Preface

This has been the *1st International Conference on Systems and Complexity Sciences for Healthcare*, an event more than two decades in the making. Having reached this landmark, not possible without the enthusiasm, passion and persistence of those attending and those unable to do so, it is time to reflect on the journey, an inevitably part of celebrating *firsts*.

Each of us has had their own long and often lonely journey to understand and make sense of the many obvious complexities we encounter in daily practice that could not, cannot and never will be accounted for by the prevailing scientific frame based on reductionism. We represent an alternative frame, *holism*, one that describes and studies phenomena based on the dynamics of the interactions between connected entities—the larger the number of entities, the greater is the dimension of its complexity. Collectively we represent all the knowledge entities relating to *health*, the sciences basic to medicine, healthcare delivery, ethics, education, healthcare organisations and health policy. As individual agents in a holistic frame, we are interconnected in a web of relationships whose interactions allow us to learn, to create new knowledge and to find answers to questions that have not yet emerged.

Before reading on reflect for just a moment on your own journeys.

My journey entails two childhood experiences and a crisis in the early years as a medical practitioner. I learnt from my father, a mechanical engineer, the notion of *unintended consequences*; his designs of new machinery to make it possible to build very high precision products, like the spindles for the canal lift at Henrichenburg or the magnets for the first hadron collider at CERN, meant that highly qualified tradesmen would lose their jobs, and with it manufacturing would lose a unique set of valuable but underappreciated skills solely residing in these men, something that weighed heavily on his social conscience. The exposure to Donella Maedows' *Limits to Growth* provided a different way of seeing and thinking that of *interconnected and interdependent systems* and their *nonlinear system dynamics*

behaviour. Unfortunately medical school pushed all of this to the side, only to hound me in my early career in general practice.

At the time of crisis in my early years, two eminent persons came to my rescue. Ian McWhinney helped me to understand my role in healthcare. He emphasised the importance of understanding the contextual dimensions—*sensitivity to initial condition*—and the underlying *feedback* relationships that characterise the patient's illness experience.[1]

> Complex natural systems are "particulars". To make general inferences from studies in these sciences we must have good descriptions of the contexts in which they were conducted. . . . A complex, self-organizing system does not respond to change in a simple unidirectional manner. Reciprocal effects and feedback loops are circular, not linear processes.

Ed Pellegrino opened my eyes to the epistemology of medicine as a discipline whose *essential focus* is on both health and disease.[2]

> . . . the principal conception of medicine, health, and disease are necessarily related to, and acquire their meaning from, the epistemological features of clinical interaction. Both health and disease are essential conceptions of medicine as a discipline. To the objection that health and disease are definientia only of organ systems, one must counter with the large body of evidence that both concepts are evaluative; that is, they include in their meaning the values of patients, societies, and cultures (p. 63).

Whilst Paul Cilliers introduced me to the philosophical foundations of complexity sciences,[3] Dave Snowden provided a pragmatic framework, the Cynefin[4] model, to appreciate the different dimensions of understanding with different levels of connectedness between its agents, their underlying dynamics and the different approaches required to meaningfully engage within and between these differing domains.[5]

Systems and complexity science methodologies have been applied to answer questions encountered in every domain affecting the health professions. The chapters in these *Proceedings* describe the approaches and results of high-profile researchers from across the discipline and should serve as encouragement for especially our younger colleagues to engage with *systems and complexity sciences* in their clinical and research work.

Newcastle, NSW, Australia Joachim P. Sturmberg
April 2015

---

[1] McWhinney I. 'An acquaintance with particulars . . . '. Family Medicine 1989;21(4):296–298.

[2] Pellegrino E and Thomasma D. A Philosophical Basis of Medical Practice. Towards a Philosophy and Ethic of the Healing Professions. New York Oxford: Oxford University Press; 1981.

[3] Cilliers P. Complexity and Postmodernism. Understanding Complex Systems. London: Routledge; 1998.

[4] A Welsh word most closely meaning 'place of belonging'.

[5] Kurtz CF and Snowden DJ. The new dynamics of strategy: Sense-making in a complex and complicated world. IBM Systems Journal. 2003;42(3):462–483.

http://www.springer.com/978-3-319-26219-2

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