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Advancing the measurement rigour of organizational and programmatic knowledge management in health and development

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Abstract

Knowledge management (KM) plays an important role in global health and development where resources for programme implementation are limited and needs to collaborate and learn across organization and sector boundaries are great. Health and development professionals depend on KM approaches to access, share, and use critical health knowledge. However, measuring the contribution of KM to achieving programme goals is complex. The Guide to Monitoring and Evaluating Knowledge Management for Global Health addresses this challenge by offering a standard practice and comprehensive guidance to measure the process, reach, engagement, and usefulness of KM as well as the learning and application of knowledge. In this paper, we first outline a collaborative effort among KM practitioners to develop the guide and describe the theoretical basis of the logic model and common indicators that have continued to evolve over the last decade. Using a case study approach, we demonstrate how the guide has been used in organizational (internal) and programmatic (external) KM initiatives. We also discuss recent efforts to address emerging KM themes that resulted in the development of additional indicators on adaptive practice, organizational partnership, and social interaction. These efforts have advanced the measurement rigour of KM in health and development.

Keywords: knowledge management, monitoring and evaluation, logic model, global health, community of practice, storytelling, adaptive practice, organizational partnership, social interaction

Introduction

Knowledge management (KM) plays an important role in global health and development where resources for programme implementation are limited and needs to collaborate and learn across

organization and sectors are great. KM enables people and organizations to collect and curate knowledge and connect people to it so they can do their jobs effectively. While many in the health and development sector have come to embrace the vital role of KM to improve organizational performance (internally focused KM) and as part of health and development programmes (externally focused KM) to contribute to health and development outcomes, measurement of KM initiatives and their impact continues to be an area for further development.

KM has the potential to improve health outcomes, particularly if it is used in a systematic way, and offers a range of tools and techniques that respond to the need to ask, tell, publish, and search (Salem et al. 2017). Measuring the contribution of KM to achieving programme goals is complex and continues to be a challenge for a number of reasons. First, KM is often used in an ad hoc manner, diluting potential results. For instance, when KM is not integrated throughout different levels of health systems, an information divide in the vertical flow of information (e.g., from national level to district and community levels) will exist, and health workers will continue to face challenges including lack of routine systems for seeking and sharing information and lack of high-quality and current health knowledge (D'Adamo, Fabic & Ohkubo 2012; Kapadia-Kundu et al. 2012). Second, measuring the impact of some KM products, tools, and techniques can be complex. For example, it is difficult to trace the effect of information housed on a website or contained in an article to changes in knowledge, attitudes, and practices (Ohkubo et al. 2015). Third, there is a need for agreement on a general theory of change to link KM products, tools, and techniques to health and development outputs and outcomes. Donors and implementers are increasingly interested in achieving the maximum return on investment in KM, yet little research address the links among project activities, the use of content, and health outcomes (D'Adamo, Fabic & Ohkubo 2012; Sullivan et al. 2010). Finally, there is a need for a set of indicators that are agreed upon and standardized to measure the process, reach, engagement, and usefulness of KM as well as the learning and application of knowledge. KM practitioners need guidance for suitable indicators to identify common issues and challenges and to collaborate to improve KM in global health and development context (Mansfield & Grunewald 2013).

To address these challenges, the primary objective of this paper is to discuss how our recent efforts to advance measurement rigour in KM can be applied to various contexts, within organizations and as part programmes in health and other fields. We first outline a collaborative effort to develop monitoring and evaluation (M&E) guidance for KM practitioners in global health, including a logic model and common indicators that have continued to evolve over the last decade. Using a case study approach, we illustrate how this guidance has been used in organizational and programmatic KM initiatives and demonstrate how the results from these activities tested and confirmed the adaptability of the proposed indicators, and chartered a course to future collaboration and development. We also discuss our recent efforts to address emerging

KM themes that resulted in the development of additional indicators on adaptive practice, organizational partnership, and social interaction and how these efforts have advanced the measurement rigour of KM in global health and beyond.

Collaboration to develop M&E guidance for knowledge management

KM can expedite the transfer of research evidence and lessons into practice to improve and save lives (Pablos-Mendez & Shademani 2006; Pang et al. 2003). Health and development professionals depend on KM approaches to access, share, and use critical health knowledge and need practical guidance to help determine which specific KM activities are effective in achieving desired health programme outcomes. With the specific goal of determining how to measure the contribution of KM products, tools, and, techniques to global health outcomes and based on the desire to continue to advance the field, KM practitioners representing a variety of organizations teamed up to develop M&E guidance, which has shifted in its delivery format over time from print guides to an online database. In every iteration, new themes and topics were reviewed and added to the guidance, resulting from a collaborative process and a dynamic approach.

The collaboration first started in 2007, when the Health Information and Publications Network (HIPNet) (https://www.hipnet.org) published the *Guide to Monitoring and Evaluating Health Information Products and Services* (Sullivan, Strachan, and Timmons 2007). This guide successfully defined the concepts of reach, usefulness, and use. It primarily focused on print publications and communication materials and introduced the original version of a logic model, indicators, sample instruments, and case studies.

In 2013, building on the initial work of HIPNet, the Global Health Knowledge Collaborative (GHKC) (https://www.globalhealthknowledge.org/) published the *Guide to Monitoring and Evaluating Knowledge Management in Global Health Programs* (Ohkubo et al. 2013) to provide guidance on M&E for knowledge management in international health programmes. This 2013 version of the KM M&E Guide retained relevant indicators and added others that reflected advances in the field and expansion to areas beyond health information products and services, including participatory approaches for sharing knowledge and capturing best practices and lessons learned. Along with the list of 42 common indicators, sample instruments, and case studies, one of the major contributions that the 2013 KM M&E Guide made was the renewed logic model named the Knowledge Management for Global Health (KM4GH) Logic Model (Figure 1).

The KM4GH Logic Model displays how key elements—inputs, processes, outputs, and outcomes—relate to one another. Unlike the typical linear structure of logic models, the KM4GH Logic Model visually incorporates a unique and relevant circular representation of KM processes that are generally found in the Knowledge Management Cycle (KMC) (Evans, Dalkir, and Bidian 2014). While there are many variations, the KMC typically includes five integrated processes that continuously renew knowledge and produce KM outputs: 1) assessment, 2) generation, 3) capture, 4) synthesis, and 5) sharing. KM outputs of a wide range are grouped into four broad categories: 1) products and services, 2) publications and resources, 3) training and events, and 4) approaches and techniques. The centre circle emphasizes the importance of KM culture and capacity, which could either facilitate or discourage KM processes. KM outputs are measured in terms or reach, engagement, and usefulness.

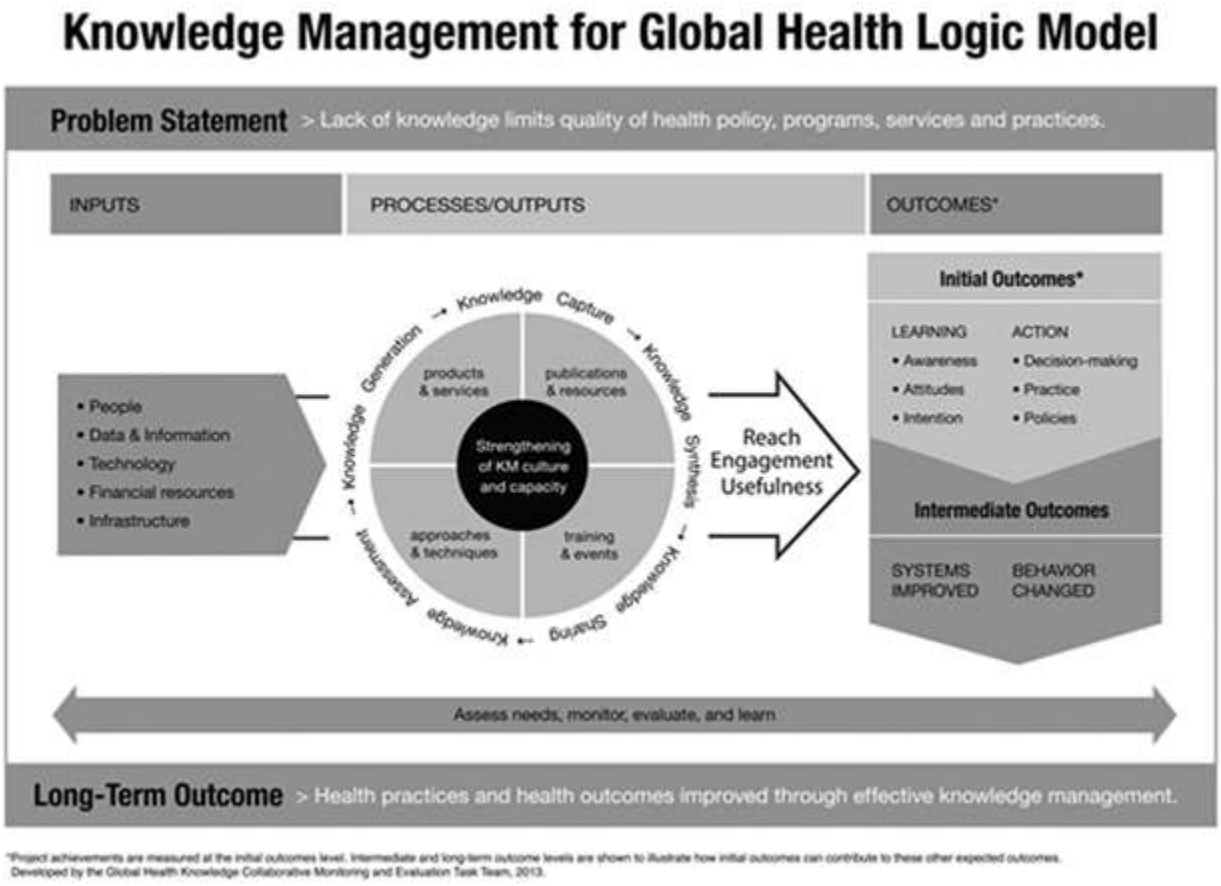
There are three stages of outcomes referring to benefits to the audience. Guided by concepts from behavioural theories such as the innovation-decision process from the Diffusion of Innovation theory (Rogers 2003) and self-efficacy from the social cognitive theory (Bandura 1986), initial outcomes--divided into two stages of learning and action--are about the knowledge gained from KM outputs. Thus, the KM4GH Logic Model makes a clear distinction between the measurement of KM (output level) and the measurement of knowledge (outcomes level). The next element of intermediate outcomes illustrates how KM can contribute to improving health systems and fostering positive health behaviours among health service clients.

Health is mentioned specifically at the beginning--the problem statement--and the end-the long-term outcome. While the Logic Model was originally designed to help global public health professionals plan their KM resources and activities to improve health programmes, it is applicable and easily adaptable to other development fields.

There is ample evidence of how various agencies have used the KM M&E Guide, with the standard indicators and the KM4GH Logic Model, to raise the profile of KM and legitimize the use of KM interventions for global health programmes (David & Dixon 2017). At the same time, in just several years since the KM M&E Guide was published in 2013, KM practitioners started noticing that a lot has changed in the field of KM. To name a few: fast-changing innovations in social interaction; renewed interest on implementing and measuring intentional collaboration, learning, and adaptation; and reaffirmed donor focus on multidisciplinary collaboration across M&E, communications, applied research, organizational development, change management, and KM. They expressed a desire for the KM M&E Guide to continue to be agile and rapidly adapt to changes in the environment around KM. For that reason, a task team convened in 2016 to update and enhance the KM M&E Guide. As a starting point, the team started consulting multiple agencies and documenting a series of case examples of how the Guide had been used

and how the indicators had been adapted (GHKC 2017). Next, we present two such case examples.

Figure 1. Knowledge management for Global Health Logic Model



Case Studies: Implementation of the KM M&E Guidance

The following cases illustrate how the Guide has been used in both organizational and programmatic KM initiatives and examine specific lessons learned to inform future iterations and enhancements to the Guide.

Case 1: Management Sciences for Health's Technical Exchange Networks (Organizational KM)

The first case illustrates how the concepts from the KM M&E Guide have been applied to organizational KM to improve staff access to knowledge, foster peer exchange, and stimulate learning and action.

Background

In 2009, the international nonprofit organization Management Sciences for Health (MSH) launched online communities of practice in the Knowledge Gateway platform, through their partnership with the IBP Initiative (a global partnership between WHO, USAID, UNFPA, and cooperating agencies), called Technical Exchange Networks or TENs, designed to increase access to technical knowledge, facilitate peer-to-peer exchange, and stimulate action and behaviour change for improved performance. Each TEN is composed of staff dedicated to learning about selected health topics and sharing relevant knowledge. Such topics include reproductive, maternal, newborn, and child health (RMNCH); HIV/AIDS; tuberculosis; leadership, management, and governance; healthcare finance; and cross-cutting topics, such as gender, youth, and M&E. Sustained institutional investments in peer-to-peer technical exchange have made it possible for the TENs to become one of MSH's most successful KM initiatives. In 2015, MSH began paying closer attention to monitoring and evaluating the TENs not only to collect patterns of performance and anecdotal experiences but also to demonstrate outcomes around learning and action.

Study design and methods

An exploratory assessment of the TENs was conducted in 2015 (n=183), described in detail elsewhere (Ortiz-Echevarria et al. 2017), using the KM M&E Guide (Ohkubo et al. 2013) to explore the reach, use, and usefulness of the TENs. This baseline assessment included a survey with scales as well as closed- and open-ended questions. Results from the survey and key informant interviews were presented to MSH leadership and TENs community members and recommendations were proposed on how to use the results to improve community members' experience including:

- Merge communities that have similar or connected topics to mitigate duplicate emails and facilitate more comprehensive discussions.
- Develop a one-stop hub on the intranet with information related to the TENs, including how to join, how to participate, and recent news.
- Develop visual symbols for individual TENs to foster a greater sense of community identity in alignment with corporate brand guidelines.
- Conduct outreach to community champions and provide them with the opportunity to create or revise community charters.

- Provide monthly performance analytics, using compelling data visualization practices, to increase awareness of discussions and recognize frequent contributors and new members.
- Coordinate webinars and informal face-to-face events around popular community discussions or recent information shared through the TENs to reach non-active members.

Implementation of recommendations immediately followed for an 18-month period. In 2017, a follow-up assessment was conducted (n=64) with an unedited subset of the questions used in the first assessment. No key informant interviews were included in the follow-up survey. The purpose the 2017 study was to measure the extent of change after the implementation of user-informed recommendations.

Table 1. TENs community member ratings on their satisfaction and knowledge change in 2015 and 2017 (Likert scale 1 = strongly disagree, 5 = strongly agree)

Indicators (from the KM M&E Guide)	**Logic model elements**	**Average scale (1 to 5)**		**Change in scales**
		2015	**2017**	
I am satisfied with the frequency of messages sent through the TENs.	Outputs (Usefulness)	3.38	3.85	**(+) 0.47**
The content is credible and trustworthy.		3.92	4.21	**(+) 0.29**
The information is of equal or higher quality than information on this topic I can find in other online resources.*		3.38	3.59	**(+) 0.21**
I understand the value of being a member of a TEN.*	Initial Outcomes (Learning)	3.94	4.11	**(+) 0.17**
TENs have provided me with information that was new to me and useful for my work.		3.83	4.0	**(+) 0.17**
Based on something I have learned through a TEN, I have changed the way I perform my job.	Initial Outcomes (Action)	3.6	3.3	**(-) 0.3**

*Adapted indicator

Results

Routine performance data between 2015 and 2017 show that performance across individual TENs communities often fluctuated due to time of year, convening of global conferences, and other community-specific activities and world health days. By 2017, 1,049 individual contributions were made to the TENs, across 722 unique posts, by 157 contributors. By the end of the year, 405 MSH staff members, representing 34 countries, were members of at least one TEN.

Table 1 shows indicators related to changes in satisfaction of being a TENs member. The assessment showed modest improvements across most domains of user satisfaction, particularly with improved satisfaction with the frequency of emails. As a composite indicator, overall satisfaction increased by 0.13 percentage points (from 3.71 to 3.84). Table 2 shows indicators related to changes in community members' attitudes or actions because of the information or knowledge made available through the TENs, which improved substantially between 2015 and 2017 in a number of areas. For example, the percentage of respondents who agreed with the statement "community members talked about or shared something from the TENs with another colleague" jumped from 43.0% in 2015 to 60.3% in 2017. Similarly, in 2015, only 12% of the respondents indicated that community members applied knowledge or information gained from the TENs to their project or programme. By 2017, however, this percentage had increased notably to 23.3%.

Table 2. Percentage of TENs community members who reported certain actions or attitudes related to information or knowledge sent through the TENs, 2015 and 2017

Indicators (from the KM M&E Guide)	Logic model elements	Percent (yes)		Change in percentage points
		2015	2017	
Community members talked about or shared something from the TENs with another colleague.	Outputs (Usefulness)	43.0%	60.3%	**(+) 17.3%**
Community members forwarded an email message from the TENs to another person.		38.0%	46.6%	**(+) 8.6%**
Community members adapted or translated information gained from the TENs.		23.1%	37.0%	**(+) 13.9%**
Community members believe that the TENs help to reduce duplication of effort.*	Initial Outcomes (Learning)	45.0%	47.9%	**(+) 2.9%**
Community members believe the TENs are a safe space for dialogue.*		57.0%	71.0%	**(+) 14.0%**
Community members applied knowledge or	Initial Outcomes	12.0%	23.3%	**(+) 11.3%**

information gained from the TENs to their project or programme.	(Action)			
Community members applied knowledge or information gained from the TENs to proposal and project design.		7.1%	11.0%	**(+) 3.9%**

*Adapted indicator

Lessons learned and recommendations

MSH's experience applying measurement discipline to its technical exchange networks highlights several important lessons for other global health and development agencies aiming to promote peer learning.

First, monitoring and evaluating community performance should include analysis not only of reach and engagement but also of usefulness and of outcomes, as defined in the KM M&E Guide. Relying on indicators such as number of members and number of posts alone does not capture member satisfaction, quality of discussions, and other indicators that could provide useful information on how to optimize member experience within a community. These assessments have allowed MSH to make both small and major changes. For instance, the assessment alerted MSH of the need to bring online community discussions to staff events such as webinars and in-person knowledge exchange events (e.g., TEN Day—a monthly knowledge exchange in the MSH café). They also have provided insights on which communities to merge or nurture.

Second, routine monitoring and periodic evaluations allow administrators of communities of practice to document trends that are critical inputs for senior leaders in allocating resources to sustain or expand KM for health and development across a globally dispersed workforce. KM platforms and initiatives cannot be taken for granted and must be able to demonstrate added value to projects, programmes, and initiatives. For instance, routine monitoring documented changes in the proportion of US-based to non-US-based staff participating in a community—in recognition that high non-US-based staff participation is highly valued. Low participation triggered MSH to reach out to non-US based staff to promote their participation.

Third, employing multiple and active engagement strategies, including face-to-face events, webinars, and cultivating a sense of community through champions, recognition of contributors, and visual symbols and graphics for the communities allowed the TENs to meet the needs of different types of learners within the community.

Lastly, for organizations working in global health and development where evidence-informed planning and decision making is a critical aspect of day-to-day work, using a globally recognized framework and indicators for KM helps align KM with the project, programme, or initiative. This ultimately helps shift away from ad hoc KM efforts that miss the full potential for KM to help achieve results. At MSH, using the KM M&E Guide has helped to promote a different way of thinking about the success of community engagement and peer learning efforts.

Case 2: K4Health FP Voices (Programmatic KM)

The second case illustrates how the concepts from the KM M&E Guide have been applied to the external or programmatic settings of KM to assess the effects of storytelling as a tool to share knowledge related to family planning.

Background

Family Planning 2020 (FP2020) is a global movement, aiming to expand access to family planning information, services, and supplies to an additional 120 million women and girls in 69 of the world's poorest countries by 2020. One of its four priority initiatives to address barriers to access to affordable and high-quality information, supplies, and services for family planning is to facilitate dissemination of knowledge and evidence (FP2020 2016). Recognizing the power of storytelling as a KM tool to accelerate the tacit-to-explicit knowledge transfer, the Knowledge for Health Project (K4Health) and FP2020 collaborated to create Family Planning Voices (FP Voices) in 2015. FP Voices documents, through photography and interviews, the stories of individuals working to improve access to family planning and shares their experiences widely. Nearly 600 stories have been published on FPvoices.org as of early 2018.

Study design and methods

In 2016, K4Health conducted a mixed-method study, described in detail elsewhere (Limaye & Sara 2017), to better understand the effects of FP Voices on workshop attendees, interviewees, and story readers' knowledge, attitudes, practice, and ability to share family planning information with their social networks (i.e., to diffuse information) planning. The study included both qualitative and quantitative methods, using an online survey (n=414), in-depth interviews (n=12), and workshop evaluation (n=4). Many of the indicators used in the online survey and in-depth interviews in particular were drawn from the KM M&E Guide as shown in Table 3.

Results

Output (reach): The assessment used two "reach" indicators--types of content delivery medium and number of FP Voices stories read--to gauge audience exposure to FP Voices. Survey respondents had heard about FP Voices in various ways (respondents could choose more than

one answer): from a conference/meeting (61%), through social media (43%), through a colleague (36%), and through friends (15%). The majority of survey respondents that were able to recall how many stories they had read had read 3 to 5 stories, with 21% indicating they had read 10 or more stories. In-depth interview revealed similar trends as the majority of interviewees had heard about FP Voices from conferences, colleagues, or someone else who had been interviewed.

Table 3. KM M&E Guide indicators, KM4GH Logic Model elements, and identified themes in the FP Voices study

Indicators (from the KM M&E Guide)	**Logic model elements**	**Themes used by Limaye & Sara (2017)**
Types of content delivery medium	Outputs (Reach)	Exposure to FP Voices
Number of FP Voices stories read		
Number of FP Voices stories shared	Outputs (Usefulness)	Diffusion of family planning and storytelling information
Understanding of FP Voices value		
Knowledge reinforcement and validation	Initial Outcomes (Learning)	Effect on knowledge, attitudes, and self-efficacy
Change in views, opinions, or beliefs		
Confidence in using knowledge		
Use of new knowledge (organizational or personal)	Initial Outcomes (Action)	Effect on knowledge application and collaboration
Collaboration with other professionals (improvement of practice)*		

*Adapted indicator

Output (usefulness): The assessment included two "usefulness" indicators--number of FP Voices stories shared and understanding of FP Voices value--to examine the diffusion of family planning and storytelling information. Respondents had shared an FP Voices story on social media such as Facebook and Twitter (25%) and had spoken to someone about an FP Voices story (39%). They shared the FP Voices story mainly when the story had family planning content relevant to their work. Interview informants reported sharing stories that resonated with them,

highlighted regional work, and were compelling. All of the workshop attendees reported having shared information they learned at the workshop with a co-worker.

Initial outcomes (learning): The assessment specifically looked at three "learning" indicators--knowledge reinforcement and validation; change in views, opinions, or beliefs; and confidence in using knowledge--to measure the effect on knowledge, attitudes, and self-efficacy. Exposure to FP Voices stories significantly ($p<0.05$) affected family planning knowledge (reinforcing or validating what respondents already knew or providing new information), attitudes (providing information that changed respondent's views, opinions, or beliefs), and self-efficacy (giving respondents confidence in their knowledge, ability to discuss issues related to family planning, and inspiring or motivating them). For example, the survey respondents indicated that FP Voice caused them to self-reflect on their family planning beliefs (33%) and helped them to view family planning as positive and no longer a sin or evil (25%).

Initial outcomes (action): The assessment used two "action" indicators--use of new knowledge (organizational or personal) and collaboration with other professionals (improvement of practice)--to capture the effect on knowledge application and collaboration. Respondents applied knowledge gained from FP Voices stories in their work and stories from FP Voices encouraged them to collaborate with other organizations working in family planning. For example, about 70% of respondents indicated that an FP Voices story led them to focus on a new family planning topic or encouraged them to start a new family planning activity. Interviewees indicated that their involvement with FP Voices nudged them to apply their new knowledge and increase their knowledge through learning opportunities.

Lessons learned and recommendations

FP Voices positively affected various constructs, such as improvements in knowledge, attitudes, self-efficacy, knowledge application, and collaboration. This case illustrates how the KM4GH Logic Model elements and the indicators from the KM M&E Guide can be used and easily adapted to design research on the effects of storytelling and narrative approaches as a KM tool to advocate and advance global health agendas.

There are a few lessons useful for KM practitioners. First, the pathway in the Logic Model--from reach and usefulness to learning and action--applies to unique KM approaches, such as storytelling, which has gained popularity in global health and development. Second, it is critical to systematically examine the level and type of reach and usefulness indicators to trace the effect of information and knowledge to changes in behavioural factors. Reach and usefulness may often be regarded as simple indicators. Certainly, they are not the *only* indicators that should be measured. However, they are indeed critical measures that should not be overlooked when

designing a comprehensive study to evaluate the effectiveness of KM. Furthermore, positive outcomes in the FP Voices assessment have been built upon the successful partnership among various agencies supporting FP2020. The relational effect between KM and such partnerships would be an area of interest for further investigation. Finally, while it was not discussed extensively in this paper, the FP Voices assessment also focused on the social element of KM such as the effect of dialogue and advocacy--aspects of social interaction that have surfaced as an emerging topic in KM measurement in recent years.

Recent Advancements in M&E Guidance for Knowledge Management

The two case studies illustrate specific examples of the KM M&E Guide's applicability and adaptability to various contexts while also presenting to the GHKC task team considerations for its future iteration and continuous enhancement. In addition, use stories and other outreach activities gave the task team a deeper understanding of user needs and preferences regarding new content and new functionalities. For example, users requested the addition of new themes and indicators, examples of adapted/modified indicators, more examples of outcome-level indicators and data collection techniques, examples for more real-time monitoring, and more frequent or regular updates.

In response, the task team identified four main principles to consider:

1. The revised guide should be more user-friendly, interactive, and easy to use than the existing print guide.
2. Revisions should continue to be evidence informed and/or informed by experience.
3. The guide should remain cutting edge by tackling issues such as adaptive management, networks and relationships, and behaviours.
4. The guide should have a more real-time nature to it, such as an online database, making it easier to adapt in the future and providing more opportunities for community contributions.

Currently in its third iteration, the KM M&E Guide has continually evolved to keep pace with changes in the field of KM since it was first published in 2007 and updated in 2013. The latest version of the guide takes this body of work to a new level--both in terms of content and format. Published by GHKC, the guide has now been updated and adapted into a searchable web-based indicator library, called the KM Indicator Library (http://indicators.globalhealthknowledge.org/), making it more accessible to health and development professionals around the world. Users can easily search for indicators tailored to their specific circumstances, and authors and creators can more readily update and add content to it. New content and indicators on three key emerging

themes relevant to KM practitioners today--Adaptive Practice, Organizational Partnerships, and Social Interaction--are included in the KM Indicator Library.

Adaptive Practice

There is rising interest in iterative, adaptive approaches to programme design, implementation and evaluation in global health and development sectors. Adaptive practice remains a highly undefined area of practice encompassing a wide variety of disciplines such as systems thinking, human-centered design, and lean and agile management, all of which share a common focus on "multiple-loop" learning and experimentation. We define adaptive practice as the set of principles and approaches meant to foster an environment that is conducive to critical reflection, flexibility, and change where, ultimately, changes in management of a project, programme, or initiative can happen. Based on a review of literature and resources available in the public domain, the KM Indicator Library includes three subcategories for adaptive practice:

1. *Prepare:* The selection, development, and adaptation of approaches for adaptive practice, and the requisite capacity and resources to use those approaches within a project, programme, or organization.
2. *Reflect:* The implementation, delivery, and evaluation of selected, developed, or adapted approaches for adaptive practice within a project, programme, or organization.
3. *Act:* The application and translation of new data, information, or knowledge acquired by using adaptive approaches to improve a project, programme, or organization.

Organizational Partnerships

Organizational partnership refers to the collaboration among two or more organizations with common goals that commit to work together and share resources. In doing so, the partners capitalize on their respective strengths in order to achieve a more positive outcome than if each organization had worked individually. KM plays an important role in creating and nurturing successful partnerships. The KM Indicator Library identified three subcategories of relevant indicators to systematically examine the relationship between KM and organizational partnerships based on a literature review of measuring the success and effectiveness of partnerships in health, development, and other related fields:

1. *Partnership commitment:* How and in what form partner organizations commit to work together to develop and nurture the partnership
2. *Partnership mutuality:* How partner organizations influence each other by looking at contracts such as trust, satisfaction, and joint activities
3. *Partnership outcome:* How the partnership adds value to or benefits partner organizations and their own stakeholders and project beneficiaries

Social Interaction

In order to foster collaboration and knowledge sharing, global health professionals are increasingly using KM tools and techniques, such as communities of practice, share fairs, peer assists, and social media platforms, that bring people together to share experiential knowledge, or know-how. Social capital, social networks, and social learning can all be leveraged to diffuse knowledge, improve coordination and collaboration, and improve global health programming. Four subcategories are identified in the KM Indicator Library to address the measurement of social interaction.

1. *Culture:* The shared vision and language that bring a group together
2. *Relations:* The level of trust between people in a group, group norms, reciprocity, and a sense of belonging
3. *Social networks:* The connections between members of a network, and the value derived from those connections
4. *Social learning:* The processes through which personal factors, environmental factors, and behaviour influence each other

Discussion

Measurement of the contribution of KM continues to evolve as the field grows. The GHKC body of work on KM indicators has adapted to keep pace with these changes. From the initial stage, proposed indicators are defined, standardized, and categorized with the aim of promoting agreement on their appropriate application and interpretation (Sullivan, Strachan & Timmons 2007). Therefore, these indicators intend to help KM practitioners compare the effects of KM interventions over time or the state of KM in various organizations. Over the past 11 years, numerous health and development agencies from a variety of sectors have used the KM M&E Guide to measure KM for both organizational and programmatic KM initiatives. In the process, they have helped test and validate the KM4GH Logic Model and the indicators contained in the KM M&E Guide, and now in the KM Indicator Library, as clearly illustrated by the two case studies discussed in this paper.

This body of work has attempted to address some of the challenges to measuring KM programmes. First, since "what gets measured, gets done," the indicators, mapped to the elements of the KM4GH Logic Model, provide a roadmap for practitioners to systematically develop and measure KM interventions and their subsequent outputs and outcomes. Second, the KM M&E Guide provides not only indicators but also guidance regarding appropriate types of

data collection methods for KM (and their relative cost). Third, the Guide provides an adaptable logic model that links KM products, tools, and techniques in general to health and development outputs and outcomes. It can be tailored to represent the theory of change for a specific set of KM interventions and the anticipated outputs and outcomes expected. Finally, the Guide, and now the KM Indicator Library, provide a standardized set of indicators to measure the process, reach, engagement, and usefulness of KM as well as the learning and application of knowledge, addressing various ideational and behavioural factors of target audiences.

The KM4GH Logic Model and related indicators have been informed by a wide variety of disciplines including systems thinking, applied research, social and behaviour change theory, organizational development and learning, and communication to name a few, which share a common focus on learning, action, systems improvement, and behaviour change. In particular, the three new areas of adaptive management, organizational partnership, and social interaction added to the KM Indicator Library may be indicative of the continuous need to monitor knowledge-related issues in adjacent disciplines. KM, even in global health, can support non-technical aspects of knowledge (e.g., quality of partnerships, relationships, and behaviours conducive to adaptation) that enable technical knowledge to be shared and applied. From a broader KM perspective, the value of our work in providing guidance to monitor and evaluate KM could be demonstrated by sharing real-life examples and experiences of the effective and practical use of the KM Indicator Library in a variety of fields, even beyond global health and development.

Limitations

Given the emergence of new KM tools and techniques, many of the new indicators contained in the KM Indicator Library around adaptive management, organizational partnership, and social interaction have yet to be field tested and validated. In addition, measuring the contribution of KM is notoriously complex, and so further guidance around appropriate research designs that can better tease out the contribution of KM to changes in knowledge, attitudes, and practice is always welcome.

Conclusions

Over the years, the KM community for global health has worked together to develop guidance in measuring the contribution of KM to achieving programme goals. These efforts have advanced the measurement rigour of KM in health and development by addressing several challenges

associated with monitoring and evaluating KM. Global health practitioners have used this guidance to evaluate the effectiveness of KM activities and tools in supporting global health and development efforts. The KM M&E Guide and the new KM Indicator Library have filled a gap in the KM for global health community and other development sectors by offering vetted guidance on a general theory of change to link KM products, tools, and techniques to health and development outputs and outcomes.

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