EDITORIAL

Systems thinking for strengthening health systems in LMICs: need for a paradigm shift

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Introduction

> 'We need new ways of thinking and of working in order to accommodate the complexity of the challenges in and urgent need for health system innovation and change.' (Herbert and Best 2011)

Health systems are complex. Failing to take this complexity into account will continue to hinder efforts to achieve better and more equitable health outcomes. Understanding and working with complexity requires a paradigm shift from linear, reductionist approaches to dynamic and holistic approaches that appreciate the multifaceted and interconnected relationships among health system components, as well as the views, interests and power of its different actors and stakeholders (de Savigny and Adam 2009; Sheikh *et al*. 2011). Systems thinking helps to re-orient our perspectives by expanding our understanding of the characteristics of complex adaptive systems and identifying how this learning may be applied to system problems and the creation of potential solutions. Long used in other disciplines, systems thinking holds great yet largely untapped potential for health systems, particularly in low- and middle-income countries (LMICs) (Senge 1994; Sterman 2006; Shiell *et al*. 2008; Paina and Peters 2012).

Systems thinking is primarily *a way of thinking* in approaching problems and in designing solutions (Checkland 1985; Cabrera *et al*. 2008). It is an approach to problem solving that appreciates the very nature of complex systems as dynamic, constantly changing, governed by history and by feedback, where the role and influence of stakeholders and context is critical, and where new policies and actions (of different stakeholders) often generate counterintuitive and unpredictable effects, sometimes long after policies have been implemented (Sterman 2006; de Savigny and Adam 2009).

Systems thinking can be applied regardless of the field of enquiry. It is a way to view the world using the general logic underlying the various systems theories (e.g. general systems theory, chaos theory or complexity theory), informed by a wide range of relevant tools and methods (e.g. system dynamics modelling, structured conceptualization, or network analysis), the choice of which will largely depend on the question at hand, the context and available capacity (Best *et al*. 2007).

We interpret systems thinking in the health system context to require us to stand back from a fixation on the individual components (usually the building blocks and their nested sub-systems) and always keep the whole system in mind when designing and evaluating health systems strengthening innovations. This often goes against our classical training in health disciplines (e.g. medicine or epidemiology), which encourages us to understand determinants of health and health system behaviour in reductionist terms rather than to understand system behaviour as driven by relationships among the parts of the system. There is no doubt that classical approaches have made great advances in medicine and public health (e.g. efficacy trials of new medicines or vaccines). The aspired benefits are, however, impeded by the complexity problem, learning failures and implementation challenges (Sterman 2006). This is where systems thinking can complement classical approaches by offering a more holistic perspective to complex problems in complex systems. This requires a radical shift in our approaches and mindsets, combined with mastering different types of skills that are consistent with systems thinking (see Table 1). None of this is unfamiliar to those working in health systems, but what is different in systems thinking is the deliberate, continuous and comprehensive way in which the approach is applied (de Savigny and Adam 2009).

Appreciating the complexity and dynamic nature of health systems has increasingly become common language in publications concerned with identifying solutions to improve the population's health more efficiently and equitably (Sterman 2006; Best *et al*. 2007; Leischow *et al*. 2008; Shiell *et al*. 2008). In 2009, the WHO-based Alliance for Health Policy and Systems

Table 1 Skills of systems thinking

Classical approach	Systems thinking approach
Static thinking	**Dynamic thinking**
Focusing on particular events	Framing a problem in terms of a pattern of behaviour over time
Systems-as-effect thinking	**System-as-cause thinking**
Viewing behaviour generated by a system as driven by external forces	Placing responsibility for a behaviour on internal actors who manage the policies and 'plumbing' of the system
Tree-by-tree thinking	**Forest thinking**
Believing that really knowing something means focusing on the details	Believing that to know something requires understanding the context of relationships
Factors thinking	**Operational thinking**
Listing factors that influence or correlate with some result	Concentrating on causality and understanding how a behaviour is generated
Straight-line thinking	**Loop thinking**
Viewing causality as running in one direction, ignoring (either deliberately or not) the interdependence and interaction between and among the causes	Viewing causality as an on-going process, not a one-time event, with effect feeding back to influence the causes and the causes affecting each other

Source: Modified from Richmond (2000).

Research (HPSR) devoted its third flagship report to this topic, 'Systems Thinking for Health Systems Strengthening' (de Savigny and Adam 2009). This report and other recent publications have catalysed an increased interest and demand for moving this kind of 'thinking' forward, particularly in how it relates to strengthening health systems in LMICs. This has stemmed from the perceived predominance of mostly theoretical, northern driven experiences using systems thinking principles, and the lack of a wider application of these concepts in health systems and in LMICs. This special issue, co-ordinated by the Alliance for HPSR, is one step towards responding to this demand. It does so by striving to make the shift from abstract concepts and theories to actual experiences and examples of how systems thinking can be used to strengthen health systems, particularly in LMIC settings.

This supplement reflects the evolution in our understanding of health systems and how and why public health programmes and policies succeed or fail. It aims to further contribute to this evolution by encouraging consideration and use of systems thinking in strengthening health systems and improving health outcomes more generally. By sharing recent experiences and ideas of ways to institutionalize this kind of thinking, we aim to provoke debate on how we can most effectively incorporate the complex nature of health systems in designing, implementing and evaluating new programmes, policies and strategies.

Content of the supplement

First, the commentary by *Atun* provides an overview of the fundamental concepts of systems thinking within the health systems context, and makes the case for its relevance and prospects for strengthening health systems. It demonstrates through examples the lost opportunities for improving the population's health that could have been mitigated through a deeper and fuller understanding of the dynamic and interconnected nature of health systems and their stakeholders.

Adam et al. then explore the extent to which recent evaluations of health systems strengthening interventions sought to address a broader set of questions related to the system impacts of these interventions, and how these system-wide effects were assessed. This analysis is a follow up to an earlier review that found a very limited number of evaluations considering the system-wide effects of complex health interventions.

The following two papers by *Agyepong et al.* and *de Savigny et al.* present in-depth analyses of the policy processes of two specific interventions: (1) the additional duty hour allowance in Ghana, and (2) the introduction of vouchers for malaria prevention in Ghana and Tanzania. Through a systems thinking lens, these two case studies unveil the elements of success and failure in implementing the two policies throughout the whole policy-making process. They shed light on the role of health systems actors, the importance of contextual factors, the value of anticipating the unintended impact of policies, and systematically evaluating the implementation process and reacting to the system's feedback.

These analyses are followed by a methodological paper by *Peters et al.*, which describes how to examine whether a new intervention or policy may develop or distort the health market, a condition called the develop-distort dilemma (DDD). Through three case studies, the authors apply the DDD tool to show how this can be done to ensure that well-intentioned interventions are more likely to lead to the expected health system outcomes while reducing the undesirable distortions of such efforts.

Thereafter, *Swanson et al.* propose key systems thinking strategies and tools that have the potential for transformational change in health systems, with three overarching themes that span these tools and strategies: collaboration across disciplines, sectors and organizations; on-going, iterative learning; and transformational leadership. This initial conceptual effort of what it takes to reach transformational change provides a starting point for learning and debate around the need for more

systemic and rigorous perspectives for strengthening health systems.

Finally, *Willis et al.* focus on a central element of systems thinking, the role of relationships. They argue that strengthening of health systems in LMIC settings will be more effective if we are able to explicitly and purposefully apply systems thinking concepts to the design, implementation and evaluation of inter-organizational networks. They go on to argue for the importance of developing measures of network performance in ways that promote learning; and to ensure that the feedback processes to operationalize the use of these measures are developed with and for those who will use these data.

Looking forward

While there remains a substantial research agenda to inform and encourage wider applications of systems thinking in LMICs, the findings presented in this special issue not only provide evidence of the added value of systems thinking in strengthening health systems, but also illustrate the range of relevant approaches and strategies that need to be explored or adapted. It shows that conviction alone is not enough—a concerted effort by all stakeholders at all levels is needed to instigate a *paradigm shift* by supporting new initiatives and new ways of working that integrate systems thinking in everyday practice. Only then will health systems make strides in achieving their desired goals, where lessons from past experiences are valued and acted upon.

Now, with systems thinking becoming increasingly a core competency in several MPH and PhD programmes worldwide, the momentum and prospects of integrating systems thinking in research and policy making are promising. However, significant challenges remain in converting these concepts and principles from the abstract to actual practices, and in continuing to share and learn from them.

We hope that the articles in this special issue are one contribution to continuing this momentum. The most recent Call for Papers by the Alliance for HPSR and the International Development Research Centre, Canada (IDRC) is another step towards this, by supporting the development of a new peer-reviewed journal supplement to be published in 2014, with a specific focus on advancing methodologies, knowledge and practices for using systems thinking in understanding and strengthening health systems in LMICs.

Conflict of interest

None declared.

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