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Johnson, James A., Douglas E. Anderson, and Caren C. Rossow. *Health Systems thinking: a primer*. Burlington, MA: Jones & Bartlett Learning, 2020. 138 pp. ISBN 9781284167146

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"In an era of a dynamic, uncertain, complex, and ambiguous health challenges [sic] at all levels and in every setting, this *Primer* on systems thinking, as it pertains to health, is urgently needed" (p. vii). Thus begins Johnson and colleagues' *Primer* and it certainly appears at a propitious time as we continue to investigate the COVID-19 pandemic. Why propitious? Specifically, the pandemic has revealed how dysfunctional the global healthcare system is and how badly it needs repair. One such means is through systems theory and thinking. Rather than the reductive approach which exemplifies traditional biomedical thinking and results in fragmented healthcare, systems thinking provides a holistic approach to meet the dynamics and complexities requisite to deliver quality and safe healthcare. After a brief preface, which frames the authors' motivation for the *Primer*, they discuss systems thinking and its application to the healthcare system throughout five chapters.

The first chapter is an introduction to systems theory and thinking. The authors initially discuss systems theory and its foundations, most notably Ludwig von Bertalanffy's general systems theory. Rather than uniting the sciences via their reduction to physics, Bertalanffy strove to unify the sciences by integrating them as a dynamic and complex system. The authors then turn to complex adaptive systems (CASs) as the paradigm for understanding the functioning of healthcare systems. They discuss the various components and attributes of CASs, including agents, interconnections, self-organization, emergence, and co-evolution, among others. Next, the authors cite the World Health Organization (WHO) regarding the requirements of systems thinking: "a deeper understanding of the linkages, relationships, interactions, and behaviors among the elements to characterize the entire system" (p. 9). The authors then explore systems thinking by reframing a problem from a perspective of the "whole"

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rather than isolated "silos," especially from the viewpoint of as many relevant stakeholders as possible. From such a holistic perspective, patterns can then be identified, and problems resolved using a host of systems thinking concepts, tools, and methodologies. Conceptually, systems thinking relies on nonlinearity, emergence, self-organization, feedback, and resilience, among other concepts. With respect to tools, systems thinking utilizes behavior-over-time graphs, stock/flow maps and computer simulations, causal loops, inference ladders, and connection circles, to name a few. The authors conclude the chapter with the application of systems thinking to patient safety.

In the second chapter, the authors argue that systems thinking is a useful tool for contemporary healthcare administration and leadership. They write: "Today's health administrators and leaders…must be more adept at seeing 'the forest and the trees' or connections and interdependencies of processes and phenomena within and outside the walls of their organizations" (p. 23). Otherwise, the healthcare system risks becoming fragmented–thereby failing to provide the quality of care that patients require and deserve. Moreover, systems thinking provides administrators and leaders the means to achieve the Institute for Healthcare Improvement's Triple Aim of improving patient care in terms of quality and satisfaction, promoting public health, and reducing the cost of healthcare per capita. They point to the Association of University Programs in Health Administration (AUPHA) and its Body of Knowledge as an example for implementing systems thinking into healthcare administration. Specifically, AUPHA provides resources for engaging and managing the various domains of healthcare, including public health, healthcare law and policy, economics, organizational behavior, and ethics. Finally, the authors identify the following competencies for implementing systems thinking in healthcare administration and leadership: critical and integrative thinking, effective communication, lifelong learning, and mindfulness.

In the third chapter, the authors discuss the need for systems thinking in the clinic. A primary reason for this is medical error, which is responsible for tens of thousands of deaths in hospitals and for tens of millions of dollars in lost revenue annually. Part of the reason for medical error is the complexity of healthcare itself. Thus, after setting the scene for the need of systems thinking in healthcare, the authors consider how systems thinking can be implemented through nurses and physicians as systems-based practice (SBP). "Systems thinking," according to the authors, "allows the registered nurse (RN) to see beyond the bedside and be able to change processes, effectively impacting patient safety by preventing errors, ultimately providing a positive patient experience and outcome" (p. 54). To that end, the authors discuss the pedagogical strategy for educating nurses to embrace and master systems thinking. Central to that strategy is the Quality and Safety Education for Nurses initiative and its core competencies including patient-centered care, teamwork, evidence-based practice, quality improvement, safety, and informatics. Besides clinical practice, systems thinking is imperative for nursing leadership, especially in working with other healthcare professionals.

The authors then turn their attention to systems thinking in medical practice. They acknowledge that around the mid-twentieth century, "medicine began to understand that illness should not be thought of as a fault of certain parts of the body but as a

response or mode of behavior of a living human organism in reaction to forces as it moves in space in time" (p. 61). In other words, illness, whether physical or mental, has roots that are not necessarily organic but emerge from social and environmental factors. Systems thinking allows the clinician to identify these factors responsible for the illness. The authors point out that general/family physicians were the first to incorporate system theory, along with complexity and chaos theory, into the clinic. "The realization," as the authors explain, "was that patients would be better understood belonging to interconnected, overlapping systems that act, react, and influence in nonlinear ways, with an agent's interaction through multicausal feedback loops" (p. 61–62). They acknowledge that, since the turn of the twenty-first century, physicians have been translating complexity and systems science into the clinic as SBP.

"Systems thinking," according to the authors, "is the cornerstone of SBP" (p. 62). And they discuss seven competency domains for SBP based on Susan Guralnick and colleagues' work on SBP [1]. The first involves an ability to function effectively in different clinical settings relevant to the clinician's specialty. The second pertains to the capacity to coordinate patient care with other healthcare fields vis-à-vis the clinician's specialty. The third competency entails the ability to perform appropriate cost and harm-benefit analyses for patient-centered and/or population-based care. The fourth competency relates to advocating for optimal quality patient care through optimizing healthcare systems. The fifth competency is the capability to operate effectively on interprofessional teams to ensure the quality and safety of patient care. The penultimate competency involves the capacity to identify systems error and to implement possible systems solutions. The final competency pertains to advocating for health promotion and to preventing illness in populations. The authors conclude: the "time is now for all healthcare disciplines to embrace a systems thinking approach" (p. 66).

In the penultimate chapter, the authors examine how systems thinking can operate to improve public and global health. They begin with Richard Riegelman's broad definition of public health [2]: "The totality of all evidence-based public and private efforts to preserve and promote health and prevent disease, disability, and death" (p. 77). They acknowledge that public health requires a systems view given the number of elements—such as physical, environmental, economic, and social—that compose such health. The authors then cite the Association of Schools of Public Health's claim that systems thinking is the "core competency" for managing and improving public health. They go on to illustrate the importance of systems thinking in public health management by discussing the core functions and essential services of public health in terms of system modeling. This includes assessments of public health data, policy development, and assurance of quality public health services. System thinking plays a key role in public health management by including a system's complexity, its interrelated parts, and its cyclical processes.

The authors next discuss the role systems thinking plays in public health initiatives. For example, they discuss how systems thinking can help to realize the United States Department of Health and Human Services' *Healthy People Initiatives*. Specifically, such thinking can integrate several factors–biological, environmental, social, and cultural–in order to maximize public health. The authors then turn to how systems thinking can assist in realizing the United Nations Developmental Program's

Sustainable Development Goals, especially the third goal of good health and well-being. Next, they discuss WHO's commitment to systems thinking in its report, *Systems Thinking for Health Systems Strengthening*, which claims that systems thinking represents a "paradigm shift" for achieving robust public health, particularly in terms of addressing chronic diseases plaguing the globe. They then discuss how systems thinking is utilized in the United States Centers for Disease Control and Prevention's Behavior Over Time graphs and Syndemics Prevention Network in addressing both infectious and chronic diseases. Finally, the authors address how systems thinking assists the One Health Initiative, with its emphasis on the intersection between human health, animal health, and ecosystem health.

"Systems thinking," as the authors conclude the fourth chapter, "is empowering to public health practitioners, researchers, policy makers, and most importantly to the people and communities being served" (p. 90). Moreover, it must be noted that systems thinking in public health has important implications for the current response to the COVID-19 pandemic and how health is defined. Health from a systems thinking perspective refers not just to personal health but more importantly to public and even planetary health, as the pandemic has taught us. Health then, can be defined as a person's, population's, or planet's capacities to properly function physically, biologically, psychologically, socially, politically, ecologically, and globally. In other words, a systems thinking approach to health entangles its personal, public, and planetary systems. Illness in any one system can result in illness spreading throughout the system, as is evident from the COVID-19 pandemic. Moreover, this definition of health is transdisciplinary and transgresses disciplinary boundaries to transform health with respect to the person, public, and planet.

In the closing chapter, the authors present ten systems thinking cases that were written by others. As they acknowledge, the "chapter was added to enrich the readers' understanding of systems thinking by seeing it in action through case studies and demonstrating the use of various systems tools and concepts" (p. 99). The cases reflect a diversity of settings – from clinics to public health agencies and of authors ranging from nurses to health administrators. As they point out, the "common denominator" of these cases is systems thinking. Their cases demonstrate a systems approach to healthcare, to behavioral health services, to the use of causal loop diagrams to make better clinical assessments, in identifying delays in dysfunctional processes, in thinking to prevent adolescent pregnancy, in solving challenges to community, to the American Native Health Initiative, in optimizing immunization services, to intervening in neglected tropical diseases, and finally in strengthening health systems. "Systems thinking," as the final case notes, "is both a worldview and a process; it can be used for both the development and understanding of a system and as the approach used to solve a problem" (p. 126). This insight aptly summarizes the importance of system thinking in healthcare.

In sum, the book is certainly required reading not only for healthcare students, especially in a classroom setting, but also for healthcare professionals, particularly in a clinical setting. The uniqueness of the book is that it cuts across the spectrum of healthcare domains from administrators to students to practitioners. Moreover, the book is very practical in terms of providing advice on how to implement systems thinking in the office, classroom, and clinic, containing interviews with experts in

healthcare systems thinking at the end of the first four chapters. Finally, I think the book would have benefited from a chapter on the role of systems thinking for conducting both basic and clinical research. Such research is at the heart of healthcare and its advancement, and inclusion of such a chapter would have provided a broader view on how systems thinking can better integrate all the dimensions of contemporary healthcare.

One final, pertinent comment pertains to Francis Peabody and his well-known article, "The care of the patient" [3]. In the article, Peabody presents the case of Mrs. Brown who comes to the clinic complaining about gastric distress after eating. The attending clinicians perform the latest diagnostic procedures and find no organic cause for her complaint. "There is really nothing the matter with you," intones the intern to the patient, "and fortunately you have not got any of the serious troubles we suspected. We have used all the most modern and scientific methods and we find there is no reason why you should not eat anything you want to" (3, p. 878). Peabody then queries whether the clinical care was "too scientific." His answer is that they were not scientific enough. He goes on to explain that the clinicians simply stopped asking questions. True science keeps asking questions until an answer is found. And to that end, according to Peabody, the clinicians needed to paint an "impressionistic painting of the patient surrounded by his home, his work, his relations, his friends, his joys, sorrow, hopes, and fears" (3, p. 878). Only then can clinicians genuinely care for patients. In a very real sense, Peabody was employing systems theory and thinking by including, as the authors of this *Primer* note, "variables such as family, community, and work" (p. 62) in his clinical practice.

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