



Understanding and Managing the Complexity of Healthcare (Engineering Systems)

By William B. Rouse, Nicoleta Serban

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Breakthroughs in medical science, innovations in medical technologies, and improvements in clinical practices occur today at an increasingly rapid rate. Yet because of a fragmented healthcare delivery system, many Americans are unable to benefit from these developments. How can we design a system that can provide high-quality, affordable healthcare for everyone? In this book, William Rouse and Nicoleta Serban introduce concepts, principles, models, and methods for understanding, and improving, healthcare delivery. Approaching the topic from the perspectives of engineering and statistics, they argue that understanding healthcare delivery as a complex adaptive system will help us design a system that is more efficient, effective, and equitable.

The authors use multilevel simulation models as a quantitative tool for evaluating alternate ways of organizing healthcare delivery. They employ this approach, for example, in their discussions of affordability, a prevention and wellness program, chronic disease management, and primary care accessibility for children in the Medicaid program. They also consider possible benefits from a range of technologies, including electronic health records and telemedicine; data mining as an alternative to randomized trials; conceptual and analytical methodologies that address the complexity of the healthcare system; and how these principles, models, and methods can enable transformational change.

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Editorial Review

Review

This book is full of ideas, concepts, and examples of how system thinking can be used to improve healthcare delivery and health. It will quickly become a key text in the fields of the science of healthcare delivery and public health.

(Denis A. Cortese, M.D., Foundation Professor, Arizona State University; Emeritus President and CEO, Mayo Clinic)

Rouse and Serban provide a valuable, engineering perspective on the complexity of healthcare. They demonstrate how a systems approach and an array of analytic methods can illuminate problems ranging from increasing equity to managing chronic disease. Anyone interested in improving healthcare has something to gain from this enlightening book.

(Harvey V. Fineberg, M.D., Ph.D., former president, Institute of Medicine)

Rouse and Serban offer an encyclopaedic knowledge of the healthcare system. They are not so naive as to think that they will present solutions to all problems, but their analyses are thoughtful and rigorous. Their descriptions will help people in the field to see it afresh, offering avenues for advocacy and action to conduct experiments in improving the complex adaptive system that characterizes healthcare delivery.

(Paul F. Levy, former president and CEO, Beth Israel Deaconess Medical Center)

About the Author

William B. Rouse is Humphreys Chair in Economics of Engineering in the School of Systems and Enterprises at Stevens Institute of Technology in Hoboken, New Jersey, and Professor Emeritus of Industrial and Systems Engineering at Georgia Institute of Technology. Nicoleta Serban is Associate Professor of Industrial and Systems Engineering at Georgia Institute of Technology.

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