Systems Thinking in Short-term Health Missions: A Conceptual Introduction and Consideration of Implications for Practice

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Abstract

A strong tradition of short-term health missions (STHMs) exists around the world. STHMs have positive and negative effects on local health systems, and these consequences are often unanticipated and unintended. Conceptualizing local health systems as complex adaptive systems (CASs) may help global health actors approach global health activities, including health missions with a greater appreciation for local cultural and environmental context, leading to increased local capacity and impact while minimizing unintended negative consequences. For some, this might entail a shift in practice as it relates to short-term humanitarian work. In this paper, we introduce readers to health as a complex adaptive system (CAS). We then consider implications for practice, including adopting a "learning health system approach," that engages local stakeholders in an ongoing, iterative process of mutual learning and self-organization.

Introduction

Short-term health missions (STHMs) to low- and middle-income countries (LMICs) have become a popular global health activity for many health care providers and public health professionals. While we are not aware of any consensus on the definition of STHMs, we have modified the definition that Martinuik et al applied to short term health missions:[1] an STHM refers to a short trip of 1 day to 2 years by a health professional to an LMIC to provide direct medical care or a public health intervention to the population. At least 6,000 trips take place each year, each with many volunteers.[2] Program planners, researchers, advocates,

physicians, dentists, nurses, pharmacists, students, and others embark on a wide range of health activities, including delivering medical care, planning and implementing public health interventions, organizing local community organizations, and performing research. In this paper, we refer to these participants in STHMs as global health actors (GHAs).

Volunteers embarking on STHMs face many challenges in resource-poor settings, including language and cultural barriers, low patient access to follow-up care, lack of resources and technology, high overall monetary cost, and dependence of host countries on foreign intervention.[1] Health systems sometimes

react to STHMs in unpredictable ways. In this paper, we define health systems broadly: the diverse actors that interact to impact health and wellness (including spiritual wellness). As such, the health system is much more than just hospitals and doctors and nurses; it includes community members, educators, politicians, businesses, religious leaders, and many others, all with their complex patterns of interaction and social norms.

Health professionals are motivated to participate in STHMs because they might see an opportunity to focus on caring for those that have more acute and significant needs than those in higher income countries (HICs). STHMs are also sometimes seen as a way to gain exposure to tropical diseases or conditions not often encountered in HICs. Participants experience life in another country while making a difference in the lives of others (volunteer tourism[1] or "voluntourism."[3]). Finally, GHAs may have a number of other motivations, ranging from religious to academic.

GHAs involved in STHMs impact the host community's health system, sometimes unknowingly, and the net result may be positive or negative. The positive health effects of STHMs are myriad and significant, including performing cataract and cleft lip repairs and responding to epidemics, such as Ebola. Negative effects may not be so obvious, as participants may be unaware of local cultural context, the multifactorial causes of disease, and the complex interactions between diverse stakeholders that make up a health system, leading to some of the unintended consequences that we discuss in this paper.[4]

Health systems are inherently complex and under some approaches to STHMs (as well as many other global health interventions)[5] — that are not always designed to address complexity by engaging local stakeholders in long-term collaboration and shared learning — impact may be limited and sustainability is sometimes lacking.[2,5-9] This paper describes health systems as CASs, discusses why some STHM practices might lead to unintended consequences, and proposes a way forward that could lead to increased local innovation and long-term capacity in health. While the concepts outlined in this paper could (and many argue should[10-14]) be applied by larger global health organizations and initiatives, in this paper we focus on their specific application to STHMs.

Health Systems as Complex Adaptive Systems

A complex adaptive system is a collection of individual agents with freedom to act in ways that are not always totally predictable, and whose actions are interconnected so that one agent's actions changes the context for other agents.[15]

Social systems, such as health, are complex and adaptive because there are many local actors or agents — including public health workers, physicians, nurses, patients, indigenous practitioners, politicians, community leaders, members of churches and other faith communities, educators, and others — continuously interacting and altering their decisions over time in response to what they learn from system conditions or other actors. All of the actors are inter-dependent in their roles because they belong to the same system, yet each actor brings a unique set of perspectives to the system.[16-18]

Diverse perspectives can contribute to the unpredictability of system behavior because each actor's perspective informs how he or she will react to the ideas and actions of others. STHM donors, planners, and volunteers may assume, for example, that community members in LMICs will use mosquito nets to prevent

malaria. Locals, however, may have other ideas that are more contextually relevant; they may use the mosquito nets to catch fish.

Diverse perspectives are especially relevant to GHAs involved in STHMs. For example, Christian health professionals participating in aid ministries may have a number of objectives that might compete with other objectives for time or resources, including witnessing of Christ, providing short-term relief from disasters, increasing local capacity long-term, experiencing an exotic place and culture, completing professional responsibilities, performing research, etc. Our purpose in this paper is to provide a framework so that GHAs can consider the impact that their actions (which are informed by their motivations) have on local health systems.

Motivations that lead to the most dominant perspectives will determine the boundaries of the system, defining "subsystems."[16] Leaders within the system use their perspective to define who is "in" the system, and who is not. Decisions about who to include in the STHM program planning (topic experts? local leaders? local community members?) are examples of how boundaries in systems are created in global health. For example, GHAs may exclude traditional practitioners in their program planning and vice-versa.

People in systems respond to the behavior of other actors, and their perspective guides their responses.[16,19] Feedback that returns to the initial person influences future action. This adaptive quality of CASs results in self-organization and unpredictable emergence of new (and sometimes surprising) ideas, processes, networks, relationships, and roles. Self-organization is seen when, for instance, local people form health promotion groups spontaneously in response to what they learn from visiting STHM teams.

History is significant in a CAS because whatever took place in the past influences the context in which system actors make decisions.[20] For instance, past policy changes may require GHAs and local practitioners to operate within new constraints. This will affect future action, effectively changing local context.

CASs are also non-linear, meaning that some actors are more influential than others, inputs in one place and time may not have the same effect as inputs in another, and some inputs may have large impacts on the system, while other similar inputs may not have any measurable impact.[20-21] For example, enlisting the help of influential people in the community to plan and implement an intervention could result in a large impact because negative unintended consequences could be minimized and long-term capacity enhanced. The trust local actors may have for community leaders and the number of influential connections possessed by leaders increases the likelihood of a larger impact.

Actors in CAS are influenced, enabled, and constrained by multiple layers of organizational, political, and social structures. Multiple and diverse organizations such as public health agencies, non-governmental organizations, research institutes, and others influence health.[22] Indigenous health workers and community leaders are part of the local culture, and influence people's beliefs and actions. Social determinates of health such as the distribution of power, legal policies, social norms such as gender equality, economic systems, access to resources, and others play a significant role in determining health status. GHAs involved in STHMs may not be aware of these other actors, organizations, or structures. Timely interventions at high-leverage structural issues (such as mobilization around political or organizational reform, or coordinating activities) may have a larger impact on health than more direct patient care or public health programs.[23] The more GHAs can understand and harness the local structures, organizations, and health determi-

CHRISTIAN JOURNAL for GLOBAL HEALTH

nates, the more STHMs will lead to long-term positive change.

Because CAS behavior is unpredictable, future activities are difficult to foresee, as some inputs will bring unintended consequences. This is especially true when agents make decisions based on their own needs and fail to consider their impact on the system as a whole, a phenomenon termed "sub-optimization."[24] Sub-optimization might occur when a STHM that focuses on one surgery or disease diverts local professionals from other health activities.[25] The focused disease or surgical activity is deemed successful, though the impact on the overall health of the community might be compromised.

"Systems thinking" is a collection of disciplines, theories, and methods that help us to understand the characteristics of complex systems such as interrelationships between actors with diverse perspectives, boundaries between those actors, feedback, self-organization, history dependency, non-linearity, and sub-optimization and to improve the way that we

function in such systems. Systems thinking ideas and approaches have been applied successfully to business, engineering, biology, and other fields. A consideration of all of the various systems thinking perspectives – such as systems dynamics, complexity theory, and cybernetics – is beyond the scope of this paper (though the interested reader might want to glance over Brian Castellani's dizzying map of the field).[26] Herein, we have focused on those concepts we have found most relevant and applicable to global health practice – specifically, using a complex adaptive systems lens. The application of CAS principles, and the degree to which individuals and organizations do so, varies widely on a continuum. For those interested in learning more and applying these ideas, we have found Williams's 3 key elements of a systems approach: interrelationships, perspectives, and boundaries a good starting point.[16]

Figure 1. Top-down or blueprint design strategy
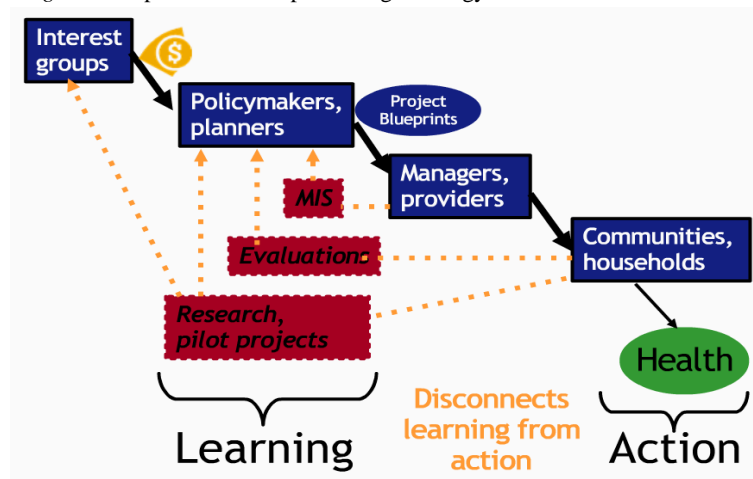
Note: Promotes learning by interest groups, policymakers, and planners, as well as managers and providers, but prevents learning by the producers of health: communities and households. Action that determines health happens at the community level, but the learning does not.[8]

Top Down, Blueprint Approach to Global Health

For decades, reductionist thinking (the view that a system is nothing more than the sum of its parts) has led to what has been described as the dominant approach to global health: a top-down, blueprint model (figure 1).[5,8,20] In this approach, interest groups and planners from HICs (high-income countries) drive the agenda, while communities and households in LICs are treated like recipients[8] as opposed to collaborators. Planners, providers, and managers learn and communicate what works within the context of narrow, often disease-specific, initiatives so that interest groups will continue to provide necessary funding. Those that produce health locally through behavior change, social influence, political advocacy, etc. — the communities and households — are denied the opportunity to learn.

Disease-specific programs, such as The US President's Emergency Plan for AIDS Relief (PEPFAR), have been described as such initiatives in global health. When targeting a well-defined problem, some of these programs have been effective in reaching focused goals, but sustainability has remained elusive due to the complex adaptive nature of health systems.[5,14,20] STHMs are often planned and executed in the same way, from the top down.[3,6-7,17-18,27]

Unintended Consequences

Approaching complex health challenges (such as building local capacity or addressing diseases with multiple context-specific determinates and possible approaches to prevention or treatment, such as AIDS) with a top-down blueprint approach (and, therefore, without taking into account their inherent complexity) too often results in unintended consequences. One major unintended consequence of the blueprint strategy is the exclusion of communities and households from learning what works and what does not, leaving this opportunity for the interest groups, providers and managers, and planners. The local communities, households, or individual patients may be treated as a challenge that needs a quick remedy, rather than a partner with whom to be fully engaged and cooperate and from whom to learn. The gains experienced as a result of global health interventions are not sustainable when needs are met only temporarily. Leveraging the potential of the households and communities to take long-term ownership of interventions may be a missed opportunity. Our review of the literature identified many other unintended consequences of STHMs, especially as they relate to medical and surgical trips (see Box 1). Other types of STHMs, such as public health interventions, may have other types of unintended consequences, though their documentation is less abundant.

There will, of course, always be unforeseen negative effects of all actions in systems such as health. Systems practitioners aim to create an environment where the overall positive effect is maximized.

Box 1. Some Unintended Consequences of Short Term Health Missions

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Consequences of mission trip brevity

- Patients experience complications after teams are gone and have no available follow-up care options.[17]

Consequences of working in resource-poor settings

- Life-threatening complications sometimes arise which would be treatable in a US hospital, but not with limited mission resources. Patients have died as a result.[17]
- Anesthesia is not able to be safely monitored or administered using evidence-based techniques.[28]
- In the case of cleft lip and palate surgery, patients may receive cleft lip surgery but wait years for palate surgery because another mission may not arrive until then.[6]

Ethical consequences

- Members of the team may face the ethical issue of whether to provide care for which they are not qualified (medical students, for example).[29]
- Patients who are not good candidates may have surgery anyway in order to reach a goal body count by the end of the mission trip.[6]

Consequences related to scope of interventions

- Medical teams are expected to care for patients whose conditions are beyond the scope of the mission's experience, abilities, or training. For example, a cleft lip/cleft palate mission may be prepared to operate, but be unable to effectively address complications.[30]

Consequences directly impacting local health system

- Visiting teams set precedent that cannot be followed by local practitioners, such as providing services that are not normally available.[28]
- Mission teams may use too much space in a clinic or hospital, inhibiting the work of the local physicians on other cases.[31]
- Relationships with local providers may suffer when visitors leave all post-operative care responsibilities to local colleagues.[6]
- Local colleagues may be alienated when volunteers fail to cooperate or work closely with them.[6]
- Patients sometimes misuse medications or fail to fill prescriptions due to cost or lack of understanding.[7]
- Locals may become dependent on foreign intervention.[18] This includes waiting to seek medical care until the next team arrives.[28]
- Local providers' self-worth suffers when patient levels drop due to unavailability of modern technology and services after volunteer teams leave.[32]
- Inequitable relationships between locals and international global health actors become entrenched.[3]

Short-term Health Missions as Events in Systems

STHM trips are often viewed as isolated events — one-time interventions that have limited impact beyond the patients being treated or the program being delivered. Viewing such trips as events within the local health system and seeking to understand system-wide effects of such events can help to maximize the positive effects of STHMs. Hawe *et al* explain that interventions are just like any other system event; they take place at particular times in various *activity settings*, often through *social networks,* and persist for discrete durations of

time.[33] This perspective demonstrates a recognition of the importance of considering local context. As interventions such as STHMs take place, system actors such as local health practitioners, community members, politicians, church leaders, and others participate and respond. Those actors less involved in the intervention will value it differently than those closely participating. Each actor's perception of intervention results will determine his or her response[16]. Even seemingly isolated and focused STHMs, such as surgical interventions or disaster relief, can impact larger systems by influencing the response of actors in ways that are not always readily evident. For example,

community members may not mobilize and advocate for local surgical training if the need is already being met by foreign experts.

Interventions often introduce people into new settings and to new people. This broadening of local social networks facilitates self-organization and emergence of new "opportunity structure" for households and community members.[33] When STHMs occur, there may be a shift in the distribution of resources and indigenous providers' current activities may be discontinued in favor of new intervention-related activities. These phenomena are examples of changing local ecological context.

Hawe *et al* identify four implications of viewing health interventions as events in systems. First, while the function of an intervention may need to be similar in all locations, the form an intervention takes does not necessarily need to be consistent.[33] Local context can determine what an intervention looks like in different communities. Fidelity of interventions is not tarnished by differences in form.

Second, degree of attitude and behavior uptake is not the only measure of intervention success. Rather, building individuals' capacity and enabling individuals to make positive health choices by improving his or her position in social networks are also successes because empowerment within the community social structure leads to increased access to resources, both material and nonmaterial, especially information.[33]

Third, evaluating system context while interventions are taking place enables GHAs to redirect efforts towards strategies that are working well and to identify positive and negative feedback mechanisms. Once identified, attempts can be made to encourage positive feedback mechanisms and mitigate the effects of negative feedback mechanisms.[33]

Finally, less focus on program evaluation and more time to evaluate changes in context after interventions are over could lead to an increased understanding of the larger system and context.[33] This process of discovering patterns in system behavior and identifying persistent needs has the potential to be a productive starting point for ongoing capacity-building efforts.

## Implications for Practice—adopting a CAS lens

Figure 2.
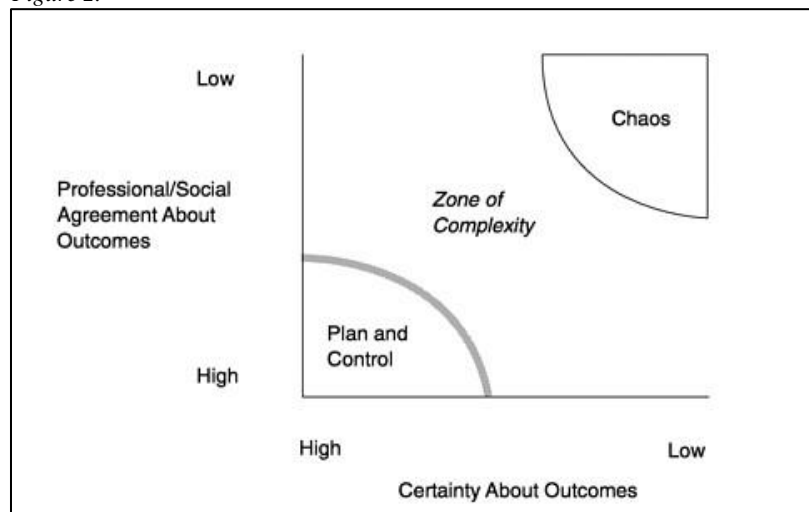
Note: In Stacey's Zone of Complexity, both certainty of outcomes and agreement about outcomes are relatively low. [19]

CHRISTIAN JOURNAL for GLOBAL HEALTH

Ralph Stacey has developed a model (figure 2) to appreciate the level of complexity of health improvement activities based upon scientific certainty about outcome and social agreement about outcome.[19] Where there is certainty about outcome and agreement among stakeholders about outcome, command and control management works well because the situation is predictable. Because certain actions or methods are known to produce predictable outcomes, it is easy for those involved to agree on approaches. However, where certainty about outcome is low, agreement on the approach will also be low. This presents a chaotic situation in which approaches cannot be based on rules because it is impossible to determine what will result from any given action. Between this realm of chaos and that of simplicity, we find complexity.

Figure 3.
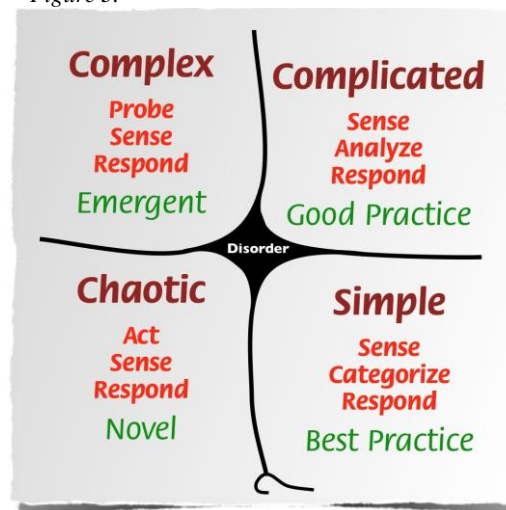
Notes for Figure 3: The Cynefin framework based on Dave Snowden's four domains[35] introduces the concept of simple, complicated, complex, and chaotic realms of existence. Complex systems require pattern management rather than best or good practice implementation.

Coupled with the Stacey diagram, Snowden's Cynefin framework[34] (figure 3) can be used to determine the best way to approach a problem based on the level of environmental complexity. The framework depends on understanding that different contextual environments require different approaches. Some problems are simple because there are relatively few steps required, and the certainty of outcomes is high, requiring straightforward *categorization* of information before response. Snowden's domain of simplicity calls for implementation of best practice: for example, immunization against childhood diseases (though the delivery of vaccination programs is quite complex because of the need to challenge erroneous assumptions about immunizations, ensure effective supply chain management, consider human resource effects, and other issues!). Other problems are complicated because there are multiple steps, requiring *analysis* of information before response. The complicated domain calls for use of good practice. Best practices do not apply to complicated problems because there is more than one suitable solution available. The complex domain requires first probing, then sensing what happens, then responding. Snowden calls the appropriate re-

sponse for the complex domain "emergent practice" because the solution only becomes evident after observing the dynamics of the system and its emerging patterns. Complex problems and situations are impossible to solve using best practice as too many components are in flux. Examples of complex health challenges include: local capacity building; healthcare reform; and addressing diseases, such as obesity, with many determinates and possible approaches to improvement. While this categorization of health challenges and interventions is helpful in theory, we have found that all health activities have some degree of complexity because of the human capacity factor.

Intervening in health systems (CASs) assuming that the environmental context is simple or complicated will lead to frustration when best practices fail to bring desired results. This might be why interventions bring varied results in different communities; environmental context varies depending on location due to each health system's set of unique actors. Implementation of practices tailored to each emerging pattern of system behavior allows actors to keep up with dynamic system behavior. Applying best practices to complex situations in the form of vertical blueprint interventions could result in negative unintended consequences.

Toward a Learning Health System

Figure 4. Learning organization approach to global health intervention
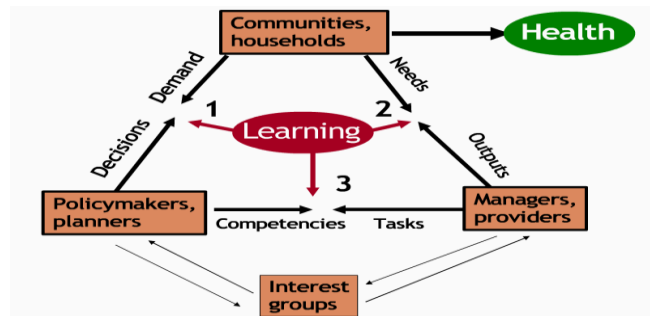
Notes: It is driven by stakeholder participation in learning the roles of other stakeholders and by the household production of health.[8]

A non-linear systems thinking approach to facilitate learning by households and communities during global health interventions has been proposed by Korten[36], and adapted by Mosley (figure 4).[8] This "learning organization approach" centers on the learning that takes place by each stakeholder group: households and communities; managers and providers; policymakers and planners; and interest groups.

Households and communities learn about the outputs of programs and interventions that the managers and providers implement. They

might be more aware of unintended consequences as they become more aware of local attitudes, beliefs, and practices, as well as the decisions being made by policymakers and planners. A significant challenge that health systems face is ensuring that there is adequate feedback from local indigenous households and communities. This can happen through formal organizations or through less formal cultural shifts.

Providers and managers need to understand the needs of households through ongoing

feedback. They also develop competencies through training funded and organized by policymakers and planners. In return, needed tasks are communicated back to policymakers and planners. Policymakers need to know the tasks that managers and providers need, as well as the needs of communities and households.[8]

Interest groups do not drive this learning organization from the top down. Rather, each stakeholder is engaged in an iterative cycle of trial and error where learning emerges based on the needs of the households and communities. This focuses the attention on building capacity at the household and community level where health is produced and, thereby, the health system is strengthened. In this process, the value of engaging local governments, health agencies, and business cannot be overstated. Indigenous community leaders (many times unexpected, informal leaders) that are health advocates, change agents, and social influencers should be identified and supported.

The challenge in using this model is learning to allow local stakeholders to learn from experience and make mistakes. Learning at the community level for health leads to technical capabilities such as learning to diagnose and treat disease and learning to recognize and respond to emerging disease patterns. "Soft" capabilities such as navigating complexity, learning collaboratively, engaging politically, and being self-reflective are at least as important as the technical capabilities, though they are too often not adequately considered in health planning.[21]

This learning organization approach can enhance the impact and efficacy of global health interventions, like STHMs, by preventing unintended consequences that invariably result when communities and households are disregarded in the learning process.

A Complex Systems Paradigm Shift

Adopting a complex adaptive systems lens has the potential to transform STHMs from isolated, episodic interventions into a global network of shared learning and positive innovation. For those interested in making such a shift, significant self-reflection will be required: what is the ultimate goal of the STHM trip? Our experience suggests that most involved in STHMs are very interested in contributing to long-term, sustainable change that results in local capacity enhancement. If so, more questions may be worth asking, and we have listed some in Box 2. GHAs may need to complement technical, medical, and public health skills and knowledge with others that can lead to health improvement such as community psychology and community organizing; economic development and systemic business management principles; educational initiatives that teach systemic thinking; cultural anthropology; ecology; etc. They may also find it necessary to commit to strengthening health systems rather than exclusively focusing on one activity, moving away from "quick-wins" or "quick-impact" strategies and towards longer-term, sustained efforts.[5,33] Ultimately, a systems thinking approach will lead to the GHAs becoming part of the local system long-term.

Box 2. Some Questions for Reflection in Approaching Short-term Health Missions with a Complex Systems Lens

Pre-Mission Planning
- Do the planned STHM activities further the organization's long-term objectives? For example, many might have "building local capacity" or "empowering locals" as important long-term objectives, while STHM activities (disease-specific interventions, surgeries or disaster relief) might not contribute to those objectives.
- To what extent are locals in LICs involved in pre-mission planning? How frequent and extensive is the communication between STHM planners and local stakeholders?
- Are STHM participants knowledgeable about local culture, history, politics, and social norms?
- Is there a new cadre of participants with each STHM, or do the same professionals participate, thereby, enhancing iterative learning and relationship building?
- To what extent do STHM planners learn from previous experiences?

Mission Implementation
- Are plans adapted to respond optimally to local circumstances, or are they rigid?
- Are activities more focused on technical interventions (such as public health programs, surgical activities, or disaster relief) or on building relationships?
- To what extent do GHAs identify and support sometimes unexpected local leaders that challenge the status quo to improve health?
- To what extent do GHAs facilitate an environment where local self-organization and innovation is encouraged?
- To what extent are unexpected positive local roles, processes, and structures that emerge identified and supported? To what extent do GHAs learn from negative ones?

Post-Mission Activities
- To what extent do STHM participants and planners follow-up on their activities?
- Do short-term relief missions consider ways to empower communities to prevent or respond to future disasters?

Implications for Practice

Taking a CAS approach to STHMs will not be achieved by following a list of prescriptive rules. Instead, systems thinking must become a mindset — a paradigm which influences the way GHAs make decisions. Box 3 contains implications for practice adapted from the European Centre for Development Policy Management based on complex systems thinking principles.

Box 3. Implications for Practice in Complex Settings[37]

- **Focus on ownership**. Ownership is critical to any capacity development process, because change is fundamentally political.
- **Approach capacity development as a process of experimentation and learning**, rather than as the performance of predetermined activities.
- **Take an evolutionary approach to design**. Recognize that good design means being clear about the desired direction of change, leaving space for adaptation along the way.
- **Engage local stakeholders** in the determination of needs and strategies.
- **Invest more in understanding context** in terms of the political, social, and cultural norms and practices that shape the way a country or organization understands capacity, change, and performance.
- **Give greater attention and recognition to less visible aspects of capacity**, such as values, legitimacy, identity, and self-confidence, as well as other, non-monetary forms of motivation that may nonetheless be critical to outcomes.
- **Be prepared to accept a higher degree of risk and failure** as a means of encouraging learning and innovation.
- **Invest in relationship-building.** The implementation of capacity development support depends tremendously on the relationships forged between local stakeholders and outsiders.
- **Be more realistic about the scope of external intervention**. In the end, external partners are marginal actors, as compared to the influence exerted by underlying domestic processes and forces.

CHRISTIAN JOURNAL for GLOBAL HEALTH

While we are unaware of any comprehensive review of the extent that STHMs apply systems concepts, many Christian relief organizations are founded on various CAS principles (though it may not be explicitly communicated or even recognized), and all STHMs likely apply these and other systems approaches to some degree. For example, World Vision partners with communities to alleviate poverty with long-term, sustainable changes.[38] The Christian Medical & Dental Associations implements systems thinking by promoting awareness of issues, working at a policy level, and providing education.[39] Samaritan's Purse sponsors several branches of international aid including everything from disaster response to campaigns to stop human trafficking. Samaritan's Purse provides holistic training, equipment, and education, thereby, allowing people to help themselves.[40]

While not explicitly applying systems thinking concepts to STHMs, the Global Community Health Evangelism (CHE) Network is one example of applied systems thinking concepts.[41] The CHE Network has several models which allow for strategy adaptation to suit various cultural, political, and religious environments. This evolutionary approach allows CHE to build relationships with local leaders and equip community members to find and implement solutions. The community is the primary driving force behind change which allows for sustainable progress. Such community ownership, defined by CHE as people "taking responsibility for their own health and well-being," is a principle of systems thinking that CHE uses to measure results.[41] The CHE network further implements systems thinking by evaluating intervention outcomes in order to more effectively facilitate positive change in the future.

While not a STHM, the experience of Comprehensive Rural Health Project in Jamkhed, India could be considered an example of a learning health system. Two Indian physicians, Raj and Mabel Arole, focused on population health improvement and equity while acknowledging complexity and operating within local context. Newly empowered community members self-organized and, as a result, increased capacity emerged.[42] Health outcomes improved significantly, including decreases in infant mortality.

Learn More

Readers interested in additional systems thinking applications in global health may wish to review this list of resources: http://st4chealth.com/systems-thinking-reading-list/. The landmark publication, *'Good Health at Low Cost' 25 years on: What makes a successful health system?*, also contains many examples of how systems thinking has improved health around the world, mostly on the country level.[43] CAS principles including long-term vision, history dependency, feedback loops, and operating within cultural context are shared that led to improved health in several countries and contexts. Many global health systems practitioners have found two systems thinking classics helpful in their work: Peter Senge's *The Fifth Discipline* and Donella Meadow's *Systems Thinking: A Primer.*[44-45]

Conclusion

STHMs can be approached as events within complex adaptive health systems, where each action has an effect on other parts of the system. Such a perspective might minimize unintended negative consequences and accomplish long-term objectives, such as increasing local capacity. For some, this may require a paradigm shift away from one-time, isolated interventions toward a learning health system, where GHAs are an integrated part of the system long-

CHRISTIAN JOURNAL for GLOBAL HEALTH

term with increased local ownership, mutual engagement, and shared learning.

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