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COMPLEXITY AND LESSONS LEARNED FROM THE HEALTH SECTOR FOR COUNTRY SYSTEM STRENGTHENING

BACKGROUND PAPER FOR THE USAID EXPERIENCE SUMMIT ON STRENGTHENING
COUNTRY SYSTEMS

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INSource
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“We will not be successful in our efforts to end deaths from AIDS, malaria, and tuberculosis unless we do more to improve health systems around the world.”

■ President Barack Obama, 2009 (cited in 3, p. 3)

“If systems thinking can turn the spotlight to the leadership and commitment of system stewards, and to new partnerships across the health system – from policy implementers to global funders – then it may very well open the next chapter in strengthening health systems.”

■ Systems Thinking for Health Systems Strengthening (1, p. 86)

I. AIMS AND CONTEXT

Health systems are increasingly becoming viewed as complex and dynamic, requiring new approaches and ways of thinking about them as interconnected components of a whole rather than as discrete elements.(4, 5) This is occurring in both industrialized (6) and non-industrialized countries.(1, 7) Health Systems Strengthening (HSS) has taken a prominent role in U.S. Governmental strategy to provide aid to foreign countries, as a mechanism for leveraging finite resources. It is one of the seven key principles of the Global Health Initiative (GHI) (8) and a primary focus of the upcoming USAID-convened Strengthening Country Systems Experience Summit. From the U.S. Government’s perspective, high-performing health systems contribute to the delivery of cost-effective interventions and technologies for combating disease, and ultimately help countries save lives. Health systems strengthening is a way to add value while achieving priority health outcomes.(3)

In high-income countries, there is a growing recognition that public health problems are complex issues, deeply rooted in society, while health care systems have grown in complexity over the past 30 years.(9) Yet solutions to public health problems continue to be developed as independent, siloed, “one-off” efforts that rarely result in producing their intended large-scale impacts.(10) Systems thinking and systems change approaches are growing in both perceived relevance and perceived necessity for achieving sustained, significant transformation in health care (11) and in other sectors.(12)

Similarly, in the developing world, HSS is not a new concept. The 1993 World Bank report titled *World Development Report 1993: Investing in Health* raised HSS as a possible strategy within the context of the health sector reform movement.(13) Nearly 10 years later, the World Health Organization (WHO) increased the visibility and prominence of HSS with its *World Health Report 2000—Health Systems: Improving Performance*.(14) Due to a growing amount of attention on both system transformation and HSS over the past 10 years, a systems approach is poised to become the prominent lens through which potential solutions to global health challenges are viewed and addressed. However, HSS, and other country strengthening efforts, still require a significant amount of justification and education to generate sufficient buy-in and engagement with relevant stakeholders. It has not yet attained an “orthodoxy” where the social norms of U.S. government agencies require inclusion of a systems approach in all aspects of addressing a particular problem, but a systems approach to addressing public health problems is quickly gaining in visibility, understanding, and support.

While there has been a great deal of attention paid, and resources allocated, to HSS efforts on the part of the U.S. Government, there has been very little evidence generated relating to measurable outcomes.(3, 15) This is in keeping with systems change efforts in high-income countries as well, where results have been less than promised or hoped for in many cases.(12, 16, 17) This background paper is intended to:

- Take what little direct evidence there is for elements that contribute to or hinder successful HSS efforts
- Link USAID experience to what is known about system transformation more generally
- Make recommendations about ways to move forward incorporating systems thinking for HSS
- Apply lessons learned in the areas of HSS to other country system strengthening (CSS) initiatives

II. KEY CONCEPTS AND TERMINOLOGY

System

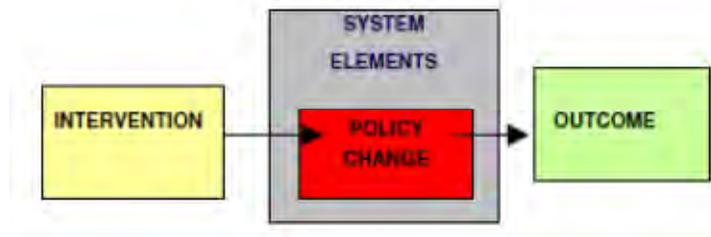
A *system*, as defined by Mandel, “unites elements into a meaningful relationship that acts as a whole.”(18) Consequently, a system can only be understood as an integrated whole, since it is the sum of both its constituent components and the relationships between those components that make it possible to comprehend it in its entirety.(19) For the purposes of this paper, “the system” is “the set of actors, activities, and settings that are directly or indirectly perceived to have influence in or be affected by a given problem situation.”(12, p. 198)

Systems Thinking

Systems thinking, then, approaches problem solving by viewing problems as part of a wider, dynamic system that evolves over time.(1, 5) In other words, it is “a process of understanding how things influence one another within a whole.”(9, p. 8) When applied to complex systems such as those in health, systems thinking can help us understand why interventions designed to address specific discrete problems, without adequately considering interactions with other elements in the system, may not have their intended impact, and in fact, can produce results counter to those that were expected.

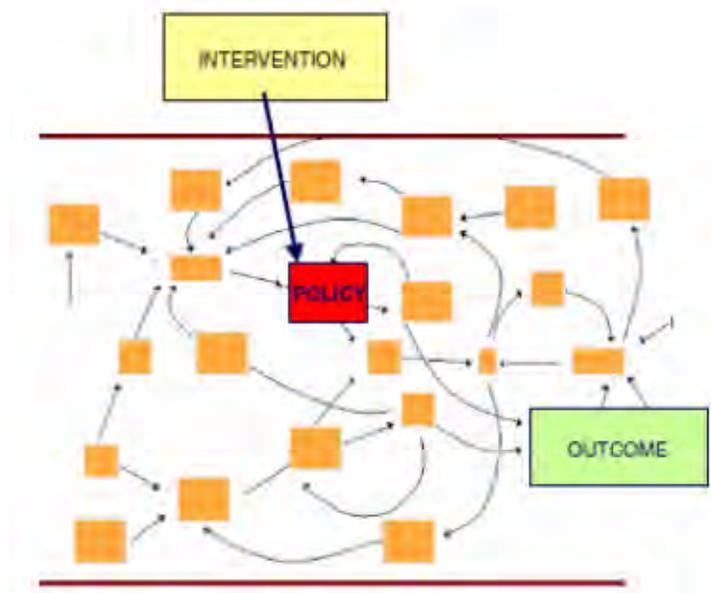
One challenge to systems thinking noted by Foster-Fishman, Nowell, and Yang, is that the mental models that are used to conceptualize the relationship between an intervention and a desired outcome are ill-suited to the task. For the most part, such models continue to assume linear, uni-directional, and sequential links between interventions and outcomes, such as those described by traditional logic models with inputs and outcomes clearly defined and linked (see Figure 1). In practice, however, interventions and outcomes are linked only by several degrees of separation, with intermediary and mediating, influencing factors that can produce feedback loops and iterative impacts over time (see Figure 2).(12) The challenge, then, is to shift from talking about systems, to thinking about systems in ways that take into account their rich variety and complexity.

Figure 1: Common Example of a Systems Change Intervention Model



Credit: [Reproduced from 12 with permission by the authors](#)

Figure 2: A Dynamic Framework for Systems Change



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Two related but distinct ways of thinking about systems are worth noting here: system *levels* and system *dynamic mapping*.

Meadows (20) described 12 leverage points or places to intervene in a complex system, from the paradigm (the highest level and the hardest to change, but the level at which there would be most impact) through the goals and rules of the system (important tools for system change), through system level structures (for example, information flows) to subsystems that give rise to the system as a whole (the lowest level, at which changes can be effective, but whose impact tends to be local). Malhi and colleagues used Meadows' ideas to develop a five-level framework (Table 1) (2) - again with the highest level being most difficult to change, but successful change at this level having the greatest potential impact. When the framework was applied to a number of data sets about actions to address obesity or chronic disease prevention, (2, 21) results showed that the majority of ideas put forward are consistently at the system structure level. The least frequent suggestions for action are regarding feedback loops and delays. Finegood suggests that this may be due to the fact that “we don't

generally consider the importance of feedback loops or their potential value in a self-organizing system like obesity.”(22, p. 22)

Table 1: Five-Level System Framework

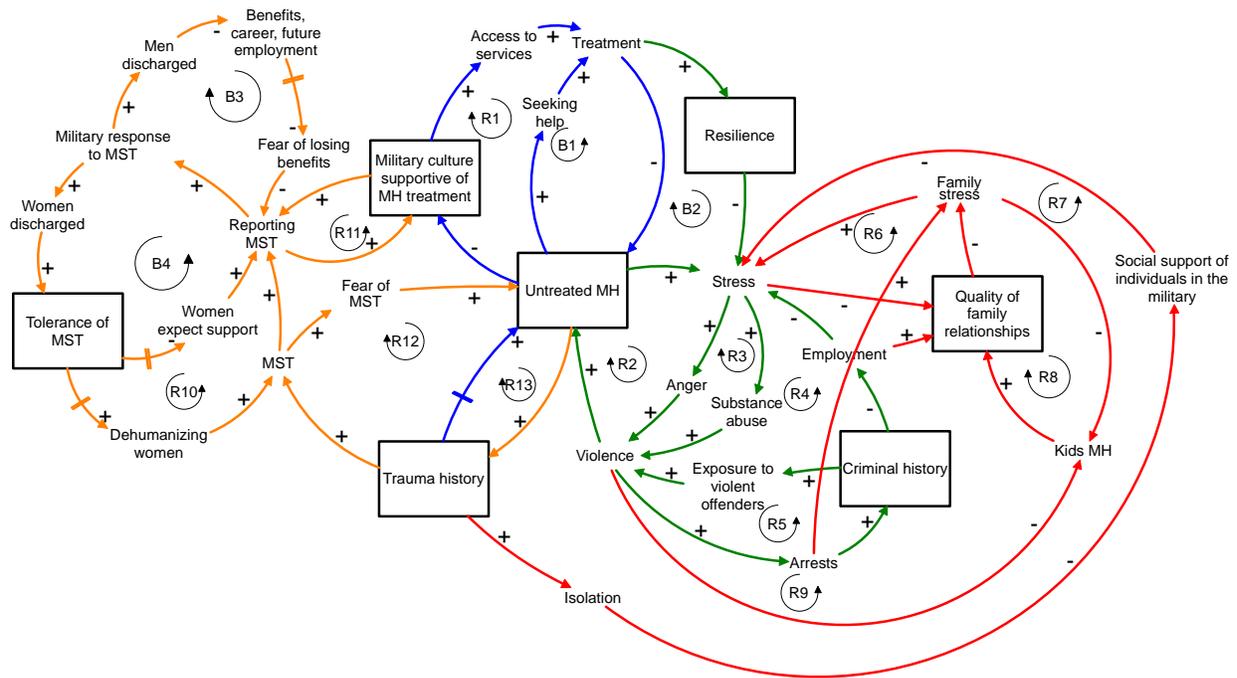
Level of Explanation	
Paradigm	The system’s “mindset,” the deepest held, often unspoken beliefs about the way the system works. Goals, rules, and structures that govern the system arise out of the paradigm. Actions and ideas at this level propose to either shift or reinforce the existing paradigm. Intervention at this level is very difficult.
Goals	Targets that need to be achieved for the paradigm to shift. Actions at this level focus or change the aim of the system.
System structure	Elements that make up the system as a whole, including the subsystems, actors, and interconnections among these elements. The structure conforms to the system’s goals and paradigms. Actions at this level can change the system structure by changing linkages within the system or incorporating new types of structures and relationships.
Feedback and delays	Feedback allows the system to regulate itself by providing information about the outcome of different actions back to the source of the actions. Feedback occurs when actions by one element of the system affect the flows into or out of that same element. Actions at this level attempt to create new, or increase the gain around existing, feedback loops. Adding new feedback loops or changing feedback delays can restructure the system.
Structural elements	The smaller subsystems, actors, and physical elements of the system, connected through feedback loops and information flows. Actions at this level affect specific subsystems, actors, or elements of the system.

Credit: from Malhi et al., 2009

Systems dynamic mapping is a process by which system stakeholders design system dynamic models. These models provide a view of the system structure in which the issue is embedded, identify leverage points within the system, and provide the opportunity to compare and test policy changes to understand what strategies will have the most impact on the structure. Of note, they look very similar to the proposed conceptual framework for systems change proposed by Foster-Fishman et al. and cited in Figure 2. By working with all relevant stakeholders within the system, a complete, and complex, picture can emerge that highlights how relevant pieces of the system interact. This in turn can help explain why inputs directed at one system element or system level might not have the intended impact, why a whole-system approach is needed, and what might be measured to assess impact of a systems approach. Figure 3 is an example of a dynamic map created using Group Model Building (GMB) scripts. The example is from the Veterans, Trauma, and Battering (VTB) project which uses system dynamics and group model building to identify the trends in veteran trauma and battering behavior, and then to design prevention strategies to reduce and eliminate veteran trauma and battering behavior. In partnership with the Foundation for Ecological Security, the GMB process was also used in rural India to apply systems thinking to the problem of declining soil fertility. Those involved have been able to build on these initial models and hold subsequent meetings with other communities using this model as

the object. It continues to be a very important piece of insightful work done with communities. See Hovmand et al. (23) for details on the development and application of scripts for this diagram. Perhaps the biggest strength of system dynamic mapping is its ability to show relationships between system elements, which can point to leverage points for interventions, as well as measurement points for assessment and evaluation.

Figure 3: VTB Project Dynamic Map



Health System

According to the World Health Organization, a *health system* “consists of all organizations, people and actions whose primary intent is to promote, restore or maintain health.” Its goals are “improving health and health equity in ways that are responsive, financially fair, and make the best, or most efficient, use of available resources.” (24, cited in de Savigny and Adams, 2009) The WHO has identified six “building blocks” of health systems: 1) service delivery, 2) health workforce, 3) health information, 4) medical technologies, 5) health financing, and 6) leadership and governance. The central component interacting with all of these building blocks is *people*. (See Figure 4) (24)

Figure 4: WHO Health System Strengthening Building Blocks



Systems can also be nested within other systems. While

the health system is quite broadly defined here, earlier we defined systems as “the set of actors, activities, and settings that are directly or indirectly perceived to have influence in or be affected by a given problem situation.”(12, p. 198) If we are interested in improving vaccination rates within a particular country, the sub-system related to vaccination service delivery, human resources, supplies, information, and financing would be nested within the larger health system of that country. The key point to highlight is that systems thinking does not replace effective strategies to address specific issues, but rather clarifies the context and the ways in which the context needs to be taken into account to appropriately adapt the strategy and increase impacts.

Health System Strengthening

When health systems are viewed as these interrelated and interacting building blocks, *health system strengthening* (HSS) is “any array of initiatives, strategies, or activities that improves one or more of the core functions of the health system [“building blocks”] ... and that contributes to better health, protects citizens from catastrophic financial loss and impoverishment due to illness, and ensures consumer satisfaction, all in an equitable, efficient, and sustainable manner” (adapted from 25) as stated in the WHO Health Systems Strengthening Glossary (http://www.who.int/healthsystems/hss_glossary).¹ Systems-level interventions thus target one or more system building blocks rather than focus on a health problem.(1, p. 33) There is a growing literature on both the positive and negative effects of disease-focused programming on country health systems that is nicely summarized by Spicer and Walsh.(26)

In essence, HSS approaches differ from disease-focused programming in that they provide an awareness of, and emphasis on, the underlying infrastructure that is necessary to effect change that may transcend the sub-system of interest. Disease-focused programming examines a particular issue (e.g., HIV prevention), and identifies specific programmatic interventions that will impact the outcome(s) of interest. A linear, one-directional theoretical framework is generally used to conceptualize how the interventions should work. Little attention is typically paid to social norms, politics, or other mediating factors that may support or detract from the intended outcomes. HSS or systems-change approaches, on the other hand, can still examine a particular issue (e.g., HIV prevention), but rather than starting with a linear logic model, starts by bounding the system by identifying all of the relevant actors, activities, and settings within the given country that are related to HIV prevention. With the assistance of stakeholders who bring multiple perspectives to the table, an understanding is developed of the various system parts that may be potential root causes of the problem at hand. Rather than assuming direct relationships between interventions and outcomes, system interactions are investigated, where reinforcing and balancing interdependencies are mapped out (i.e., elements that support or hinder achievement of the intended outcomes). Finally, levers for change are identified based on the existing system interactions. See Table 2 for a direct comparison of HSS and disease-focused programming.

¹ During the recent Bellagio conference, an alternative definition for HSS was developed: “a complex, iterative, and learning process wherein the interactions between actors, structures, services, and subsystems are optimized over time while striving for health systems goals.” It emphasizes that HSS is an ongoing process, not a single initiative or strategy, and emphasizes the need to optimize interactions. In this sense, it fits with the definition of systems change more fully than the WHO definition does. For these reasons, it should perhaps be considered as complementary to, if not a replacement of, the current WHO HSS glossary definition.

Table 2: Disease-Specific Programming vs. Health System Strengthening

Disease-Specific Programming	Health System Strengthening
Single-issue focus on a particular disease state	Single-issue or systemic infrastructure focus
Linear one-directional framework for change	Dynamic, iterative framework for change
Little attention to reinforcing or detracting elements or feedback loops	Explicit focus on reinforcing or detracting elements and feedback loops
Focus on “visible” elements of the system (e.g., regulatory processes, available resources, power and control structures)	Focus on both “visible” and “deep structure” elements of the system (e.g., attitudes, values, beliefs, expectations, and tacit assumptions that drive behavior)
Interventions selected based on assumed direct causal links to outcomes	Interventions selected based on existing system interactions

In practice, HSS occurs in a multitude of contexts and country environments with varying histories and broader political economies, cultures, demographics, and epidemiologic contexts. As a result, each country decides locally how to organize and strengthen its health system. (3, pp. 5-6) In fact, Shakarishvili and colleagues have identified 11 different health system frameworks that are in use by the global health community. (27)

Country Ownership

Within this context of dynamic, multilevel HSS, *country ownership* is “characterized by government, communities, civil society, and private sector – able to lead, prioritize, implement, and be accountable for a country’s health response.” (28) Key factors that contribute to strengthening country ownership include political leadership and stewardship, institutional and community ownership, capabilities, and mutual accountability, including financing.

III. WHAT DO WE KNOW ABOUT HEALTH SYSTEMS STRENGTHENING?

HSS in high-income contexts has also been framed as System Transformation, whereas in LMICs specific HSS or CSS terminology has more frequently been used. In all of the reports summarized here, regardless of the conceptual framework used, a common theme emerged: lack of empirical evidence for documented improved processes and outcomes. (3, 15) At the same time, several themes have begun to emerge with respect to factors that facilitate and hinder transformative or system strengthening initiatives.

High-Income Countries

Several projects have examined HSS within high-income countries (HICs). First, a Canadian Academy of Health Sciences Report on “Transforming Care for Canadians with Chronic Health Conditions” focused on the question “What will it take to improve outcomes for people with chronic diseases in Canada?” The Canadian Academy of Health Sciences is modeled on the Institute of Medicine in the United States and provides timely, informed, and unbiased assessments of urgent issues affecting the health of Canadians. The project aimed to shift from a silo approach focused on specific diseases to a systems-oriented concept of chronicity that cuts across all chronic diseases.(29)

A second report sought to examine how Canada can learn from other countries in order to prepare more adequately in anticipation of growing demands on health systems. By exploring the progress made within the health systems of seven comparator countries, Snowden and Cohen identified lessons learned that can be applied in Canada and other high-income countries to help meet population health needs more effectively and make progress in health system redesign and transformation.(15) In addition to the lack of empirical evidence, Snowden and Cohen noted that “no single country has managed to completely transform their health system to achieve sustainability.... In every case, health care costs continue to outdistance the growth of each country’s GDP as each one faces growing demands for health services from aging populations and rising rates of chronic illness.” (15, p. 67)

A third report (30) was the result of a request from the Saskatchewan Ministry of Health in Canada for a synthesis project to guide four major policy development and strategy initiatives. The aims of the review were to analyze examples of successful and less successful transformation initiatives, synthesize knowledge about underlying mechanisms, clarify the role of government, and outline options for evaluation.

Simple Rules

Based on these three reports, several “simple rules” for health system transformation and/or strengthening can be drawn. These principles play out differently in different contexts;(30) the distinct cultures and political economies of health systems influence how different countries have approached health system transformation—for example, centralized national or provincial/state health systems vs. social insurance health systems have focused on different leverage points to achieve health system transformation.(15)

- 1) **Begin somewhere**, realizing there is no one right approach for transforming healthcare systems for improved health outcomes; use ready-made pathways for change by enhancing and expanding the aligned work already underway and linking multiple efforts in a concerted direction. (29)
- 2) **Blend designated leadership with distributed leadership**. Both “top-down” and “bottom-up” leadership is critical for effective transformation of health systems.(30)
- 3) **Establish feedback loops**.(30) Use health information effectively and efficiently,(29) and be prepared to adapt based on new data. System dynamic mapping may be useful for identifying where feedback loops exist.(23)
- 4) **Use financial incentives strategically**. The countries that demonstrated a substantial shift towards community-based health services were able to do so as a result of creating financial incentives and new

financial models to drive innovation.(15) System funding and provider remuneration should be aligned with desired health outcomes.(29) Standardized performance measurements and incentives are enablers.(29)

- 5) **Attend to history.** (30) Realize that past transformation efforts will affect current initiatives.
- 6) **Engage physicians and other health care professionals** as necessary (but not sufficient) drivers of change and sources of potential resistance to transformative efforts.(30) Create a culture of lifelong education and learning for healthcare providers.(29)
- 7) **Include patients and families.** (30) Support self-management as part of everyone’s care.(29) The role of consumers in engaging and managing their own health and wellness (consumer engagement in health care services is a very consistent finding in every country in this analysis and was a defining feature of innovation in most countries).(15)
- 8) **Integrate health services** across the continuum of care. Moving towards greater integration of services in the community and strengthening primary health care services that manage chronic illness were the two most compelling innovation trends.(15) There is a movement towards **creative partnerships** (e.g., public, nongovernmental organization, and private collaborations are growing). (29)

Low- and Middle-Income Countries

While the same kind of empirical evidence about “what works, for whom, in which circumstances” is lacking for Low- and Middle-Income Countries (LMICs), there is a large body of work that describes United States Government (USG) goals and current efforts with respect to HSS in LMICs. When examined in the context of USG philosophy and strategic direction, very similar themes or “simple rules” begin to emerge regarding the strategies that USAID and other components of the US Government are attempting to incorporate into their work.

- 1) **Begin somewhere.** Each country creates its own local definition of HSS given its own unique context, history, culture, and resources. “There is no established framework for [strengthening health systems] in developing countries, and no formula to apply or package of interventions to implement.” (1, p. 19)
- 2) **Ensure local country ownership.** True partnerships between donor countries and host countries require a balance of the needs and goals of each organization or government. (1, 3) The quality of the collaboration between donor and recipient countries is key. (31)
- 3) **Build monitoring and evaluation systems.** Use performance data to monitor and enforce accountabilities, and link resources to results.(31) “Many health systems simply lack the capacity to measure or understand their own weaknesses and constraints, which effectively leaves policy-makers without scientifically sound ideas of what they can and should actually strengthen.” (1, p. 19)
- 4) **Engage creatively with health system financing** to improve predictability, flow, and use of sector resources.(1, 31) Utilize both domestic and external funding sources.(31) Engage in whole-government approaches to leverage resources and reduce duplication.(3)
- 5) **“Know the system”** via assessment, evaluation, and engagement of stakeholders.(1, 32) Ensure adequate representation of key stakeholders to provide all relevant perspectives on all parts of the system. System dynamic mapping may be useful in this process.(23)

- 6) **Focus on local infrastructure** that supports system-wide capacity for health workforce development. [\(1\)](#)
- 7) **Build the multi-disciplinary and multi-stakeholder involvement** that is central. The importance of this cannot be over-emphasized. [\(1\)](#)
- 8) **Involve system stakeholder networks** to strengthen integration and harmonization of system, which will improve the quality and functionality of collaborative partnerships. [\(1, 3, 31-33\)](#)

While the simple rules described above for HICs and LMICs are not identical in the language they use to frame each principle, they do map onto the same conceptual areas, as illustrated by Table 3. Table 4 illustrates parallels between USAID initiatives and the simple rules.

IV. DISCUSSION OF SIMILARITIES AND DIFFERENCES

One interesting difference between the approaches observed in HICs and LMICs is the prominence of the system capacity issue. LMICs are putting factors such as capacity, whole-of-government involvement, etc. on the table from the beginning. Conversely, HICs look at the capacity of health systems to conduct various activities (e.g., reporting on outcomes, responding to patient feedback). Yet there is very little attention paid in HICs to issues such as whole-of-government involvement, or increasing capacity for transformation. Instead, the assumption within HICs seems to be that transformation will occur by reformulating and rearranging the system elements that currently exist, rather than fundamentally changing the nature of those elements.

Table 3: Simple Rules for Health System Strengthening

Key Factor	High Income Countries	Low Income Countries
Common Aims	Begin somewhere (29)	Define HSS given local context, history, culture, and resources (1)
Context	Attend to history (30)	Obstacles and opportunities vary from one country to another; consequently, each country decides locally how best to organize and strengthen its health system.(3) “Know the system” via assessment, evaluation, and engagement of stakeholders (1, 32)
Leadership, Governance, and Ownership	Blend designated with distributed leadership (30)	Ensure local country ownership and balanced goals (1)
Financing	Use financial incentives strategically (15, 29)	Engage creatively with health system financing to improve predictability, flow, and use of sector resources (1, 31)
Capacity	Capacity for innovation lacking	Focus on local infrastructure that supports system-wide capacity for health workforce development (1)
Engagement	Engage patients and families (15, 30)	Ensure representation of key stakeholders to provide all relevant perspectives on all parts of the system
Information, Feedback, Evaluation, and Learning	Establish feedback loops.(9, 30) Use health information efficiently and effectively (29)	Use performance data to monitor and enforce accountabilities, and link resources to results (31)
Power	Engage physicians and other health professionals.(30) Create a culture of lifelong education and learning (29)	Donor countries must balance a “hands-off” approach to ensure local country ownership of HSS efforts, and “hands-on” engagement of donor country expertise to fill any gaps in knowledge or skills that exist in the host country.(31) A discussion of in-country (local) power dynamics are missing from the literature
Integration	Integrate health services across the continuum of care.(15) Build creative partnerships (29, 32, 34)	Involve system stakeholder networks to strengthen integration and harmonization of system, which will improve the quality and functionality of collaborative partnerships (1, 3, 31-33)

Table 4: USAID Demonstration of Simple Rules

Key Factor	GHI Strategy	Examples
Common Aims	✓	
Context	✓	
Leadership, Governance, Ownership	Encourage country ownership and invest in country-led plans	<p><u>Honduras</u>: “Smart decentralization” - The USG’s maternal and child health program in Honduras is closely linked with the Feed the Future (FtF) Initiative</p> <p><u>Mozambique</u>: Health and democratic governance (DG) teams will work together to train journalists and civil society on governance issues in the health sector</p> <p><u>Nepal</u>: “Smart decentralization” - USG has been working with Health Facility Management and Operations Committees at sub-health posts, health posts, and primary health care centers to improve and empower communities in managing health services for local people. Progress in establishing partnerships with NGO and private sector service providers</p>
Financing	Increase impact through strategic coordination and integration	<p><u>Albania</u>: Used DG funds for HSS work, and expanded the focus to health</p> <p><u>Mozambique</u>: The multi-donor “Human Resources for Health Working Group,” in collaboration with the Ministry of Health, planned and mapped resources among donors to avoid duplication and improve coordination</p> <p><u>Rwanda</u>: Increased impact through strategic coordination</p> <p><u>Uganda</u>: USAID/Uganda is planning to sign a District Operational Plan with local governments in selected focus districts as part of its new USAID Country Development Cooperation Strategy. This pilot effort will be signed by local government leadership, USAID, and USAID partners working in the districts and, should it prove successful, could be expanded to a whole-of-government approach to ensure that all USG partners and funding are aligned</p>
Power	Focus on women, girls, & gender equity	
Integration	<p>Increase impact through strategic coordination and integration</p> <p>Build sustainability through health systems strengthening</p>	<p><u>Armenia</u>: The diagonal approach supports USAID and the government of Armenia to improve MCH/RH/FP/TB/NCD services for the population</p> <p><u>Bangladesh</u>: Integrated FP-MNCH services = maternal and newborn, infant, and child mortality in the FP-MNCH Area</p> <p><u>Kenya</u>: Building a single, comprehensive, high-performing procurement and management system</p> <p><u>Liberia</u>: Building a single, comprehensive, high-performing procurement and management system</p> <p><u>Nepal</u>: Further increase of high immunization coverage. Universal distribution of Vitamin A and deworming. Significantly improved availability of services in health facilities (especially RH and child health services). Essential package free of charge to all at peripheral health facilities</p>

Key Factor	GHI Strategy	Examples
Capacity	<p>Focus on women, girls, and gender equity</p> <p>Build sustainability through health systems strengthening</p>	<p><u>Ethiopia</u>: New training program in field epidemiology that will create a new generation of field epidemiologists and public health leaders; and a new master's program in M&E and biostatistics</p> <p><i>Medical Education Partnership Initiative (MEPI)</i> supports the development, expansion, and enhancement of models of medical education</p> <p><i>Nursing Education Partnership Initiative (NEPI)</i> aims to address the critical health care worker shortage in sub-Saharan Africa by strengthening the quality and capacity of nurses and midwives</p> <p><u>Honduras</u>: Build local capacity for decision making and management</p> <p><u>Kenya</u>: <i>Medical Education Partnership Initiative (MEPI)</i> supports the development, expansion, and enhancement of models of medical education.</p> <p><i>Nursing Education Partnership Initiative (NEPI)</i> aims to address the critical health care worker shortage in sub-Saharan Africa by strengthening the quality and capacity of nurses and midwives</p> <p><u>Nepal</u>: Build local capacity for decision making and management</p> <p><u>Tanzania</u>: <i>Education Partnership Initiative (MEPI)</i> supports the development, expansion, and enhancement of models of medical education</p> <p><i>Nursing Education Partnership Initiative (NEPI)</i> aims to address the critical health care worker shortage in sub-Saharan Africa by strengthening the quality and capacity of nurses and midwives</p>
Engagement	<p>Strengthen and leverage key multilateral organizations, global health partnerships and private sector engagement</p>	<p><u>Honduras</u>: "Smart decentralization" The USG's maternal and child health program in Honduras is closely linked with the Feed the Future (FtF) Initiative</p> <p><u>USG? USAID?</u>: Successful partnering with multilaterals around HSS, such as WHO, the World Bank, UNICEF, and UNAIDS</p>
Information, Feedback, Evaluation, Learning	<p>*Promote learning and accountability through monitoring and evaluation</p> <p>Accelerate results through research and innovation</p>	<p><u>Bangladesh</u>: Demographic Surveillance System since mid-1960s</p> <p><u>Ethiopia</u>: New country-owned Health Management Information System</p> <p><u>Georgia</u>: Assisting the MoLHSA in creating a national health management information system *Development of the NHA Production Tool software to measure financial resource flows in the health sector</p> <p><u>Kenya</u>: HHS/CDC established first Human Resource Information System (HRIS) in sub-Saharan Africa</p> <p><u>Nepal</u>: Strengthened, reliable health information system. Community scorecards are being piloted to measure satisfaction with local health services, with the results being channeled to the District Public Health Office as well as to the central level Ministry of Health and Population</p>

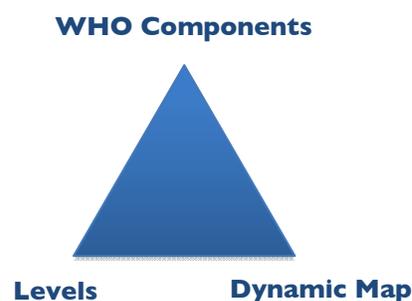
While this may truly be a matter of differences in levels of capacity, it is worth considering that HICs might have something to learn from the approaches and perspectives taken by LMICs, particularly with respect to the issue of capacity.

While systems thinking is gaining traction and interest within HICs, it is perhaps even more critical in LMICs because their system infrastructure and relationships are not as robust. Therefore, there is the potential for encountering more pitfalls as interventions are planned and implemented. There also is a greater need for synergies with existing infrastructure in other parts of the system to leverage what resources there are (human, system, etc.).⁽¹⁾ This, however, points to great opportunities for HICs to learn from the work being done in LMICs, and to apply the same kind of critical lens to their own capacities for HSS/system transformation.

Perhaps most striking is the relative lack of discussion of power issues in the LMIC documents reviewed. In HICs, the tensions between professional associations and governments in particular tend to dominate transformation dynamics. Most of the power issues discussed in the LMIC literature relate to tensions between donor countries and host countries, and balancing the need for expertise and rigor with the need for in-country ownership and engagement of HSS efforts.⁽³¹⁾ A better understanding of how existing power issues internal to LMICs interact with CSS strategy will be key to success.

This paper now has introduced three different systems thinking perspectives on strengthening: the WHO six *component* building block framework (1), the Meadows/Malhi framework on *levels* of intervention (2), and the set of eight *dynamic* simple rules derived from the literature on health systems strengthening in high- versus low- and middle-income countries. The three perspectives are complementary, as shown in Figure 5. Using the WHO components, we can identify one or more specific building blocks to address in any HSS work. It is important to recognize that a systems approach will likely take multiple blocks into account, depending on the particular issue at hand. The intervention itself can be strategically targeted at one or more *levels* of the system. And system dynamic maps can help us understand how all of the relevant components interact at any given system level, giving us a starting point for applying the dynamic simple rules. The dynamic maps will look different in different contexts, and will shift within the same context depending on which level the intervention is trying to affect, thus leading to varying applications of the simple rules.

Figure 5: Systems Thinking Perspectives



V. USAID APPROACH TO HSS

To date, USAID has invested a great deal of time and resources (both human and financial) in developing an approach to HSS that prioritizes a systems approach. Disease-focused programming is no longer the preferred strategy for addressing health-related problems, both due to a growing awareness of the complexities of health systems, and a shrinking pool of resources from which to draw to address such problems. Such efforts have been successful from the perspective of shifting the focus of applications for funding, as well as program proposals so they include references to each (or a majority) of the six WHO building blocks. However, an

analysis of the actions needed to address change at one or more system levels seem to be missing from USAID HSS work. And there seems to be a notable lack of any planning tools that resemble systems dynamic mapping, despite analyses and conclusions drawn by evaluators that call for a systems approach to planning and implementation.(35) In addition, assessments of HSS efforts are still primarily outcomes-based.(36)

One of the significant challenges that USAID will face in its efforts to incorporate a systems approach to health system strengthening is how to incorporate the other two foundation points of the pyramid shown in Figure 5: both an awareness and application of system levels, as well as utilizing tools such as concept mapping and systems dynamic mapping in project planning and design, implementation, and evaluation. Integration of both system levels and system dynamics will allow USAID to answer several questions that to this point appear to have gone unanswered: How do the various system components interact? How can USAID leverage efforts funded by certain health system sectors (e.g., HIV prevention) that were designed to address national data surveillance tools to improve data surveillance in other areas (e.g., for tuberculosis or vaccination rates)? How can duplication of effort be avoided? What impacts will the sub-system strengthening have on the larger health system, and how might those impacts have cascading effects on other sub-systems? To fully adopt a systems approach, it will be critical for USAID and other U.S. government agencies and initiatives to integrate an awareness of the different levels of systems, and how the various components interact through system dynamic mapping. This can also assist with evaluation efforts, as discussed below.

A final area for consideration is USAID's capacity to coordinate HSS efforts across entire health systems. USAID's current whole-government focus ties in well here, for it will be critical to coordinate efforts to improve infrastructure for each of the building blocks as they relate to supporting specific HSS efforts with different content foci (e.g., child welfare, HIV prevention, improved vaccination). For example, if improving health human service training infrastructure is identified as a need for child welfare, HIV, and vaccination efforts, then it is important that there not be three disconnected attempts to improve or reform the health care human resource educational and training system.

VI. WHAT ARE THE CRITICAL ISSUES MOVING FORWARD?

As Table 4 illustrates, the GHI Health Systems Strengthening framework aligns very well with the evidence-informed simple rules for health systems strengthening. The only major gap is a lack of attention to power dynamics within LMICs. But as the discussion above highlights, there are additional components of systems thinking and approaches to strengthening health systems that USAID has not yet seemed to adopt, as shown in Figure 5. To address these gaps, there are several critical issues moving forward with in-country system strengthening initiatives.

First and foremost, a broad and inclusive dialogue needs to take place, with all relevant stakeholders involved. Key decision-makers, defined as those who have the power to make critical changes, need to be at the table.(1, 31) Compelling and common goals are critical, the absence of which leads to a lack of effective or genuine partnerships.(1, p. 82, 34) Specific, prioritized, and ambitious-but-feasible targets are necessary.(31) While the need for such a process may seem highly intuitive, the details with respect to how such a process can be facilitated and maintained over time are elusive.

Broad and Inclusive Dialogue

Ideally, CSS efforts could be shepherded by “policy-makers and leaders responsible for providing strategic direction to the system and its concerned stakeholders,”(1, p. 76) what the WHO calls “health system stewards.”(14) Chreim and colleagues promote a similar concept in the guise of “change agents” – one or more people completely focused on a transformation project in order to successfully achieve transformation.(37) While these stewards typically are from government, they may also include other stakeholders from both civil society and the private sector. In essence, system stewards are “information providers and change agents, linking the general public, consumer groups, civic society, the research community, professional organizations and the government in improving health of the people in a participatory way.”(14) Health system stewards thus could and should be the primary drivers and managers of CSS efforts, attending to the management of relationships between donors and national policy-makers, developing health system networks, designing and implementing monitoring and evaluation tools, and building capacity at the country level.

Managing Relationships Between Donors and National Policy-Makers

Equally important to the broad and inclusive dialogue at the country level are the relationships between HIC donors and LMIC policy-makers. Currently, there is a tension between the short-term goals of donors and longer-term goals of national policy-makers (and potentially of system stewards themselves).(1, p. 75) A critical need is to align the policies, priorities, and perspectives between the stakeholders at any given CSS table.(3, 31) Currently, siloed or disease-specific agencies and organizations within recipient countries make it more difficult to take a whole-system perspective, even with funding existing specifically for health systems strengthening since 2007.(1, p. 77) One role of system stewards could be to manage and coordinate partnerships and expectations among system stakeholders.(1, 34)

Developing Health System Networks

In addition, system stewards should focus on development and evaluation of health system networks. Similar to the concept of increasing “personal contact” within systems to improve knowledge translation,(1, p. 84) Willis and colleagues contend that “network-centric approaches that foster integration, innovation and local creativity hold much promise for strengthening health systems and health policy development in low- and middle-income countries (LMICs).” (32, p. iv62)

Designing and Implementing Monitoring and Evaluation Tools

One critical gap acknowledged in the HSS literature in both HICs and LMICs is monitoring and evaluation. While there has been a significant amount of thinking and planning around measuring the impact of HSS efforts (see “Select Relevant Indicators” on p. 21 below), much of the work is still in pilot phases. According to Meadows, two of the highest leverage points in systems are governance and information: “Missing information flows are often identified as the most common cause of system malfunction,(20) and incapable or overstretched governance structures can contribute to less than optimal performance and cohesion among the building blocks and for the system as a whole.” (1, p. 47)

Similarly, Willis and colleagues note that monitoring and evaluation tools for networks are underutilized and in need of development. According to them, “critical challenges exist in developing measurement tools and feedback mechanisms that not only provide opportunities for learning, but that also build accountability into the system.” (32, p. iv65)

Systems thinking is needed with respect to intervention design and evaluation (and evaluation results that are used to alter and redesign interventions). (1) There must be a clear focus on monitoring and evaluation systems from the beginning, with a balanced focus on both implementation and results. Provision of incentives may help link resources to results. (31)

Building Capacity at the Country Level

The literature is clear that human resource capacity needs to be developed at the country level to ensure effective management of local political economy issues, and to ensure the ability to apply a systems analytic perspective. (1) Indeed, the Independent Evaluation Group review concluded that attention to human resource capacity building is critical *before* other changes are initiated. (31) The health workforce is one of the critical building blocks in the WHO system framework, and yet the gap between current capacity and that needed for effective strengthening is frequently underestimated in terms of its importance and priority in HSS work. The quality and availability of national management capacity and leadership is critical to the success of HSS efforts, yet turnover of key staff has often undermined government stewardship capacity. (31, p. 43) While health system stewards can help facilitate work on country capacity in health workforce development and other areas, the capacity of system stewards themselves needs to be built for systems thinking. (1, p. 92) It should be noted that in cases where country expertise is not yet fully formed, donor expertise should be leveraged, although a balance should be reached between the extremes of micromanagement and being too lax. (31)

While the role of a health system steward could, in theory, encompass all of these tasks, such a job description is not concrete enough to be actionable. It is unclear in any given situation who the system stewards are, if they exist at all. Where do they come from? How are they identified? What do they look like/what qualifications or training do they have? What roles do they have? Is there more than one in any system or sub-system? Do they need to work collaboratively? Is there any evidence that the work of system stewards can overcome existing political barriers or other forms of resistance to HSS efforts?

VII. HOW DO WE LEARN AS WE GO?

While evaluation of CSS efforts is noted as a priority for USAID and other USG agencies, a key gap identified in both HICs and LMICs is the lack of attendance to feedback loops, monitoring, and evaluation activities. (1, 3, 31, 32, 34) Notably, the WHO report on *Systems Thinking for Health Systems Strengthening* highlights the design of HSS evaluations as the counterpoint to developing and implementing the HSS interventions themselves. (1, see especially p. 54) In addition, the World Bank’s Independent Evaluation Group included monitoring and evaluation systems on the list of four criteria critical for the success of Sector-Wide Approaches (SWAs) in the health sector. (31) Finally, measuring health system performance is a primary area of “Health Systems 20/20,” the mechanism by which USAID has complemented its disease- and service-

focused investments with technical assistance, capacity building, and global leadership in financing, governance, and operations (www.healthsystems2020.org). Based on the literature reviewed for this report, as well as our own knowledge and experiences, we present here recommendations for processes, methods, and indicators that may be useful to measure the success of HSS efforts.

Engage All Relevant Stakeholders

Following the recommendations of de Savigny and Adams,⁽¹⁾ HSS interventions (and CSS efforts more broadly) should be designed by convening a diverse group of stakeholders to brainstorm and develop a conceptual pathway mapping the intervention's effects on each sub-system (perhaps using concept mapping; [see 38 for more details](#)). Incorporating the knowledge and expertise of stakeholders from all of the relevant sub-systems within the health system, the intervention can be designed and re-designed to maximize intended impacts, leverage scarce resources, avoid duplication of effort, and minimize potential negative consequences. Similarly, any proposed program must be reviewed and assessed by system stakeholders prior to implementation.⁽³¹⁾

Using a parallel process, the evaluation of the intervention should be designed with the engagement of the same relevant stakeholders. All system stakeholders should be present for this process, including civic society and the private sector.⁽³¹⁾ Further, the initial evaluation results should be fed back into the ongoing adjustments of the intervention being evaluated, with resultant modifications of the intervention being made accordingly.⁽³⁰⁾

Use an Evaluation Framework

The use of an evaluation framework can help stakeholders focus on the highest priority goals and measures in evaluation work. The framework proposed by Kruk and Freedman ⁽³⁹⁾ suggests that “well-performing health systems are effective, equitable, and efficient.” As such, this framework has been useful to USAID and other USG agencies “because it is consistent with evaluating the effects of HSS within a categorical funding environment.” ^(3, p. 35)

Select Relevant Indicators

For the evaluation, it is important to determine or select indicators to track, and identify the best methods and design to track those indicators.^(1, 30) It will be important to identify indicators that will highlight negative impacts of the proposed intervention, so course corrections can be made early on in the implementation process.⁽³⁰⁾ Figure 6 shows examples of potential measures for improved performance in the six WHO-identified core functions:

Figure 6: Potential Measures for Improved Performance

- *Financing*: improved patterns of public financing and increases in financial protection (e.g., reduction in out-of-pocket payments as a share of total health spending)
- *Service delivery*: improvements in the scope, coverage and quality of cost-effective services with high impact (e.g., number of health facilities with fully functioning basic emergency obstetric and neonatal care services)
- *Health workforce*: density, composition and quality of the health workforce and their retention (e.g., increase in the number of health workers per 1,000 population)
- *Information*: extent to which information is made available and used effectively by all health system participants in planning and decision making (e.g., improvement in health management information system (HMIS) performance as measured by an HMIS index)
- *Medicines, vaccines and technology*: availability, quality and cost-efficient procurement, distribution and use of appropriate medicines, vaccines and technologies
- *Governance*: evidence of increasing transparency, accountability, and responsiveness to citizen preferences (e.g., general government expenditure on health as a percentage of total government expenditure [%]; adoption of key policies such as authorization of midwives to administer a core set of life-saving interventions; programmatic and budget health data regularly published in the public domain)

Credit: [from 3, p. 36](#)

In addition, there are several sources for indicators to measure changes in the performance of health systems:

- *Monitoring the building blocks of health systems: A handbook of indicators and their measurement strategies*; [\(40\)](#)
- *Handbook on Monitoring and Evaluation of Human Resources for Health with special applications for low- and middle-income countries*; [\(41\)](#)
- *Monitoring and evaluation toolkit: HIV, TB and Malaria and HSS*; [\(42\)](#)
- *Measuring the impact of health systems strengthening: a review of the literature*; [\(43\)](#) and
- WHO *Toolkit on monitoring health systems strengthening*. [\(cited in 43\)](#)

A critical issue is that available methods and measures often do not adequately capture the complexity and dynamic nature of system change. Significant investment in careful analysis of evaluation needs, and the development of new tools and methods as required, is essential to the continuing success of HSS and other CSS initiatives. The importance of, and challenges associated with, moving from systems thinking to systems evaluation cannot be overstated. Despite the investment in systems thinking for health and other sectors by the U.S. Government, evaluation strategies continue to persist using linear non-systemic thinking. For example, the HSS Health Outcomes Theoretical Framework presents the conceptual framework of a health system not in terms of a systems dynamic map, but as a logic model containing inputs and outputs with little or no indication of the relationships between and among the different inputs and outputs. And while there are multiple measures and indicators being tracked related to HSS (e.g., Indicators from GHI Strategies document), it will be important both to monitor the use of these indicators over time and to re-assess their use from the perspective of system dynamics. A system dynamics map can show how different influencing factors are related, and how they can have complementary or conflicting influences on certain outcomes of

interest. Such a map thus can highlight which indicators might be more important to track over time than others, which might be more feasible to track over time as “proxy” measures for outcomes of interest, and which might have seemed unrelated but when viewed from a systems perspective take on a more central role. System dynamic maps also make it possible to identify ways to measure concepts such as emergence and capacity, which traditional evaluation methods have not been very good at doing to date. Finally, system evaluation pairs well with iterative evaluation processes and mixed methods, which are both necessary to fully evaluate the impact of HSS work.

Obtain Funding for the Evaluation

In an ideal situation, there would be sufficient resources to fully fund an intervention and its evaluation. However, in some cases, strategic choices must be made due to insufficient funding for evaluation work. Based on recommendations made by the WHO, IEG, and others, as well as our own experience, longer-term outcome measures may be of most interest to program funders. However, indicators that can help identify short-term intervention alterations to keep an intervention on course should likely be prioritized. In any case, discussions and choices should be made in as transparent a manner possible, involving all relevant stakeholder groups, so that the implications of prioritizing some measures over others will be fully understood.

Create and Strengthen Monitoring and Evaluation Infrastructure

In both HICs and LMICs, there is an enormous priority placed on monitoring and evaluation. In USAID HSS missions in LMICs, this priority has often placed excessive burden on front-line health systems workers. In some instances, parallel data collection and reporting mechanisms have been developed that are duplicative of in-country systems for data collection. This is a barrier to CSS progress and poses a significant challenge to CSS efforts and sustainability.[\(1, 3\)](#)

While USAID priorities understandably emphasize quality and timely data for use in monitoring and evaluation efforts, it is strongly recommended that future HSS and other CSS initiatives use or strengthen country capacity and country systems for data collection and reporting. This in turn can support progress in the areas of country ownership, human resource capacity for monitoring and evaluation activities, and engagement.

Create Learning Communities

For all aspects of learning as we move forward, we recommend the formation and funding of learning communities. Similar to the task force on systems thinking for health systems and the Systems Thinking Network or communities of practice,[\(1, p. 92\)](#) learning communities consist of practitioners engaged in health systems strengthening work in similar contexts who can discuss what they are learning in practice, and share those learnings with their counterparts. This type of activity supports progress not only in evaluation and learning, but also country ownership, engagement, human resource capacity, power, and integration. Learning communities have been successful in HICs, and can serve to leverage scarce resources in LMICs where funding might not exist for measurement development or other similar activities.

VIII. APPLYING WHAT WE HAVE LEARNED FROM HSS TO OTHER CSS EFFORTS

Because HSS efforts have enjoyed a rich and varied history, HSS can serve as a model for other CSS interventions. At a minimum, the lessons learned from HSS initiatives can be applied as a starting point for other types of CSS activities. The following is a work in progress, showing how some of the key lessons from HSS can be applied to CSS work in other areas. This list should be adapted and tailored for each unique constellation of history, politics, environment, resource allocation, needs, and goals.

- Begin with the simple rules for LMICs. Start the conversation here with system stakeholders, and modify the rules as needed to fit other country systems.
- Avoiding duplicative, parallel systems (especially with respect to data collection, monitoring, and evaluation). Instead, work to build, maintain, and strengthen existing “native” infrastructure for such work, thus supporting overall country system strengthening rather than providing a short-term workaround for a given CSS project.
- Coordinate whole-country approaches to HSS efforts. Disease-focused programming may be replaced by “building-block-focused programming” which will not provide many advantages in the end if application of system levels and system dynamics does not also occur.
- Focus on human resource development infrastructure (educational system, apprenticeships, etc.) first. Without the appropriate level of training and development at the human resources level, country systems strengthening is not likely to be sustainable.
- Prioritize moving to systems-thinking-based evaluation strategies, using tools such as concept mapping and systems dynamics mapping. Such tools can provide insight not only into leverage points for interventions, but also feasible measurement strategies and metrics to assess the impact of a systems strengthening approach.

REFERENCES

1. de Savigny D, Adams T, editors. *Systems thinking for health systems strengthening*. Geneva: World Health Organization; 2009.
2. Malhi L, Karanfil O, Merth T, Acheson M, Palmer A, Finegood D. "Places to intervene to make complex food systems more healthy, green, fair and affordable." *Journal of Hunger and Environmental Nutrition*. 2009;4(3&4):466-76.
3. Global Health Initiative. "GHI Principle Paper: Health systems strengthening." Washington, DC: U.S. Government, 2012.
4. Best A, Clark P, Leischow S, Trochim W, editors. *Transforming tobacco control through systems thinking: Integrating research and practice to improve outcomes*. Bethesda, MD: U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute; 2007.
5. Sterman JD. "Learning from evidence in a complex world." *American Journal of Public Health*. 2006;96(3):505-14. Epub 2006/02/02.
6. Trochim WM, Cabrera DA, Milstein B, Gallagher RS, Leischow SJ. "Practical challenges of systems thinking and modeling in public health." *American Journal of Public Health*. 2006;96(3):538-46. Epub 2006/02/02.
7. Roberts M, Hsiao W, Berman P, Reich M. *Getting health reform right: A guide to improving performance and equity*. New York, NY: Oxford University Press; 2008.
8. Global Health Initiative. "U.S. Global Health Initiative Principles." U.S. Government interagency website managed by the U.S. Global Health Initiative and the Bureau of Public Affairs, U.S. State Department; 2012 [cited 2012 November 12]; Available from: <http://www.ghi.gov/about/principles/>.
9. Holmes B, Finegood D, Riley B, Best A. "Systems thinking in dissemination and implementation research." In: Brownson R, Colditz G, Proctor E, editors. *Dissemination and implementation research in health: Translating science to practice*. Oxford, England: Oxford University Press; 2012.
10. Bar-Yam Y. *Making Things Work: Solving complex problems in a complex world*. United States of America: NECSI - Knowledge Press; 2004.
11. Best A, Holmes B. "Systems thinking, knowledge and action: Towards better models and methods." *Evidence and Policy*. 2010;6(2):145-59.
12. Foster-Fishman PG, Nowell B, Yang H. "Putting the system back into systems change: a framework for understanding and changing organizational and community systems." *American Journal of Community Psychology*. 2007;39(3-4):197-215. Epub 2007/05/19.

13. World Bank. *World Development Report 1993: Investing in health*. Washington, DC: World Bank, 1993.
14. World Health Organization. *The World Health Report 2000: Health systems: Improving performance*. Geneva: World Health Organization, 2000.
15. Snowdon A, Cohen J. *Strengthening health systems through innovation: Lessons learned*. London, Ontario, Canada: University of Western Ontario International Centre for Health Innovation, 2011.
16. Amado A, McBride M. "Realizing individual, organizational, and systems change: Lessons learned in 15 years of training about person-centered planning and principles." In: Holdburn S, Vietze P, editors. *Person-centered planning: Research, practice, and future directions*. Baltimore, MD: Brookes Publishing; 2002. p. 361-77.
17. King-Sears M. "Institutionalizing peer-mediated instruction and intervention in schools: Beyond "train and hope"." *Remedial and Special Education*. 2001;22(2):89-101.
18. Mandel T, editor. "Is there a general system?" In: *Conference Proceedings*. International Society for the Systems Sciences; 2000.
19. Cilliers P. *Complexity and postmodernism : understanding complex systems*. London ; New York: Routledge; 1998. x, 156 p. p.
20. Meadows D. *Thinking in systems: A primer*. White River Junction, VT: The Sustainability Institute, 2008.
21. Johnston L, Matteson C, Finegood D. "Places to intervene in the complex systems giving rise to childhood obesity - stratification of recommendations to government with an intervention level framework." International Congress on Obesity Stockholm, Sweden 2010.
22. Finegood D. "The complex systems science of obesity." In: Cawley J, editor. *The Social Science of Obesity*. Oxford, England: Oxford University Press; 2011.
23. Hovmand P, Andersen D, Rouwette E, Richardson G, Rux K, Calhoun A. "Group model-building 'scripts' as a collaborative planning tool." *Systems Research and Behavioral Science*. 2012;29:179-93.
24. World Health Organization. "Everybody's business: Strengthening health systems to improve health outcomes - WHO's Framework for Action." Geneva: World Health Organization, 2007.
25. Islam M, editor. "Health systems assessment approach: A how-to manual," submitted to the U.S. Agency for International Development in collaboration with Health Systems 20/20, Partners for Health Reformplus, Quality Assurance Project, and Rational Pharmaceutical Management Plus; 2007.
26. Spicer N, Walsh A. "10 best resources on ... the current effects of global health initiatives on country health systems." *Health Policy and Planning*. 2012;27(3):265-9. Epub 2011/05/10.

27. Shakarishvili G, Atun R, Berman P, Hsiao W, Burgess C, Lansang MA. "Converging health systems frameworks: towards a concepts-to-action roadmap for health systems strengthening in low and middle-income countries." *Global Health Governance*. 2010;3(2):1-17.
28. Global Health Initiative. "U.S. Government Interagency Paper on Country Ownership." Washington, DC: U.S. Government, 2012.
29. Canadian Academy of Health Sciences. *Transforming care for Canadians with chronic health conditions: Put people first, expect the best, manage for results*. Ottawa, Ontario, Canada: Canadian Academy of Health Sciences, 2010.
30. Best A, Greenhalgh T, Lewis S, Saul JE, Carroll S, Bitz J. "Large-system transformation in health care: a realist review." *The Milbank Quarterly*. 2012;90(3):421-56. Epub 2012/09/19.
31. Independent Evaluation Group. "Do health sector-wide approaches achieve results: Emerging evidence and lessons from six countries" (IEG Working Paper 2009/4). Washington, DC: World Bank, 2009.
32. Willis CD, Riley BL, Best A, Ongolo-Zogo P. "Strengthening health systems through networks: the need for measurement and feedback." *Health Policy and Planning*. 2012;27 Suppl 4:iv62-iv6. Epub 2012/10/04.
33. Swanson RC, Cattaneo A, Bradley E, Chunharas S, Atun R, Abbas KM, et al. "Rethinking health systems strengthening: key systems thinking tools and strategies for transformational change." *Health Policy and Planning*. 2012;27 Suppl 4:iv54-iv61. Epub 2012/10/04.
34. Riley B, Best A. "Stakeholders, organizational partnerships, & coalitions." In: Kahan S, Gielen A, Fagan P, Green L, editors. *Health behavior change in populations: The state of the evidence and roles for key stakeholders*. Baltimore, MD: Johns Hopkins University Press; 2012 (in press).
35. Setzer J, Lindner M. "The use of USAID's non-project assistance to achieve health sector policy reform in Africa: A discussion paper." Bethesda, MD: The Health and Human Resources Research and Analysis for Africa (HHRAA) Project, Human Resources and Democracy Division, Office of Sustainable Development, Bureau for Africa and Policy and Sector Reform Division, Office of Health and Nutrition, Center for Population, Health and Nutrition, Bureau for Global Problems, Field Support and Research, Agency for International Development, 1994.
36. Global Health Initiative. "Improve metrics, monitoring & evaluation." www.ghi.gov: Global Health Initiative, 2012.
37. Chreim S, Williams BE, Janz L, Dastmalchian A. "Change agency in a primary health care context: the case of distributed leadership." *Health Care Management Review*. 2010;35(2):187-99. Epub 2010/03/18.

38. Trochim W. "An introduction to concept mapping for planning and evaluation." *Evaluation and Program Planning*. 1989;12(1):1-16.
39. Kruk ME, Freedman LP. "Assessing health system performance in developing countries: a review of the literature." *Health Policy*. 2008;85(3):263-76. Epub 2007/10/13.
40. World Health Organization. "Guidance for monitoring and evaluation of national health strategies." Geneva: World Health Organization, 2010.
41. World Health Organization, World Bank, USAID. *Handbook on monitoring and evaluation of human resources for health, with special applications for low and middle income countries*. Geneva: World Health Organization, 2009.
42. Global Fund. *Monitoring and evaluation toolkit: HIV, TB and malaria and HSS*. Geneva: Global Fund, 2009.
43. USAID. *Measuring the impact of health systems strengthening: A review of the literature*. Washington, DC: USAID, 2009.