, who had moved from HCA to Dartmouth in 1992. Dartmouth Medical School's Center for the Clinical Evaluative Sciences (now the Dartmouth Institute for Health Policy and Clinical Practice), under the leadership of Jack Wennberg and Gerry O'Connor, had begun a novel master's degree program to prepare health professionals in health policy, epidemiology, biostatistics, and quality improvement. Dartmouth recruited Batalden to lead the new quality improvement track in the master's degree program and to develop a core curriculum on the fundamentals of modern improvement in health care. The capstone course in this quality track that provides both the content and the structure of our present book was formally named "Continually Improving the Health and Value of Health Care for a Population of Patients: The Design and Improvement of Clinical Microsystems." Offered initially in 1995 and every spring since that time, the *Microsystems Course* (as it is less formally known) remains popular among graduate students, health care administrators, and experienced health care professionals.

The Microsystems Course continues to evolve as new insights are gained and as new applications of modern improvement in health care are tested (and found to work) in the real world. Marjorie Godfrey joined the faculty team in 1999 and has developed numerous useful tools (many of which are featured in this book's action guides) to guide clinical microsystems in the hands-on work of practice self-assessment and change. More recently, Tina Foster and Joel Lazar have joined the core group as well, and have helped further align course principles with the experiential realities of patients, families, and frontline caregivers. The course's theoretical and practical underpinnings come from many sources, with special debt to W. Edwards Deming, James Brian Quinn, Kerr White, Karl Weick, Edgar Schein, Donald Berwick, and Tom Nolan. As time has passed and knowledge has grown, the Dartmouth-based group has authored numerous journal articles on clinical microsystems and a book titled *Quality by Design: A Clinical Microsystems Approach*.

The present book, however, represents our first effort to organize our capstone course material into a single volume for both teaching and value improvement purposes. *Value by Design: Developing Clinical Microsystems to Achieve Organizational Excellence* may be used either as a textbook in health courses like our own, or as a practical guide in the real-world improvement of health care. Because (as we discuss in greater detail in Chapter One) the functions of better patient outcomes, better professional development, and better systems improvement are inextricably linked, we hope and expect our book will serve both purposes simultaneously.

Organization of the Microsystems Course

The Microsystems Course is based on action-learning methods, skips back and forth from classroom to real-world clinical programs and clinical units, and is outrageously fun to teach. Our own course has thirty to forty students each spring and is made up of an almost equal mix of physicians, nurses, mid-career health professionals, and recently graduated undergraduates. Students organize themselves into teams of three or four; each team is then matched with a particular real-world clinical microsystem that becomes the locus of action-learning throughout the semester. The ten or so clinical microsystems are selected from the surrounding region and are picked to represent different parts of the health care continuum. Our most recent year's sites (2009) included a family practice, a general internal medicine clinic, a pediatric surgery program, an electroconvulsive therapy (ECT) psychiatric treatment center, an ear-nose-and-throat program, a home health agency, a blood bank, an inpatient oncology unit, an infectious disease group, and an ultrasound testing service.

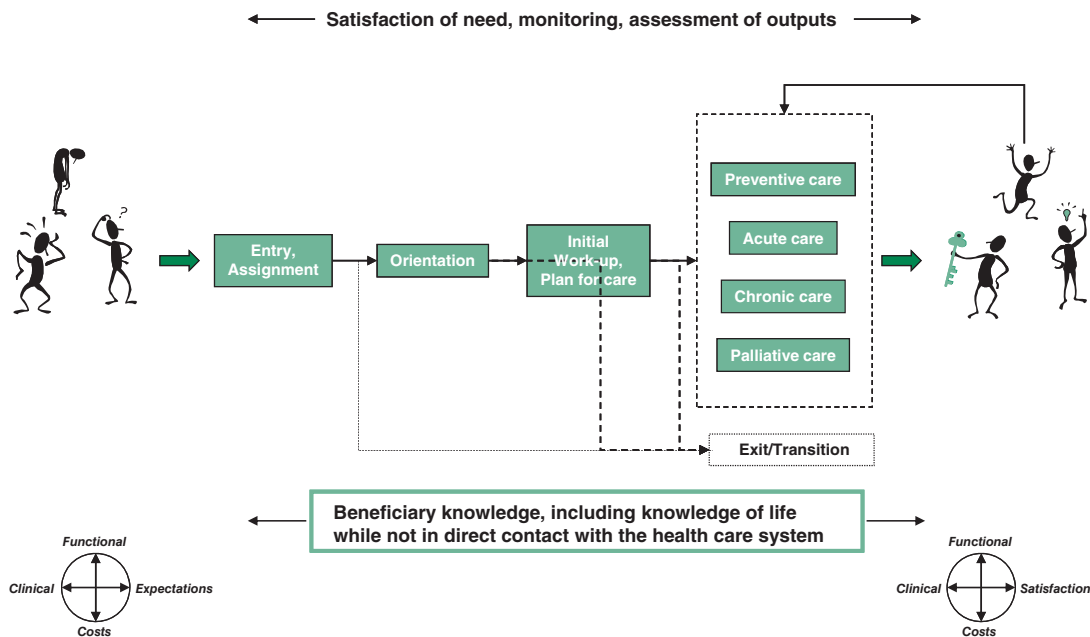
During the course of a ten-week academic term, student teams spend (each week) one half-day in the classroom and one-half to one full day in the field studying their clinical microsystem. The team's study of each particular clinical microsystem is guided by ideas, concepts, and methods covered in class and is specifically based on the *clinical microsystem model*. Student teams complete weekly assignments that contribute to their two final academic products: (1) a twenty-plus page case report assessing the clinical microsystem and making recommendations for improvements, and (2) a poster summarizing the students' assessment of their microsystem and recommendations for improvement. For more detailed information on the Microsystems Course, see the course syllabus, action guides, and three final microsystem case reports written by student teams. These and other resources are available at our Web site, www.clinicalmicrosystem.org.

The Clinical Microsystem Model

Although specific care processes will of course vary greatly from one clinical microsystem to the next, we have found that a core model is common to the flow of activity in virtually all microsystems. Patients and families enter a system of care with specific health needs; they participate in clinical processes of orientation, assessment, intervention, and reevaluation; and they emerge from that system hopefully with a large or small health benefit, through satisfactory meeting of their needs. Students' and caregivers' rich knowledge of this model permits detailed exploration of care processes and outcomes. This exploration in turn facilitates development and improvement of specific workflows that may improve health outcomes and patient experience, enhance system safety, and reduce associated costs. *This is value by design!* The general clinical microsystem model is shown in Figure P.1. The clinical microsystem model is sometimes referred to as the physiology model (see discussion in Chapters 1 and 2.) The model provides an overarching framework for the spring Microsystems Course, as it does for the present book. The model's strength is its adaptability to any microsystem in any part of the care continuum. We have seen it successfully applied to emergency departments, intensive care units, inpatient medical-surgical units, home health programs, physical rehabilitation programs, nursing home units, outpatient surgical settings, and medical specialty and primary care practices. The model works because, in virtually all caregiving settings, care itself is built from the same *types* of core processes.

- Studying Figure P.1 and the clinical microsystem model, we observe the following: the microsystem's work begins when an individual with a particular health need leaves his everyday environment and *enters* (most often physically but sometimes virtually) a clinical microsystem. This individual can be recognized as one of a population of patients cared for by the microsystem. Attributes of his baseline health status may be depicted with a *value compass* (see discussion in Chapter Four). The value compass

FIGURE P.1 Clinical Microsystem Model.



reveals the patient's clinical and functional condition, expectations for goodness of care, and historical costs associated with getting health care and with being ill or injured.

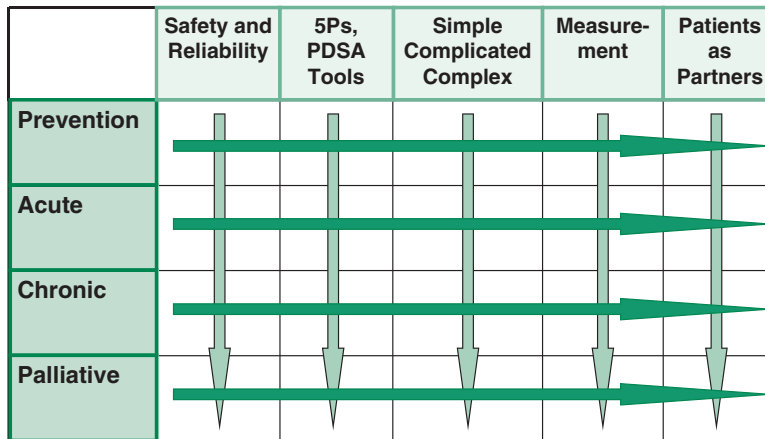
- The individual next receives some *orientation* to the particular microsystem as well as an *initial workup* and *plan of care*, which in turn lead to the delivery of a mix of services (*preventive, acute, chronic, palliative*), based on the patient's health status, preferences, and available resources.
- As time passes, the individual exits the particular clinical microsystem (which can be thought of as *exit/transition* from the microsystem's perspective) and either returns to the everyday social environment or enters another *adjacent* clinical microsystem for the next step in care.
- The goodness of the outcomes of time spent in (or in relationship with) the clinical microsystem can be registered on this individual's *value compass* (measured or unmeasured) at this new point in time. Once again, the individual can be recognized as one member of the population the microsystem has served.
- Two important processes contribute to the linear flow of this model and to the improvement of microsystem performance. The first process is *measurement and monitoring*, which permits assessment of key clinical and performance metrics, primary *outputs* and outcomes, and establishes the degree to which services result in *satisfaction of need* over time. The second process is *knowledge acquisition* about patients, families, and other *beneficiaries* of microsystem service. This *beneficiary knowledge* is specific to immediate needs and to realms of experience external to contact with the microsystem.

Organization of This Book

We have organized *Value by Design* as we have organized the Microsystems Course itself. Each of the book's ten chapters corresponds to one week in our ten-week course and to detailed exploration of one component of the clinical microsystem model. When we teach the Microsystems Course, the model is shown at the start of every class meeting to orient learners to each new step in their own explorations and to each new step in the clinical care journey of patients, families, and the microsystem itself. At the start of each chapter we provide learning objectives for the unit to indicate what will be covered in the subsequent text. Each chapter concludes with a brief summary, list of key terms, study questions, and discussion topics that serve to broaden and deepen the chapter's (week's) explorations.

Chapters One through Five explore infrastructure elements of the clinical microsystem and show how these elements may be conceptualized, analyzed, designed, and improved to optimize service to patients and families. In Chapter One we define basic terms and explore key concepts that provide a foundation for microsystem design and improvement more generally. Chapter Two highlights the importance of patients as partners, not only in generating caregiving knowledge, but also in creating clinical value. Chapter Three introduces the paired themes of safety and reliability, which are essential to the efficacy and integrity of microsystem care. In Chapter Four we examine the microsystem functions of measuring and monitoring; we observe that these activities entail much more than simple registering of numeric outputs. Indeed, they support and guide our improvement of caregiving activities. Chapter Five directs our attention to the function of patient entry into clinical microsystems: important core processes here include orientation, data acquisition, reliable access, and effective care transitions.

FIGURE P.2 Infrastructural and Experiential Domains of the Clinical Microsystem.



In weeks six through nine of the Microsystems Course, and in the corresponding chapters of this book, we maintain the same clear focus on quality improvement and value creation while shifting our perspective. Where our attention previously focused on microsystem processes and infrastructure that support patient care, we now explore more deeply the clinical experiences of patients and families. In Chapters Six through Nine we consider the unique clinical needs, challenges, and opportunities of preventive, acute, chronic, and palliative care.

But we do not view the content of these latter, care-focused chapters as distinct from the infrastructure explorations that preceded them. Quite the contrary, the discussions in Chapters One through Five gain greater relevance as their implications and applications are examined in the context of unique forms of clinical and caregiving experience. As depicted in Figure P.2, we conceptualize the entire microsystem model as something of a grid, with infrastructural domains (such as safety and reliability and measurement and monitoring) represented as vertical columns and clinical experiential domains (preventive, acute, chronic, and palliative care needs) represented as horizontal rows. Throughout the text the reader is invited to give special attention to each of the resulting squares at the intersection of these domain axes. As suggested earlier in this Preface, it is at these points of connection between patients' clinical needs, resources, and care processes that microsystems generate quality, safety, outcomes, and costs that contribute to value.

In Chapter Ten we consider the subject of value creation from one further perspective. After reexamining fundamental principles and discrete practices from earlier chapters, we expand our focus beyond clinical microsystems to meso and macrosystems where quality, safety, and value are achieved on a larger scale. How do we connect the front line to the front office, so that the building blocks of improvement in local contexts support and strengthen one another and stimulate improvement, innovation, and reform across entire health systems?

Additional Features and Online Resources

We wrote this book with the aim of creating a multifunctional text. *Value by Design* may serve as a course textbook, since its content and structure already reflect the Dartmouth

Institute's Clinical Microsystems Course. Alternatively (or in addition), it may function as a practical guide for real-world improvement in actual clinical microsystems and may function to enhance value in health care settings already familiar to readers. We have made liberal use of case studies, sidebars, and chapter-specific action guides (derived from the Internet-based *Clinical Microsystem Action Guide*) to add texture, tools, depth, and scope. (See www.clinicalmicrosystem.org and select Materials and select Workbooks and select Clinical Microsystem Action Guide).

In using the book as a textbook, educators and learners may take advantage of the model course syllabus for overall planning and management and may then proceed sequentially through each chapter's learning objectives, core material, review questions, and discussion questions. In addition, a set of PowerPoint slides accompanies each chapter and can be accessed at www.clinicalmicrosystem.org. This Web site, developed and administered by one of the editors (Godfrey), has many useful materials and resources, including the Dartmouth Institute Microsystems Course Syllabus, PowerPoint slides, and case studies completed by the Dartmouth Institute Microsystems Course graduate students. Readers should explore the Web site's Resources and Materials sections. Educators will also find a helpful Instructor Guide to offer support in teaching *Value by Design*.

In using the book as a value improvement guide, we recommend that readers familiarize themselves with the content of Chapters One through Five and then selectively explore Chapters Six through Ten and relevant action guides, based on their interests and improvement challenges. Again, this material can be richly enhanced through full use of www.clinicalmicrosystem.org, the free educational Web site where many colleagues from around the world find and contribute resources and knowledge.

One final function of our book and of the Clinical Microsystems Course that informs it is to serve as an invitation. We will have succeeded in our efforts only if we engage educators and students, clinicians, nurses, and other health professionals, leaders and administrators, and, of course, patients and families in the ongoing and essential work of health care improvement. Our health system is deeply in need of improvement, and those of us who work with an awareness of the clinical microsystems are uniquely positioned to perform this necessary work. We invite you to participate, knowing that only by working together can we achieve our common goal of value creation in health care.

We leave you with one further invitation. Our Microsystems Course, like the health care system itself, is an appropriate target for continuous improvement. Fifteen years of design and changes have brought our course to its current state, but there is certainly more work to be done. We expect our readers to experiment with the course material, to modify its content to appropriate educational and clinical contexts, and to engage new learners (new participants in the community of quality improvement and value creation) in ways we have not anticipated. We thus invite all readers of *Value by Design* to share with us their own discoveries. How have the model and materials helped your educational and clinical work? What would be more helpful? Please share your own experiences and insights with us at www.clinicalmicrosystem.org so we can learn together how best to achieve high-value health care, best outcomes for patients and families, and genuine pride in work for health professionals, support staff, and system leaders.

