CURRENT DEBATE

Defining features of the practice of global health research: an examination of 14 global health research teams

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Objectives: This paper strives to develop a pragmatic view of the scope of practice and core characteristics of global health research (GHR) by examining the activities of 14 Canadian-funded global health teams that were in the process of implementing research programs.

Methods: Information was collected by a reflective exploration of team proposals and progress reports, a content analysis of the outputs from an all-team meeting and review of the literature.

Results: Teams adopted equity-centered, problem-focused, systems-based approaches intended to find upstream determinants that could make people more resilient to social and ecological factors impacting their health. Long-term visions and time frames were needed to develop and solidify fully functional interdisciplinary, multinational, multicultural partnerships. The implementation of research into practice was a motivating factor for all teams, but to do this, they recognized the need for evidence-based advice on how to best do this. Traditional measures of biomedical research excellence were necessary but not sufficient to encompass views of excellence of team-based interdisciplinary research, which includes features like originality, coherence and cumulative contributions to fields of study, acceptance by peers and success in translating research into gains in health status. An innovative and nuanced approached to GHR ethics was needed to deal with some unique ethical issues because the needs for GHR were not adequately addressed by institutional biomedical research ethics boards. Core competencies for GHR researchers were a blend of those needed for health promotion, population health, international development, sustainable development, and systems science.

Discussion: Developing acceptable and meaningful ways to evaluate the short-term contributions for GHR and forecast its long-term impacts is a strategic priority needed to defend decisions being made in GHR development. Planning and investing to support the underlying GHR elements and competencies that allow for adaptive, innovative, and supportive research partnerships to achieve 'health for all' are more likely to have long-term impacts than building research strategies around specific diseases of interest.

Keywords: *global health*; *practice*; *features*; *competencies*; *excellence*

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We set out to understand what constitutes the essential elements of global health research (GHR) for two distinct reasons. One author, a university researcher, needed to help guide the operations and dynamics of three GHR teams to maximize their research and capacity-building outputs. The other author, a senior program officer and manager of a GHR funding body, needed to undertake a formative review of a funded research program to help guide its development and to establish criteria for later program evaluation. At the outset of this process, it was evident that there was no common definition of GHR and, thus, no commonly established criteria for assessing its excellence or agreement on its governance. There was also debate and lack of an evidence base to select validated means for evaluating GHR and deciding the attributes of excellence. In this paper, we review the collective experiences of 14 GHR teams and compare that to the comments and

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experiences of others in the literature to help guide our understanding of the features that are essential to the practice of GHR.

GHR is an approach to inquiry that continues to emerge from international health research and population health research (1, 2). The term global health was perhaps first used as early as the 1970s with rapidly increasing reference to it in recent years. This, to some extent, signifies a shift in thinking from 'international health,' which concerns itself primarily with the control of the spread of epidemics across national boundaries to 'global health,' which concerns itself with the health of the global population as the forces of globalization become stronger (3). As investment in GHR has increased, this shift in thinking has not been accompanied with a concerted effort to define the scope and boundaries of this emerging approach to health research. A consistent conception is needed to portray the importance and relevance of GHR to supporters and donors, to position GHR in the minds of policy makers and to help frame the appropriate institutional and governance structures to implement and sustain GHR programs.

In 1997, the US Institute of Medicine defined global health as 'health problems that transcend national boundaries, that may be influenced by circumstances or experiences in other countries, and that are best addressed by cooperative actions and solutions' (4). A more recent definition suggests that 'global health is an area for study, research, and practice that places a priority on improving health and achieving equity in health for all people worldwide' and that it could be thought of as a notion or an objective (5). Research for global health is part of a wider process aimed at reducing health inequity rather than an end in itself.

In 2005, the Global Health Research Initiative, a partnership between five agencies of the Government of Canada (Canadian Institutes of Health Research, International Development Research Centre, Health Canada, Canadian Agency for International Development and Public Health Agency of Canada) launched the Teasdale-Corti Global Health Research Partnership Program. The program's orientation is toward 'addressing the upstream drivers that influence the political, social, cultural, economic, and environmental determinants of health and development' (6) by supporting innovative international approaches to health knowledge generation and synthesis through research, health research capacity development, and the use of evidence for health policy and practice. Fourteen Canadian and low- and middle-income country (Canada-LMIC) research partnerships have been supported by this program to conduct programs of research, research capacity building and knowledge transfer and exchange, covering a wide range of topics and spanning more than 45 countries (http://www.ghri.ca) (Table 1).

Table 1. Research topics and regions of activity for 14 Canadian-funded Teasdale-Corti global health research teams

Topics of research	Region(s)
Pediatric pain management in urban and rural Thailand	Southeast Asia
Unraveling the emerging childhood obesity epidemic	Central America
HIV prevention for rural youth: mobilizing schools and communities	Africa
Veterinary public health as part of the global response to emerging diseases	South Asia
Political violence, natural disasters and mental health outcomes	South Asia, Central and South America
Prevention, care and support for vulnerable populations at risk for HIV/STI	China
Revitalizing health for all: learning from comprehensive primary health care experiences	Africa, South Asia, Central and South America, Australia
Strengthening nurses' capacity for HIV policy development	Africa, Caribbean
A gender perspective on research, policy and practice with regard to work-related mental health problems	South America
Interdisciplinary research team on vulnerability and equity in health	Africa
Public and environmental health interactions in food and water-borne illnesses	Caribbean
Primary prevention of ill human health through sound land use for small-scale farmers of the humid tropics	South America
Increasing capacity to achieve Millennium Development Goal #6: combating infectious diseases	Central America
Researching equity in access to health care	Africa

The opinions expressed in this paper are those of the authors alone and are based on a reflective exploration of the experiences of the 14 teams coupled with a review of current literature. Literature was collected from the search engines Google, Google Scholar, and PubMed, relying primarily on the keywords: global, health, promotion, population, sustainable development, competencies, evaluation, skills, knowledge, excellence, and research. We adopted an interpretive approach based on listening to the experiences of GHR practitioners involved in the 14 teams. We did this in four ways. First, an all-team meeting was held in 2009. The purposes of that meeting were to share the collective experience of teams in order to identify their perceptions on advances and gaps in GHR, to provide a venue to access each other's

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experience and share ideas that could inform team research and capacity-building activities, and to inform the future planning of the funding program. In generating the report of that meeting, one author (CS) undertook a qualitative content analysis of the meeting's minutes, presentations, and recorded statements. Content was examined in five main categories: research targets and goals, features and function of the team, research processes, methodology, and 'other.' This report was provided to meeting attendees for feedback and clarification on key concepts. Second, the original proposals of the teams were reviewed to establish the intentions of the teams' research, capacity building and knowledge transfer and exchange outcomes and processes. Third, the concrete experiences of the teams, as documented in annual progress reports to the funder, were reviewed to look for cross-cutting activities, goals, organizational structures, challenges, outcomes, and methods. Only one author (ID) reviewed the annual reports as they were written for the funder and were not public documents. Finally, the themes and concepts derived from individual and collective experiences in conducting their work, the challenges they have been facing and their successes were compared with experiences reported in the literature to develop an applied perspective on the way GHR can be practiced, evaluated, and supported.

The scope of topics and geographic coverage of these teams was wide. When we undertook our review, the teams had progressed to the stage where they had created the necessary infrastructure, profile, capacity and governance to begin research towards their goals. Baseline data for projects had been collected and data for research-specific questions were being derived. However, most projects still had 2 years remaining to complete their planned research and thus it was premature to attempt to measure the effectiveness of their approaches. Instead, this paper focuses on the processes and characteristics being used to implement their GHR projects. While each team faced unique challenges locally, this paper focuses on shared practices, principles, essential elements, and core competencies that arose from teams' experiences and lessons learned from implementing their research.

Research goals and principles

The principles and practice of GHR used by the teams were strongly aligned with the health promotion and population health perspectives, but not simply in applying these perspectives abroad. National borders were only one of many determinants of health, one that set the cultural, political and resource constraints affecting health goals and outcomes. A shared goal was to seek key modifiable determinants that could be affected to make people more resilient to the social and ecological factors that impacted their health and well-being. Underlying the teams' conception of GHR was their focus on equity as an ethical imperative in the concept of health for all. The ultimate goal was, through understanding the complexities of these determinants and their interactions, to contribute to the development of effective, equitable, sustainable and ethically sound solutions to health problems, and create equity in health between and among populations. GHR, as practiced by these teams, required a very broad approach to health research, one that was complex and interdisciplinary in nature, and ideally capable of visualizing the complexities of the interactions between the social, ecological, and economic determinants of health and consequently developing effective and practical solutions to global population health problems and issues.

Shared features of teams' global health research (GHR) practices

Six main themes were common across all 14 teams and were seen as key issues to research planning and implementation (Table 2).

Time lines needed to be long to meet global health research (GHR) goals

By virtue of being interdisciplinary endeavors, and in most cases, multinational and multicultural ones, team partnerships required time to develop, solidify and become fully functional and effective. Long time frames were needed to ensure the translation of research into positive health outcomes. Teams unanimously felt that long-term investment toward a long-term vision was essential to meet project expectations, which included action be taken on the determinants of health, investments in systems and societal change becoming sustainable, new capacities be planned and delivered, and meaningful evaluation of the impacts of investments be conducted. Taylor-Robinson et al. (7) similarly concluded that the time frames for population and public health decision making need to be long to resolve the complex social and/or ecological interactions that lie at the heart of global health issues. Pressures against long-term visions included funding cycles driven by political cycles,

Table 2. Main domains of features of global health research shared by 14 research teams

Excellence in research
Long-term visions and time frames for research
Focus on implementation
Partnerships
Ethical foundation
Skilled people

institutional re-organization, the emphasis on randomized clinical trials to support evidence-based policies, the need for public organizations to show quick returns on investments and the challenges in making long-term forecasts (7).

Many of the external factors affecting the health outcomes concerning the teams were beyond the sphere of influence of the teams and their partners because they were restricted by the 4- to 5-year duration of their funding. Global health researchers needed skills in working across time frames so that they could identify the proper temporal scale to investigate an issue as well as learn how to effectively communicate the contribution of long-term work to politicians, donors, and decision makers. A proposed strategy for improving the influence of research outputs was support for a long-term research agenda that allowed for the study of topics such as improved forecasting, improved knowledge translation, and measures of effectiveness that reveal incremental short-term benefits of long-term work.

Indicators of research excellence based on a biomedical model were necessary but not sufficient for judging global health research (GHR)

There was unanimous support among the teams that GHR must demonstrate excellence, but the exact meaning of this was less clear. Research excellence is often defined as the production of new and cutting edge knowledge that pushes back the frontiers of a discipline. Breadth of research, however, is equally or more important than depth in interdisciplinary fields such as GHR (8). Because GHR spans and combines multiple disciplines, it is challenging to attribute specific gains in a specific discipline through the actions of a GHR team. More recently, scientific excellence has been equated with commercialization and competitiveness of products derived from research. Many team members had an applied definition of excellence that focused on improvement in health outcomes as the principle measure rather than the creation of a commercial product. The interdisciplinary and population-based effectiveness characteristics of GHR (e.g. having broad appeal, being adaptable for both participants and intervention agents) (9) create traits that are not in line with the above-mentioned common definitions of research excellence. Additional criteria for assessing excellence in interdisciplinary research, and thus GHR, are needed. For example, Tijssen (10) identified four features of research excellence to which we will add a fifth: (a) originality in tackling problems, (b) coherence and cumulative character of the research, (c) contributions made to fields of study, (d) acceptance by peers, and (e) success in translating research into positive gains in health status that reduce inequities in health. These criteria do not imply that historical standards of excellence that focus on publications and success in securing research funds are irrelevant, rather that there are additional features of GHR that should be evaluated when judging excellence. To meet such a suite of criteria for excellence would require all team members to strive for excellence in their independent disciplinary approaches while the team as a whole combined the disciplinary outputs in a creative, innovative, and effective manner.

Systematic approaches to implementing research to promote equity are needed

Given that equity in health is a foundational concept for GHR in general and the Teasdale-Corti program specifically, teams planned and implemented research in a manner that allowed knowledge to be broadly shared and applied to attain equitable health outcomes. All teams had explicit plans on how to weave research into wider processes that were needed to ensure new knowledge could be applied to improve health outcomes. However, evidence to guide and accelerate the implementation of research findings was seen as an important gap by many team members. Implementation research was also an essential need identified by the Commission on Health Research for Development. If translating research into positive gains in health status is accepted as a criterion for excellence, GHR needs to develop, apply and evaluate means to demonstrate the value of new knowledge and to discover ways to implement findings in a timely and effective manner. Randomized controlled trials, which are widely accepted as the most reliable method of determining effectiveness in health care settings, have not been designed to evaluate complex interventions that involve multiple components (11). People living in poverty face social constraints and health threats that make prevention and treatment more difficult and create unique challenges for GHR knowledge implementation (12). The challenge of implementing research was not unique to these teams or to GHR in general, however, the problem seemed especially acute in GHR given the paradoxical widening gap in health status between populations at the same time as increasing investment in international health and GHR.

Partnerships are essential for global health research (GHR)

Even though the teams' motivations to conduct research and collaborate varied, partnerships were a defining feature of all teams' work and were felt to provide benefits to all players involved. Teams needed a multisectoral approach to their research design and implementation owing to the multidimensional features of the issues they studied and the diversity of actors required to turn their research into action. By virtue of the complexity of the issues and interactions that they sought to understand and address, teams were intrinsically

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interdisciplinary and collaborative. Teams rejected the historical approach where various disciplinarians worked on different aspects of a health issue in isolation, with little communication among researchers and few avenues for communication between the producers of research findings and those who will use and ultimately benefit from them. Because the Teasdale-Corti program emphasized finding practical solutions to problems, team partnerships included decision makers, practitioners, and communities in the full range of the research process, from setting priorities to implementing solutions. Partnerships were needed as a foundation of community-based and participatory research and to fulfill the knowledge generation and knowledge implementation cycle. Donors and researchers must recognize that developing and maintaining trusting partnerships are as essential for GHR as pipettes are for bench-top scientists. Investment in partnership development should be considered a necessary part of research and deserving of financial support.

The number and nature of collaborations and partnerships existing within and between teams was defined by the problems at hand. Teams recognized that interdisciplinary approaches are typically associated with GHR, but noted that they may not be needed to resolve all GHR questions. There will be some global health issues that could be addressed within a discipline in partnership with communities and decision makers. Others need to have a wide suite of disciplines integrated effectively to uncover the root causes of an issue and discover strategies for intervention.

Prevailing approaches to biomedical research ethics failed to capture global health research (GHR) ethical dilemmas

The focus of GHR on pro-equity health policy and the desire to examine 'systematic disparities in health between more and less advantaged social groups' and the intervening social factors that influence health create some unique ethical dilemmas (13). Teams dealt with some challenging ethical issues that were different from those posed by related health sciences, particularly clinical and biomedical research, such as: equity in research partnerships and power dynamics; the potential for exploitation of vulnerable populations; the risks of moral relativism; issues around fulfillment of obligations toward research participants; dilemmas posed by conflicting moral issues (e.g. those between health, livelihood, and environment); and responsibilities of researchers from rich countries and donors toward institutions and partners from LMICs. None of these are unique to GHR, but teams felt that their universities, both in Canada and elsewhere, had not yet developed a process well suited to GHR. Many team members saw a need for a different way of looking at research ethics, including a reconsideration of how we balance and consider differing perspectives and capacity for ethical review of research across nations and disciplines. An innovative and nuanced approach to research ethics was deemed necessary in GHR, but a mechanism for achieving such an approach was beyond the scope of the teams' work or our meetings. The GHRI recognized this issue and created new funding opportunities to critically examine ethics in GHR.

Training in global health research (GHR) core competencies is necessary

Competencies describe the functional and behavioral qualities that an individual must possess in order to succeed. All teams benefited from the diverse skills, knowledge, and attitudes of their members, but few were explicitly trained as global health researchers. All teams had research capacity building as a main component of their work and thus were keen on identifying the core competencies for global health researchers. Only a portion of the teams had explicitly tackled the challenge of identifying and developing training for GHR competencies. By combining team experiences with literature on competencies of associated domains like population health, we found four themes for GHR core competencies (Table 3). They were a blend of the competencies for health promotion, population health, international development, sustainable development and systems science. Team members felt that training in these competencies was needed across the entire spectrum of researchers, from senior academics, to trainees, to community researchers, and from practitioner to policy maker.

The core competencies of health promotion and population health are fundamental for GHR, as these fields were foundational specifically for teams' work and for GHR in general. The Galway consensus conference nominated eight core competencies for effective health promotion practice: catalyzing change, leadership, assessment, planning, implementation, evaluation, advocacy, and partnerships (14). Employing a socio-ecological model of health; a commitment to equity and social justice; a respect for cultural diversity; a dedication to sustainable development; a participatory approach to engaging the population in identifying needs, setting priorities, and planning, implementing and evaluating the practical; and feasible health promotion solutions to address needs are also core values and principles for health promotion (14). They reflected the values of many team members as well as the humanistic values common to many of the health and social sciences. Additional competencies for health promotion include being able to: identify sources of information on health needs; involve communities and stakeholders in building effective programs; be evidence based when building and evaluating programs; support capacity building; communicate

Table 3. Proposed core perspectives and competencies of global health researchers

Perspective	Associated competencies
Team and collaboration skills	Able to develop partnerships, consensus and capacity by applying participatory approaches, strong communication, integrated decision making and effective leadership Willing and able to collaborate and cooperate with communities and stakeholders in trusting relationships
Systems attitudes and perspectives	Be comfortable working in a dynamic socio-ecological model of health Value the importance of understanding relationships and interactions within a complex system and their influences on sustainable health outcomes
Program and project management skills	Develop evidence-based approaches to assessment, planning, implementing and evaluating research using health and other information from a variety of sources Identify the enablers and obstacles to effective translation of research into action and develop plans for implementing research to achieve improved health outcomes
Ethical and personal perspectives	Be open and flexible to creative approaches to working in a team that supports equity and social justice Seek to continually improve and share lessons learned in a reciprocal fashion with research users Be professional and respect cultural and biological diversity Strives for research excellence

effectively; demonstrate personal qualities that support creativity, flexibility, cooperation and team work, and professionalism (15).

Understanding sustainability was important for teams because of their emphasis on a long-term vision for GHR. Knowing how the use of resources, investments, technology, and institutional development affect the health and well-being of future generations is key to understanding sustainable development and is an important public health competency (16). Six themes address the essential knowledge, skills, and attitudes necessary to apply the principles of sustainable development in day-to-day activities: ethics and values; integrated decision making; responsible use of resources; valuing diversity; safety and well-being; and continual improvement (17). Additional skills include systems thinking, strong communication ability, forecasting events over time, mobilizing knowledge to action, collaboration and cooperation, ability to use various processes to acquire knowledge, valuing biological and cultural diversity, and valuing justice and equity (18).

Being prepared and open to collaborating and integrating with multiple disciplines and perspectives was critical for many team members. Some have concluded that the first educational goal of interdisciplinary training should be the development of strong disciplinarians because it is understood that interdisciplinarians must first be excellent in the art and science of their own field of study (21, 22). The individual talents, disciplinary skills, theoretical knowledge, and standards of scholarship of strong disciplinarians can serve as platforms for interdisciplinary inquiry (19, 20). Subsequent experience working collaboratively will develop the management skills required for the multiple agendas and perspectives inherent in interdisciplinary research. Reliance on acquired experience to prepare interdisciplinarians will take time and limit the number of competent interdisciplinary researchers produced (19, 23). Some advocate that trainees are introduced early to other fields of study to develop understanding and respect for the differences and similarities of other disciplines, but not necessarily receive training in collaboration skills. Still others advocate for exposure and experience in collaborative multi- to interdisciplinary work early in training. Regardless of the approach, in addition to their technical proficiency and sound professional knowledge, interdisciplinarians must be willing and able to recognize and manage the cultural, political and personal aspects of working across disciplinary and institutional lines. Relationships are critical to knowledge creation and knowledge transfer (24–26). Therefore, a culture of trust, reciprocity and respect is required to enable effective collaboration. A willingness and ability to contribute, effective communication, readiness to seek consensus rather than domination, compatibility and an enthusiasm for sharing the credit are all attitudes needed for interdisciplinary work.

Systems thinking underlies many modern concepts of health promotion, population health and public health; hence, it is central to GHR. Understanding the social and environmental determinants of health and how they function and interact requires one to think in terms of complex dynamic systems. However, finding the skills, personality traits and educational backgrounds that promote effective systems thinking has been somewhat elusive. Sweeney and Sterman (27) included the following as specific systems thinking skills: ability to understand how the behavior of a system arises from the interaction of its agents over time; discover and represent feedback processes hypothesized to underlie observed patterns of system behavior; recognize delays and understand their

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impact; identify non-linearities; recognize and challenge the boundaries of mental models and understand the domain-specific knowledge of the system under study. These same authors recognized that the pace of claims about the necessary skills for systems thinking has outstripped attempts to evaluate those claims. Despite these controversies, there are perhaps two key attitudes necessary for a systems thinker (28). First, she/he must see the study of relationships and interactions of systems components as a legitimate area of inquiry. Second, she/he must be able to conceptualize changes in these relationships over time.

Implications for promoting global health research

The features and challenge we identified are not unique to GHR. Because GHR teams function in a multi- and interdisciplinary fashion, it is not surprising that their features and challenges are shared with other disciplines. They are, in large part, derived from various fields of inquiry that contribute to GHR, such as population health, health promotion, ecosystem approaches to health, and sustainable development. All are interested in systems views on the origin, protection, and promotion of health. The overlap in defining features across these research approaches is to be expected for a research approach that highly values the integration of multiple perspectives and disciplines into a cohesive whole. Commonalities with other fields does not reduce the importance of these features and competencies, but instead, in our opinion, re-enforces them as foundational elements of an interdisciplinary field like GHR, without which it cannot succeed. Unfortunately, they may also make GHR ill fitted to traditional approaches to organizing academic units and funding opportunities. Ambiguity in the definition of GHR and its scope of practice still challenges the promotion of GHR funding, hampers attempts to establish GHR as a sustainable approach to redressing health inequities and complicates assessment of excellence in GHR by peers in related health sciences. For the time being, GHR essential elements and criteria for excellence will remain based on expert opinion and shared experiences, as there is a dearth of published systematic evaluation of GHR. We believe there is value in the opinions and field experiences of these 14 teams because the intellectual capital and tacit knowledge of experienced practitioners and policy makers has been found to be useful in informing policy development decisions while research lags behind (29).

From our review, three main priorities arose that donors and institutions must address to foster strategic thinking and actions that will lead to innovative and effective GHR. First, they must develop a firm conception of what they are supporting. Even though a definitive definition of GHR remains elusive, our review has identified key elements (Table 2) and core competencies (Table 3) that funders must enable to support the practice of GHR. Donors need to support programs that allow adaptation and flexibility for ongoing learning while working in 'messy' socio-ecological systems. Researchers and their partners need to have the latitude to be dynamic, innovative, and opportunistic to identify and target underpinnings of health that can be manipulated to achieve wider prevention of undesired health outcomes and create resilience and health equity. Donors, however, tend to require a more narrow focus for their investments. GHR priorities are often selected based on burden of disease measurements superimposed on resource limitations affecting the coping capacity of a nation (30). These often result in funding priorities targeting specific diseases in selected countries. It is our assertion that short-term (2–5 year) funding cycles for specific etiologically defined health issues will fail to yield the return on investment that long-term GHR, focused on upstream socio-ecological interactions, can generate. While it may be more consistent with current practices to build GHR strategies around key diseases of interest, the experience of these 14 teams and others argues for the need to invest in the underlying features and competencies that create the environments and people that can be adaptive, innovative, and able to build teams that address obstacles to health equity. Research that improves the quality and longevity of life is unarguably to be highly valued, but GHR programs must distinguish themselves by taking a few steps back from remedying clinical disease and seek out the strategic issues found in upstream social and environmental determinants of health and illness. We argue that this is a defining feature of GHR.

GHR strategic planning requires decision makers and managers to find out what truly is important to the communities they are trying to help, which must be established in large part by engaging partners in vulnerable communities of concern. Understanding how well an organization's strategic plan meets the expectations and needs of its stakeholders is a fundamental way that an organization can assess its success (31). Which specific issues should be studied is best determined by anchoring strategic priorities within the context of the resources, political realities, and needs of those affected by health inequities. The practice of identifying strategic priorities for promoting health equity by partnering with communities and local partners was key to the successful implementation of all 14 teams.

The second step in enabling a strategic approach to sustain GHR is to invest in research on how to evaluate the short-term contributions for GHR and forecast its long-term impacts. There must be short- and long-term plans to address the evaluation challenge of GHR so as to move global health strategic plans onto a solid basis of

evidence. In the short-term, researchers must be rewarded for investigating how to document success. Academic reviews for promotion and tenure need to demonstrate patience when evaluating global health researchers because research outcomes and successes, and subsequent publications may not come quickly. Developing ways to recognize scholarly success in addition to the usual venues of publication must become a priority for research institutions and universities promoting global health programs. However, such a cultural shift may not be quickly forthcoming. A significant challenge is to determine what additional measures, if any, are needed to evaluate interdisciplinary research beyond those used or shown to be effective for disciplinary research. The problems in evaluation are linked to the lack of accepted criteria or single standard for excellence in research that crosses and combines perspectives, disciplines, and standards. Donors should fund research into how to evaluate and communicate success and excellence in GHR. This can include internal processes that use funded research projects as 'living evaluation labs,' supporting working groups to expand the theoretical foundations for evaluation, or having explicit calls for proposals on evaluation sciences. Donors may wish to employ the principles of GHR outlined above when making funding decisions and when developing priorities and criteria for the success of funded programs. Engaging a suite of disciplines, communities and decision makers in equitable partnerships to reflect on and develop consensus on criteria for evaluation may be a short-term means to begin what will be an iterative process of figuring out how to recognize excellence and success. In the long term, donors, universities, and researchers must develop systems and perspectives that support stable funding that is continued on the basis of demonstrable research excellence and progress toward indices of success.

The third theme in GHR strategic planning is the need to be people-centric. All 14 teams highly valued the people with whom they worked; from the community members and research users to academic collaborators and trainees. The human dimensions of GHR require support and investment to sustain the recent development of a global health approach to health research. Strategic planning must be built on creating the human potential to realize the goals of GHR, such as seeing partnership development as a core GHR methodology, training the next generation of global health researchers, or developing new mechanisms to encourage young faculty to work in GHR. The focus of most post-graduate research training programs on producing disciplinary experts, and the focus of training programs on particular disciplinary orientations are essential for producing top-notch researchers within any particular discipline and for providing people with foundational skills for later use in GHR. But they are in themselves not sufficient for equipping new researchers with the necessary skills and expertise that are required for GHR. The generally short time frames and pressures to achieve tenure, in many instances discourage new researchers from engaging in GHR. Much PhD level and post-doctoral training does not encourage collaborative and interdisciplinary research experiences that are essential for future success in GHR. The generally short-term funding cycles of many donors work against nurturing long-term relations that are necessary for GHR. Successful GHR requires a different and innovative approach to training and capacity building, one that embraces partnership building and an interdisciplinary approach as well as other key principles of GHR outlined above. Changes need to take place within research granting mechanisms and structures and within post-graduate training institutions to overcome some of the intrinsic pressures that discourage allocation of resources and time to GHR. Despite the political pressures on many donor agencies to demonstrate 'value for investment' in the short term and to attribute specific health outcomes to research programs, it is hard to do so when dealing with complex socio-ecological systems that are dynamic in nature and are influenced by multiple interacting factors. This is even more challenging when the time lines for evaluation are a fraction of the time required to see changes in health outcomes and where there are multiple and sometimes conflicting goals.

We recognize that this paper provides a biased opinion based on the experiences of GHR teams that were preselected to meet the specific requirements of a specific funding program. This paper was not intended to be a systematic evaluation of the 14 teams; that process will not be undertaken until the teams complete their work. Instead, our goal was to 'ground truth' some of the opinions we encountered in the literature and at meetings against the experiences of GHR teams to see where opinion and experience intersected in hopes of finding concurrence and thus identifying core competencies and features of GHR. Listening exercises such as this are useful to help set the agenda for user-driven research (32). It complements but does not substitute more objective program evaluations or user surveys. We encourage donors and researchers to develop or deploy capacity to undertake and publish research impact assessments and program evaluations to provide a basis for evidence-based GHR development.

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