## Contents

### Part I Complexity in Clinical Care

1. **“Returning to Holism”: An Imperative for the Twenty-First Century** .............................................. 3  
   Joachim P. Sturmberg

2. **Systems Biology: Unravelling Molecular Complexity in Health and Disease** ................................. 21  
   Amrita K. Cheema, Massimo S. Fiandaca, Mark Mapstone, and Howard J. Federoff

3. **Complicated vs. Complex, Disease vs. Illness: Rethinking Diagnosis, Therapy, and Restoring Health** 29  
   S. Lee Hong and Simeon J. Hain

4. **A System for Systems Epidemiology: The Example of Inference from Agent-Based Models** .................. 39  
   Abdulrahman M. El-Sayed

5. **Coping with Complexity and Uncertainty: Insights from Studying Epidemiology in Family Medicine** 51  
   Martin Konitzer, Waltraud Fink, Vilen Lipatov, Gustav Kamenski, and Thorsten Knigge

6. **Anticipation in Complex Systems: Potential Implications for Improving Safety and Quality in Healthcare** 69  
   Thomas O. Staiger

7. **Extreme Variability is Typical Not Normal** ........................................ 79  
   Bruce J. West

8. **Monitoring Variability and Complexity at the Bedside** ................................. 91  
   Andrew J.E. Seely, Kimberley D. Newman, and Christophe Herry
9  Heterogeneity Mediated System Complexity: The Ultimate Challenge for Studying Common and Complex Diseases … 107
Henry H. Heng, Steven D. Horne, Joshua B. Stevens, Batoul Y. Abdallah, Guo Liu, Saroj K. Chowdhury, Steven W. Bremer, Kezhong Zhang, and Christine J. Ye

10  Multimorbidity: Through a Glass Darkly ................................. 121
Carmel M. Martin

11  Viewing Mental Health Through the Lens of Complexity Science …. 133
David A. Katerndahl

12  Quantitatively Demonstrating the Complex Nature of Intimate Partner Violence ................................................. 147
David A. Katerndahl, Sandra Burge, Robert Ferrer, Johanna Becho, and Robert Wood

13  Depression: Not Just a Top–Down Phenomenon ........................ 163
Jeanette M. Bennett and Joachim P. Sturmberg

Part II  Complexity and the Healthcare System Ethics, Organisation Policy, and Politics

14  Ethical Complexities in Systems Healthcare: What Care and for Whom? ......................................................... 177
Kevin T. FitzGerald

15  Systematic Reviews: Beyond Cochrane to Complexity ................. 187
Frances Griffiths and Jane Goudge

16  Agent-Based Modelling of Organizational Performance ............... 197
Russell S. Gonnering and David Logan

17  Leading the Emergency Department as a Complex Adaptive System ................................................................. 205
Paola Camorlinga and Sergio Camorlinga

18  The Value of Systems and Complexity Thinking to Enable Change in Adaptive Healthcare Organisations, Supported by Informatics .............................................................. 217
Beverley S. Ellis

19  Using a Team Approach to Address Avoidable Emergency Department Utilization and Re-hospitalizations as Symptoms of Complexity Through Quality Improvement Methodology .......................................................... 231
Jacqueline Morse, Andrew S. Valeras, Dominic Geffken, Daniel Eubank, A. John Orzano, Douglas Dreffer, Amanda DeCook, and Aimee Burke Valeras
20 Access to Primary Care: A Complex Adaptive Systems Lens on Acuity .............................................................. 239
   Carmel M. Martin and David Emanuel Surate Solaligue

21 “If the Facts Don’t Fit the Theory, Change the Theory”: Implications for Health System Reform ................................. 247
   Joachim P. Sturmberg

Appendices ........................................................................ 261

Index ............................................................................... 281
The Value of Systems and Complexity Sciences for Healthcare
Sturmberg, J.P. (Ed.)
2016, XVIII, 285 p. 89 illus., 18 illus. in color., Hardcover
ISBN: 978-3-319-26219-2