
CONTENTS

Tables, Figures, and Exhibits xiii

Foreword xix

Donald M. Berwick

Preface xxiii

Acknowledgments xxvii

Introduction xxxi

The Editors xxxix

The Contributors xliii

PART ONE: CASES AND PRINCIPLES 1

1 Success Characteristics of High-Performing Microsystems: Learning from the Best 3

Eugene C. Nelson, Paul B. Batalden, Thomas P. Huber, Julie K. Johnson, Marjorie M. Godfrey, Linda A. Headrick, John H. Wasson

True Structure of the System, Embedded Systems, and Need to Transform Frontline Systems

The Bladyka Case

- Research Design
 - Results
 - Practical Implications
 - Conclusion
- 2 Developing High-Performing Microsystems 34
- Eugene C. Nelson, Paul B. Batalden, William H. Edwards, Marjorie M. Godfrey, Julie K. Johnson
 - Case Study: A Decade of Progress for an Intensive Care Nursery
 - A Model of Development and a Curriculum to Catalyze Microsystem Growth
 - Conclusion
- 3 Leading Microsystems 51
- Paul B. Batalden, Eugene C. Nelson, Julie K. Johnson, Marjorie M. Godfrey, Thomas P. Huber, Linda Kosnik, Kerri Ashling
 - Leader, Leadership, Leading
 - Recap of Methods
 - Three Fundamental Processes of Leading: What Clinical Microsystem Team Members Observe and Report
 - Discussion
 - Conclusion
- 4 Leading Macrosystems and Mesosystems for Microsystem Peak Performance 69
- Paul B. Batalden, Eugene C. Nelson, Paul B. Gardent, Marjorie M. Godfrey
 - Case Study: A True Story, with Names Changed to Protect the Innocent
 - Leadership Frameworks: Some of the Best Approaches
 - Leading Large Health Systems to Peak Performance Using Microsystem Thinking
 - Conclusion
- 5 Developing Professionals and Improving Worklife 106
- Thomas P. Huber, Marjorie M. Godfrey, Eugene C. Nelson, Julie K. Johnson, Christine Campbell, Paul B. Batalden
 - Case Study: Staff Development at Massachusetts General Hospital Downtown Associates
 - Conclusion
- 6 Planning Patient-Centered Services 124
- Marjorie M. Godfrey, Eugene C. Nelson, John H. Wasson, Julie K. Johnson, Paul B. Batalden
 - Planning Patient-Centered Services and the 5 P's

Case Study: Planning Services for Subpopulations of Patients to Best Provide Care for Individual Patients

A Developmental Journey: Beginning to Assess, Understand, and Improve a Clinical Microsystem

Analysis and Improvement of Processes

A Huddle in Plastic Surgery

Conclusion

7 Planning Patient-Centered Care 148

John H. Wasson, Marjorie M. Godfrey, Eugene C. Nelson, Julie K. Johnson, Paul B. Batalden

Planning Care Well: Exemplary Clinical Microsystems

Planning Care in Any Microsystem

A Low-Tech Example for Ambulatory Services: CARE Vital Signs

Conclusion

8 Improving Patient Safety 165

Julie K. Johnson, Paul Barach, Joseph P. Cravero, George T. Blike, Marjorie M. Godfrey, Paul B. Batalden, Eugene C. Nelson

Microsystem Patient Safety Scenario

Case Study: Dartmouth-Hitchcock PainFree Program

Conclusion

9 Creating a Rich Information Environment 178

Eugene C. Nelson, Paul B. Batalden, Karen Homa, Marjorie M. Godfrey, Christine Campbell, Linda A. Headrick, Thomas P. Huber, Julie K. Johnson, John H. Wasson

Case Study 1: Specialty Care: Dartmouth-Hitchcock Spine Center

Case Study 2: Overlook Hospital Emergency Department

Case Study 3: Intermountain Health Care Shock Trauma Intensive Care Unit

Tips and Principles to Foster a Rich Information Environment

Discussion

Conclusion

PART TWO: ACTIVATING THE ORGANIZATION AND THE DARTMOUTH MICROSYSTEM IMPROVEMENT CURRICULUM 197

10 Overview of Path Forward and Introduction to Part Two 199

Recap of Part One and Overview of Part Two

Using Real Case Studies and Practical Applications of Microsystem Thinking, Methods, and Tools

- Working at All Levels of a Health System
- Focusing on the Microsystem Level
- Review Questions
- Pework
- 11 Introduction to Microsystem Thinking 230
 - What Is a System in Health Care?
 - How Did Clinical Microsystem Knowledge Evolve?
 - What Is a Clinical Microsystem?
 - Where Do Clinical Microsystems Fit in the Health Care Delivery System?
 - What Does a Clinical Microsystem Look Like?
 - Why Focus on the Clinical Microsystem?
 - How Do Clinical Microsystems Link to *Crossing the Quality Chasm*?
 - What Were the Findings of the Dartmouth Clinical Microsystem Research?
 - What Does a Microsystem's Developmental Journey Look Like?
 - Conclusion
 - Case Studies
 - Review Questions
 - Between Sessions Work
- 12 Effective Meeting Skills I 243
 - What Is a Productive and Effective Meeting?
 - Why Use Meeting Skills and Roles?
 - What Are Effective Meeting Roles?
 - What Are the Phases of an Effective Meeting?
 - What Processes Are Evident in an Effective Meeting?
 - What Is the Seven-Step Meeting Process?
 - What Does a Meeting Agenda Template Look Like?
 - What Are the Ground Rules for Meetings?
 - What Are Some Tips for Getting Started with Productive Meetings?
 - How Do You Keep a Rhythm of Improvement?
 - Case Studies
 - Review Questions
 - Between Sessions Work
- 13 Assessing Your Microsystem with the 5 P's 258
 - How Does an Interdisciplinary Lead Improvement Team Begin to Assess and Improve a Clinical Microsystem?
 - What Does the 5 P's Framework Look Like?

What Resources Are Available to Guide the 5 P's Assessment?
What Is a Helpful Way to Introduce Your Team to the Assessment Process?
What Are the 5 P's?
What Should You Do with the Assessment Findings?
Case Studies
Review Questions
Between Sessions Work

14 The Model for Improvement: PDSA ↔ SDSA 271

What Is the Model for Improvement?
Why Use the Model for Improvement?
How Does the Model Fit into the Improvement Process?
What Is the PDSA Part of the Model?
What Are the Benefits of Using PDSA?
What Is Involved in Each of the Four Steps of Plan, Do, Study, and Act?
What Is the SDSA Cycle?
What Is Involved in Each of the Four Steps of Standardize, Do, Study, and Act?
What Tools Can Assist Your PDSA Cycle ↔ SDSA Implementation?
What Are Some Tips for Using the PDSA ↔ SDSA Method?
Case Studies
Review Questions
Between Sessions Work

15 Selecting Themes for Improvement 284

What Is a Theme for Improvement?
Why Use a Theme?
What Are the Theme Selection Considerations?
What Process Can You Use to Generate Theme Ideas and Select a First Theme?
What Are the Next Steps?
Case Studies
Review Questions
Between Sessions Work

16 Improvement Global Aim 291

What Is a Global Aim?
Why Use a Global Aim?
How Do You Write a Global Aim?
What Are the Next Steps?
Case Studies

- Review Questions
- Between Sessions Work
- 17 Process Mapping 296**
 - What Is Process Mapping?
 - Why Use Process Mapping?
 - What Are the Commonly Used Flowchart Symbols?
 - What Does a High-Level Flowchart Look Like?
 - What Does a Detailed Flowchart Look Like?
 - What Are Some Tips for Creating a Flowchart?
 - What Does a Deployment Flowchart Look Like?
 - What Are Some Tips for Creating a Deployment Flowchart?
 - Case Studies
 - Review Questions
 - Between Sessions Work
- 18 Specific Aim 308**
 - What Is a Specific Aim?
 - Why Use a Specific Aim?
 - Where Do Specific Aims Come From?
 - Where Does the Specific Aim Fit in the Overall Improvement Process?
 - How Do You Write a Specific Aim?
 - What Are the Next Steps?
 - Case Studies
 - Review Questions
 - Between Sessions Work
- 19 Cause and Effect Diagrams 313**
 - What Is a Cause and Effect Diagram?
 - Why Use a Fishbone Diagram?
 - What Is the Structure of a Fishbone Diagram?
 - What Does a Completed Fishbone Look Like?
 - What Are Some Tips for Creating a Fishbone Diagram?
 - Case Studies
 - Review Questions
 - Between Sessions Work
- 20 Effective Meeting Skills II: Brainstorming and Multi-Voting 321**
 - What Is Brainstorming?
 - What Are the Benefits of Brainstorming?

- What Are Some Different Types of Brainstorming?
- What Are Some Tips for Conducting Brainstorming?
- What Is Multi-Voting?
- Do Teams Always Multi-Vote After a Brainstorming Session?
- How Do You Multi-Vote?
- What Does a Brainstorming Session with a Multi-Voting Outcome Look Like?
- Case Studies
- Review Questions
- Between Sessions Work

21 Change Concepts 331

- What Is a Change Concept?
- Why Use Change Concepts?
- How Can You Use Change Concepts in a Process?
- What Are the Next Steps?
- Case Studies
- Review Questions
- Between Sessions Work

22 Measurement and Monitoring 339

- What Are Measures, What Makes Measures Good, and How Do They Relate to Aims?
- What Is a Run Chart?
- What Are the Benefits of Using a Run Chart?
- How Do Run Charts Fit in the Overall Improvement Process?
- What Do Run Charts Tell You About Your Performance Level and Variation?
- What Are Special Cause and Common Cause Variation?
- How Do You Make a Run Chart?
- How Do You Interpret Run Chart Results?
- What Is a Control Chart?
- What Is the Theory Behind Control Charts?
- What Are the Benefits of Using a Control Chart Instead of a Run Chart?
- What Are the Different Kinds of Control Charts?
- What Is an XmR Control Chart?
- How Do You Interpret Control Chart Results?
- When Do You Recalculate Control Chart Values?
- What Are Some Tips for Using Run Charts and Control Charts?
- Case Studies

	Review Questions	
	Between Sessions Work	
23	Action Plans and Gantt Charts	362
	What Is an Action Plan?	
	What Is a Gantt Chart?	
	Why Use Action Plans and Gantt Charts?	
	How Do You Write an Action Plan?	
	How Do You Create a Gantt Chart?	
	What Are the Next Steps?	
	Case Studies	
	Review Questions	
	Between Sessions Work	
24	Follow Through on Improvement: Storyboards, Data Walls, and Playbooks	369
	What Is the Importance of Follow Through?	
	What Can You Do to Follow Through?	
	What Are the Fundamentals of Improvement?	
	What Is a Data Wall?	
	What Is a Playbook?	
	How Is the Playbook Used?	
	How Do You Create a Playbook?	
	How Do You Maintain Your Playbook?	
	What Is a Storyboard?	
	How Do You Make a Storyboard?	
	Discussion	
	Case Studies	
	Review Questions	
	Between Sessions Work	
25	Conclusion: Continuing on the Path to Excellence	380
	Looking Back	
	Looking Forward and an Invitation: Make It Personal and Make It Happen	
	Appendix A: Primary Care Workbook	385
	Name Index	433
	Subject Index	437

TABLES, FIGURES, AND EXHIBITS

Tables

- 1.1 Scope of Primary Success Characteristics and Illustrative Underlying Principles 22
- 1.2 Specific Examples of the Primary Success Characteristics 24
- 1.3 Illustrative Best Practices Used by High-Performing Clinical Microsystems 27
- 3.1 Building Knowledge in Clinical Microsystems: Views on Leading Quoted from Our Interviews 55
- 3.2 Taking Action in Clinical Microsystems: Views on Leading Quoted from Our Interviews 59
- 3.3 Reviewing and Reflecting in Clinical Microsystems: Views on Leading Quoted from Our Interviews 63
- 4.1 Leadership Frameworks and Challenges 78
- 4.2 Bolman and Deal's Four Complementary Leadership Frameworks, with Barriers and Strategies 81
- 4.3 Highlights of Robert Greenleaf's Dartmouth College Lectures 83
- 4.4 Either-Or States of Organizational Change 85
- 4.5 System Examples Associated with Loose and Tight Coupling 85
- 4.6 Matching Change Strategies to the Coupling Situation 86
- 5.1 Workstation Assignments at MGH Downtown 111
- 5.2 Evaluation Sheet for Performance Evaluation Program (PEP), Showing Categories and Definitions 112

- 5.3 Staff Comments That Support the Human Resource Value Chain Concept 115
- 5.4 Staff Comments That Support Success Characteristics 117
- 5.5 Examples of Skills Addressed in a Personal Skills Assessment 121
- 6.1 Evergreen Woods's Additional Success Elements and Their Links to the 5 P's 129
- 6.2 Know the P's for Clinical Microsystems Across the Health Continuum 132
- 6.3 Practice Core and Supporting Processes Assessment 136
- 6.4 Assessing Your Practice Discoveries and Actions: The P's 140
- 6.5 Assessing Your Practice Discoveries and Actions: Common Oversights and Wastes 142
- 7.1 Common Myths Rejected by Effective Clinical Microsystems 153
- 7.2 Attributes of Planned Care 156
- 8.1 Linkage Between Microsystem Characteristics and Patient Safety 175
- 9.1 Tips for Fostering a Rich Information Environment 186
- 10.1 Dartmouth Microsystem Improvement Curriculum 221
- 21.1 Langley's Change Concepts 334

Figures

- 1.1 Chain of Effect in Improving Health Care Quality 6
- 1.2 Flowchart of Ken Bladyka's Journey Through the Health System 9
- 1.3 Anatomy of a Clinical Microsystem 11
- 1.4 Research Design for Study of Twenty Clinical Microsystems 15
- 1.5 Success Characteristics of High-Performing Clinical Microsystems 21
- 2.1 Value Compass for the DHMC Intensive Care Nursery 37
- 2.2 Noise Levels in the ICN Intermediate Care Unit Before and After Quiet Pleases 38
- 2.3 ICN Median Cost per Infant Admitted in 1996–1997 Intensive Care Nursery 39
- 2.4 Longitudinal Trends in Number of Days ICN Infants Spend on Mechanical Ventilation 40
- 2.5 A Model for a Microsystem's Developmental Journey 43
- 4.1 A View of the Multilayered Health System 73
- 4.2 The Health Care System as an Inverted Pyramid 75
- 4.3 Bossidy and Charan's Framework for Execution 79
- 4.4 The Baldrige Process of Improvement 80
- 4.5 The Toyota Pyramid 88

- 4.6 Eight Frames for Exploring Microsystems 94
- 5.1 Clinical Microsystem Short Staff Survey 120
- 6.1 High-Level View of a Primary Care Clinical Microsystem 138
- 7.1 Schematic of the Planned (Chronic) Care Model 150
- 7.2 Planning Care and Patient Self-Management: Service and Information Flow in a Microsystem 155
- 7.3 Example of Using a CARE Vital Signs Form 161
- 8.1 Microsystem Patient Safety Scenario 167
- 8.2 Haddon Matrix Analyzing an Auto Accident 169
- 8.3 Completed Safety Matrix for Allison's Scenario 169
- 9.1 Patient Value Compass for a Typical Spine Patient 181
- 9.2 Feed Forward and Feedback in a Microsystem: The Spine Center Design for Information Flow 190
- 9.3 Patient Value Compass: Spine Center Herniated Disk Patients 193
- 9.4 Balanced Scorecard for the Spine Center 195
- 10.1 Evolution in Approaches to Improving Health System Quality: From Projects to Mesosystems to Macrosystems 202
- 10.2 The M3 Matrix: Suggestions for Leadership Actions at Three Levels of a Health System 206
- 10.3 Experiential Learning Model 216
- 11.1 Health Care Viewed from a Systems Perspective 231
- 11.2 Health Care Is an Open System, Capable of Continual Improvement 231
- 11.3 The Embedded Systems of Health Care 234
- 11.4 The Physiology of a Microsystem: A Generic Model 236
- 11.5 A Microsystem's Self-Awareness Journey 238
- 11.6 Improvement Ramp 240
- 12.1 Improvement Ramp: Meeting Skills 244
- 12.2 Sample Meeting Agenda Template 251
- 12.3 Rhythm of Improvement 254
- 12.4 Sample ICCU Meeting Agenda 256
- 13.1 Improvement Ramp: Assessment 259
- 13.2 ICCU Wall Poster for the 5 P's Microsystem Assessment 267
- 13.3 Plastic Surgery Section Access Patterns 269
- 14.1 Improvement Ramp: Model for Improvement 272
- 14.2 Model for Improvement 273
- 14.3 Themes, Aims, Processes, and PDSA Cycles 274
- 14.4 The Complete PDSA Cycle 275
- 14.5 The Back-and-Forth Relationship of PDSA and SDSA 278
- 14.6 The Complete SDSA Cycle 280
- 14.7 The ICCU's PDSA Ramp of Tests 282

- 15.1 Improvement Ramp: Theme 285
- 15.2 Key Themes and Components of Ideal Practices 288
- 16.1 Improvement Ramp: Global Aim 292
- 16.2 Template for Writing a Global Aim Statement 294
- 17.1 Improvement Ramp: Process Mapping 297
- 17.2 Flowchart Symbols 299
- 17.3 High-Level Flowchart of a Medical Office Visit 301
- 17.4 Detailed Flowchart of Treatment Process for Cystic Fibrosis–Related Diabetes (CFRD) 302
- 17.5 Section of Deployment Flowchart for Enrollment in Outpatient Cystic Fibrosis Clinic 304
- 17.6 High-Level Flowchart of ICCU Admission Process 305
- 17.7 High-Level Flowchart for Beginning of Breast Reduction Process 306
- 18.1 Improvement Ramp: Specific Aim 309
- 18.2 Template for Writing a Specific Aim Statement 311
- 19.1 Improvement Ramp: Cause and Effect Diagrams 314
- 19.2 Web of Causation 315
- 19.3 Fishbone Diagram 317
- 19.4 Fishbone Diagram Showing Causes of Lengthy Appointments 317
- 19.5 Fishbone Diagram for ICCU Bed Assignment 319
- 19.6 Fishbone Diagram for Plastic Surgery Appointment Backlog 320
- 20.1 Improvement Ramp: Brainstorming and Multi-Voting 322
- 20.2 Brainstorming and Multi-Voting Example 328
- 21.1 Improvement Ramp: Change Ideas 332
- 21.2 Change Concepts Applied to a Clinical Process 336
- 22.1 Improvement Ramp: Measurement 341
- 22.2 Run Chart Displaying Fasting Blood Sugar Levels 343
- 22.3 Run Chart Displaying No Shows 343
- 22.4 Run Chart Displaying Days to Third Next Available Appointment 344
- 22.5 Worksheet for Collecting Data to Measure a Key Variable 348
- 22.6 Gross Anatomy of a Run Chart 350
- 22.7 Gross Anatomy of a Control Chart 351
- 22.8 Control Chart for Individuals with Diabetes in a General Medicine Practice 351
- 22.9 Normal Distribution, AKA the Bell Curve 352
- 22.10 Control Chart in Relation to Normal Distribution 353
- 22.11 Gross Anatomy of an XmR Chart 355
- 22.12 XmR Chart Showing Fasting Blood Sugar Variance in One Patient over One Month 356
- 22.13 Special Cause Signal: Eight Consecutive Points on Same Side of Center Line 358

- 22.14 Special Cause Signal: Six Consecutive Points Trending in the Same Direction (Upward in This Case) 358
- 22.15 Special Cause Signal: A Point Outside a Control Limit 359
- 23.1 Improvement Ramp: Action Plans and Gantt Charts 363
- 23.2 Example of a Gantt Chart 365
- 23.3 Gantt Chart for the ICCU's Overall Seven-Month Improvement Strategy 367
- 24.1 Playbook Checklist Template 374
- 24.2 Storyboard Display of the ICCU Improvement Journey 377
- 24.3 Plastic Surgery Section Data Wall 378
- A.1 Microsystem Assessment of Data Sources and Data Collection Actions 391
- A.2 Primary Care Practice Profile 393
- A.3 Point of Service Survey: Patient/Family Satisfaction with Primary Care Practice Access 396
- A.4 Primary Care Practice Patient Viewpoint Survey 397
- A.5 Through The Eyes of Your Patients 399
- A.6 Assessment of Care for Chronic Conditions 400
- A.7 Primary Care Staff Satisfaction Survey 402
- A.8 Primary Care Staff Personal Skills Assessment 403
- A.9 Primary Care Staff Activity Survey Sheets 406
- A.10 Primary Care Practice Patient Cycle Time 408
- A.11 Primary Care Practice Core and Supporting Processes 410
- A.12 Primary Care Practice Unplanned Activity Tracking Card 413
- A.13 Primary Care Practice Telephone Tracking Log 415
- A.14 Primary Care Practice Metrics That Matter 418
- A.15 PDSA ↔ SDSA Worksheet 424
- A.16 Huddle Worksheet 430

Exhibits

- 4.1 Kotter's Eight-Step Process for Leading Large-Scale Change 84
- 4.2 Toyota's Fourteen Principles 89
- 4.3 Leading the Mesosystem 101
- 10.1 Letter to the Editor About a Clinical Program with a Local and National Reputation 203
- 10.2 Improving Patient Flow: The Esther Project in Sweden 212

