THE POPULATION HEALTH IMPLEMENTATION AND TRAINING DATA COLLABORATIVE

CONCEPT PAPER AND SCOPE OF WORK[1]

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(Appendix D added May 19, 2011)

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Table of Contents

I. Introduction and purpose 1

II. A conceptual model for the Collaborative 2

A An overview of existing frameworks 2
B The PHIT Collaborative conceptual model 4

III. Methodological challenges in cross-site learning 7

A Defining priority cross-site research questions 7
B Design issues in cross-site analyses 8
C Measurement approaches 9

IV. Metrics 9

A Selection process and criteria 9
B Metrics for population health impact 12
C Metrics for outcomes 13
D Metrics for outputs 14
E Metrics for inputs and processes 15

V. Supporting Documentation 17

A Documentation of project implementation 17
B Documentation of contextual factors 17

VI. Database construction and maintenance 18

VII. Next steps and Collaborative timetable 18

List of Boxes, Tables and Figures

A Box 1: Defining PHIT metrics 1
B Box 2: Examples of priority cross-site metrics 8
C Box 3: Core metrics for population health impact 12
D Box 4: Core metrics for outcomes 14
E Box 5: Core metrics for inputs and processes 16
F Box 6: Initial milestones for the PHIT Data Collaborative 19
G Figure 1: A conceptual model for the PHIT Data Collaborative 6

H Table 1: Core and common metrics 11

Appendices

A Results of mapping of Partnership strategies onto the WHO Health System Building Blocks Framework

B Definitions for Collaborative metrics (core and common)

C Additional topic areas and metrics considered but not selected

D Contextual Factors - optional variables for the Documentation component of the Data Collaborative *(added May 19, 2011)*

Acronyms

AHI	African Health Initiative
CHeSS	Country Health Systems Surveillance, a global initiative
CI	Catalytic Initiative to Save One Million Lives
DDCF	Doris Duke Charitable Foundation
HSS	Health Systems Strengthening
HSS/SQ	Health Systems Strengthening/Service Quality working group of the Collaborative
HTN	Hypertension
IPTp	Intermittent Preventive Treatment for malaria in pregnancy
MDG	Millennium Development Goal
ORS	Oral Rehydration Salts
PHIT	Population Health Implementation and Training
UN	United Nations
US	United States
U5	Children under the age of five years
WG	Working Group

I Introduction and purpose

In 2007 the Doris Duke Charitable Foundation (DDCF) launched the African Health Initiative (AHI) "…to help catalyze a shift from the current public health focus on single-disease programs to an emphasis on strengthening health systems to effectively deliver integrated primary care to underserved populations."[2] In 2009 DDCF awarded grants to support Population Health Implementation and Training (PHIT) Partnerships in five African countries. Each Partnership is comprised of one or more in-country institutions and a US-based sponsor institution, and was selected through a competitive process based on the promise of the project to: 1) make significant, measurable health improvements by providing sustainable integrated primary health care to a substantial underserved region (a minimum of 250,000 people); 2) strengthen health systems and the health workforce in the region of interest in a manner that enables local and national governments to sustain those improvements beyond the grant period; and 3) increase the knowledge for evidence-based health delivery and health systems planning by supporting implementation research.

Generating new knowledge of global significance is central to the achievement of the AHI goal, and requires a systematic mechanism for cross-site learning. DDCF therefore created the PHIT Data Collaborative to provide a forum for sharing ideas and generating new knowledge for the field. Collaborative members include staff from Partnership Teams, DDCF, and The Johns Hopkins Bloomberg School of Public Health in their role as "Data Coordinator" for the Collaborative. Further information about the Collaborative and its management structure is available in a companion document titled "Principles, policies and procedures for the PHIT Data Collaborative".

Box 1

Defining PHIT Metrics

The Collaborative uses the term "metric" to refer to a quantified measurement that can be repeated over time, synonymous with the term "indicator". In this document we refer to two types of metrics:

"Core" metrics, which all Partnership teams will collect and report to the Collaborative; and

"Common" metrics, which at least two but not all Partnerships will collect and report to the Collaborative.

These metrics may be revised or expanded over time as further experience is gained.

The Collaborative aims to foster cross-site and global learning by:

1 Defining core and common metrics (see Box 1);

2 Establishing and supporting quality in data collection and analysis for these metrics and supporting documentation;

3 Facilitating cross-site data analysis, interpretation, dissemination and use of data to improve public health policies and programs;

4 Providing training and other opportunities for sharing best practices and tools across the sites; and

5 Making core data accessible to policy makers and the public in a timely manner.

The purpose of this document is to summarize Collaborative plans for cross-site learning through the collection and analysis of data and supporting information (activities 1-3 in the above list). These plans supplement (rather than replace) the existing monitoring, evaluation and research plans developed by

[2] Doris Duke Charitable Foundation. African Health Initiative Population Health Implementation and Training (PHIT) Data Coordinator - Request for Applications. April 2007.

each Partnership, and have been developed in consultation with all Collaborative members. This document captures the thinking of the Collaborative at the end of 2010, and incorporates the feedback received from the Technical Advisory Group (TAG) and the Partnerships. These plans have been endorsed by all Collaborative members but are not static; they will evolve over time as experience is gained.

Plans for training and sharing best practices and tools (activity 4) will be developed as needs and opportunities arise, and are not addressed here. Plans for publication and ensuring public access (activity 5) are addressed in the companion document on principles, policies and procedures.

The next section of the document presents a conceptual model for the work of the Collaborative, followed in subsequent sections by the presentation of the metrics and supporting documentation, and procedures for developing and maintaining the Collaborative databases. The final section of the document describes the work plan for the Collaborative and a timetable for specific activities and products.

II A Conceptual Model for the Collaborative

All public health programs are based on a set of assumptions that reflect an underlying conceptual model. A conceptual model[3] specifies the pathways through which program activities (inputs and processes) will lead to changes in intermediate variables (outputs and outcomes) and eventual impact on population health. The model guides the selection of metrics and supporting documentation, and provides a road map for the analysis of progress and results. Each of the PHIT Partnerships is based on a unique conceptual model reflecting how the strategy for health system strengthening that they will implement will result in public health impact in their setting. The Collaborative was established after these plans had been developed and funded, so a first step was to work together to develop a *post hoc* conceptual model consistent with existing frameworks and reflecting areas of overlap in the strategies planned by the five Partnerships. Consistency with existing frameworks is important because it will allow the Collaborative to contribute more easily to global learning.

In this section we review several existing frameworks and explain how the Collaborative combined various elements of them to forge its own conceptual model.

A An overview of existing frameworks

Two conceptual frameworks served as cornerstones in the development of the conceptual model for the Collaborative. The first is a ***common framework for monitoring performance and evaluating progress in the scale-up for better health***, a widely-accepted paradigm for selecting metrics and developing evaluation designs developed in response to calls for consensus on a standard set of indicators to assess

[3] This is also sometimes called an "impact model", a "results chain" or a "model of change"; in this context the words "framework" and "model" are interchangeable – we have elected to use "model" to distinguish the Collaborative from the existing frameworks which were the primary starting points for its development.

progress toward achievement of the Millennium Development Goals.[4,5] The framework is consistent with the Paris Declaration on Aid Effectiveness, and the current version is the result of a broad consultative process involving countries, major development partners, donors, global initiatives and UN partners.[6] It has been used as the basis for developing an evaluation framework focused on the scale-up to achieve the fourth and fifth MDGs (focused respectively on reducing child mortality and improving maternal health) as a part of the Catalytic Initiative to Save One Million Lives (CI).[7] This framework was presented to Partnership teams at a meeting convened by DDCF in Dar es Salaam, Tanzania in November 2008.[8] Most recently the framework has been adapted for use in monitoring and evaluating health systems strength by a working group composed of representatives of WHO, the World Bank, GAVI and the Global Fund to Fight AIDS, TB and malaria.[9]

The second framework used by the Collaborative as a cornerstone in the development of our conceptual model is the ***WHO health systems framework and health systems building blocks.***[10,11] This framework proposes that six linked and overlapping components of a health system (service delivery, health workforce, information, medical products, vaccines and technologies, financing and leadership/governance) operate through the desirable attributes of improved access, coverage, quality and safety to lead to improved health and other outcomes (responsiveness, social and financial risk protection and improved efficiency). The framework reflects the properties of all complex systems, including the basic principles of non-linearity, interconnectedness and synergy among systems elements.[12] Introducing change into one of the six health systems building blocks is likely to change the others, and methodological work is needed on how best to capture these system-wide effects.[13]

Work by a global initiative to strengthen "Country Health Systems Surveillance", or CHeSS, has combined these two frameworks into a single diagram in which the building blocks are incorporated into

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[4] Victora, C.G., Black, R.E. & Bryce, J. Learning from new initiatives in maternal and child health. *Lancet* 2007;**370** (9593): 1113-4.

[5] Murray, C.J., Frenk, J. & Evans, T. The Global Campaign for the Health MDGs: challenges, opportunities, and the imperative of shared learning. *Lancet* 2007;**370** (9592): 1018-20.

[6] Monitoring and Evaluation Working Group of the International Health Partnership and Related Initiatives (IHP+). Common framework for monitoring performance and evaluating progress in the scale-up for better health. No Date. Available at http://www.internationalhealthpartnership.net//CMS files/documents/a_proposed_common_framework_EN.pdf. Accessed 4 December 2009.

[7] Bryce JW, Victora CG, Boerma T, Peters DH, Black RE. Evaluating the scale-up for maternal and child survival: A common framework. International Health, In Press.

[8] Bryce J. Measurement challenges in evaluating maternal and child health programs in low-income countries. Presentation at the Planning Grant Meeting of the DDCF Population Health Implementation and Training program, 5 November 2008.

[9] Boerma T, Abou-Zahr C, Bos E, Hanswen P, Addai E, Low-Beer D. Monitoring and evaluation of health systems strengthening: An operational framework.

[10] WHO. 2007. Everybody's Business. Strengthening Health Systems to Improve Health Outcomes. WHO's Framework for Action. http://www.who.int/healthsystems/strategy/everybodys_business.pdf.

[11] Health in South Africa. An Executive Summary for the Lancet Series." The Lancet. August 24, 2009. Available online: http://download.thelancet.com/flatcontentassets/series/sa/sa_execsum.pdf.

[12] Bateson G. *Steps to an Ecology of Mind: Collected Essays in Anthropology, Psychiatry, Evaolution, and Epistemology.* 1972. Chicago: University of Chicago Press. ISBN 0226039056.

[13] de Savigny D, and Adam T (editors). 2009. Systems thinking for health systems strengthening. Geneva: Alliance for Health Policy and System Research and WHO.

a ***stepwise framework for evaluating health systems reform and strengthening***.[14] This framework represents an important advance over its predecessors by including contextual factors as potential determinants of progress in the causal chain.

Other health systems frameworks that have and will continue to inform the work of the Collaborative include the following:

- Approaches that address the integration of health services across the continuum of care from the family and community through outpatient health care and outreach to inpatient and referral services, seeking to identify the health system inputs needed at each level;[15]
- "Determinants" models developed by the World Bank to link specific characteristics of households, communities, health and education sectors and government policies and capacity to the achievement of the MDGs;[16]
- The conceptual model of "functions the health system performs" that underlies the Health Systems 20/20 work and data bases of the United States Agency for International Development;[17]
- Models that are used to examine the integration of health services within health systems;[18]and
- Numerous other frameworks that have been developed to guide specific intervention and research projects in health systems strengthening.

The plethora of existing frameworks reflects the expanding recognition of the important role of health systems in population health, and reinforces the rationale for the AHI project. The Collaborative has built on and extended these frameworks to develop a conceptual model that reflects the underlying assumptions about how each Partnership strategy will lead to improvements in the health system and population health. This model will continue to be refined in response to PHIT work and research findings.

B The PHIT Collaborative conceptual model

The Collaborative established a Working Group on Health Systems and Service Quality (WG-HSS/SQ) at its first meeting in October 2009, and charged it with developing a PHIT-specific conceptual model. The WG-HSS/SQ began their work by mapping the planned activities of each Partnership onto the WHO health system building blocks framework, with the aim of identifying common activity areas across the

[14] No author. Global Initiative to Strengthen Country Health Systems Surveillance (CHeSS). Summary Report of a Technical Meeting &Action Plan. Bellagio Rockefeller Centre, Italy, 28-30 October 2008.

[15] Lawn JE, Rohde J, Rifkin S, Were M, Paul VK, Chopra M. Alma-Ata 30 years on: revolutionary, relevant, and time to revitalise. *Lancet* 2008; **372**: 917–27.

[16] Wagstaff A, Claeson M. *The Millennium Development Goals for Health: Rising to the Challenges*. Washington DC: The World Bank, 2004. ISBN 0-8213-5767-0. Available at http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2004/07/15/000009486_20040715130626/Rendered/PDF/296730PAPER0Mi1ent0goals0for0health.pdf

[17] Islam, M., ed. 2007. *Health Systems Assessment Approach: A How-To Manual. S*ubmitted to the U.S. Agency for International Development in collaboration with Health Systems 20/20, Partners for Health Reform *plus*, Quality Assurance Project, and Rational Pharmaceutical Management Plus. Arlington, VA: Management Sciences for Health.

[18] Atun R., et al. 2010. Integration of targeted health interventions into health systems: a conceptual framework for analysis. *Health Policy and Planning* (in press). Doi:10.1093/heapol/czp055

Partnerships. The results of this exercise are available in Appendix A. The WG-HSS/SQ then reviewed existing consensus indicators related to their common areas of activity. The starting point was the draft WHO "Toolkit on Monitoring Health Systems Strengthening", which provides recommended indicators and measurement strategies for each of the building blocks, [19] supplemented by other metrics used by global initiatives and health systems research investigators.[20] The WG-HSS/SQ will continue to review the health systems indicators as the work of the Partnerships progresses and in response to ongoing efforts to develop global consensus indicators in this area.

Figure 1 presents a working version of the PHIT conceptual model for health systems strengthening and population health. It is adapted from the CHeSS, WHO six-building block, and other frameworks described above, and reflects a consensus among the Partnerships and TAG members about specific inputs and processes that will contribute to intermediate outputs and outcomes and eventually to an impact on population health. This model is not intended to be comprehensive. The evidence base on links between health systems components, intervention coverage and population health is insufficient to support assumptions about specific programmatic levels, activities, or timelines needed to achieve health impact; it is precisely in this area that the PHIT project hopes to make important contributions.

Each of the proposed model components for inputs and processes, outputs, outcomes and impact are described below, along with a discussion of our rationale for modifications to the CHeSS framework on which it is based. The items within each component (referred to here as "elements") correspond roughly to the health system building blocks, but several could reasonably be placed in more than one model component. We have presented each element in only one component, but explained in the text other components where it should be considered.

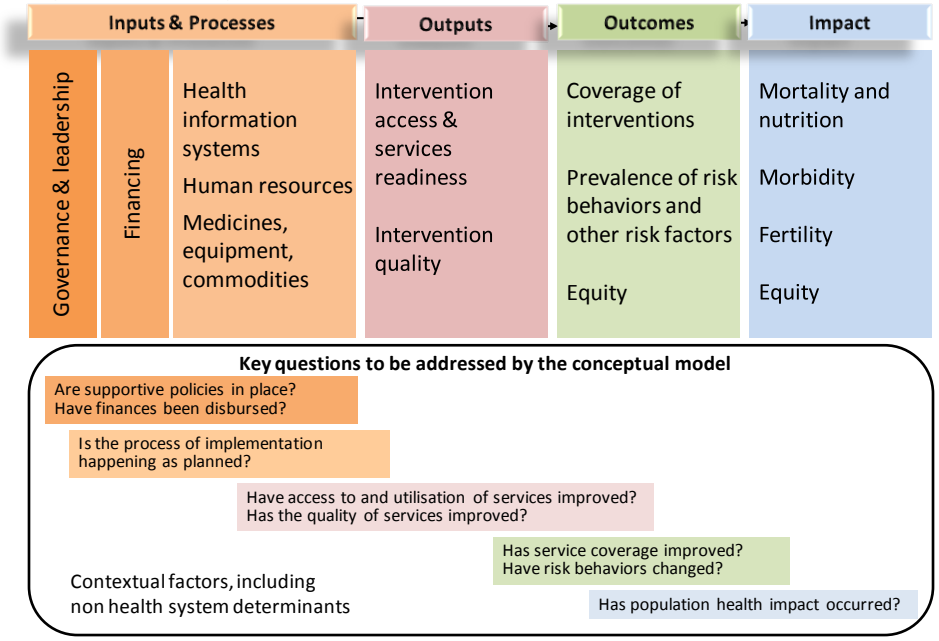
Inputs and processes refer to a broad range of activities largely captured by the WHO six-building blocks for health systems strengthening with the exceptions of service delivery and service quality. There is considerable variation in this component across the Partnerships, reflecting site-specific strategies for health systems strengthening that respond to local needs, current status of the health care system, and contextual factors. For example, four Partnerships propose activities intended to strengthen management, health planning and governance at district level. In Mozambique and Rwanda this will be done primarily through management training and supervision of district health staff while in Zambia, this will be achieved through the mentoring of existing district management staff during the annual planning of district action plans and though management mentoring provided by health systems experts. Ghana is introducing district based leadership team training and the District Health Planning and Analysis tool (DiHPART) based on the PlanRep tool used in Tanzania to increase the efficient allocation of health care resources. The CHeSS framework has been modified here slightly to align more closely with the terminology in the WHO building block framework.

Outputs refer to the short- and medium-term results of the inputs and processes, and include health services utilization, readiness and quality. All Partnerships share the aim of increasing population access to quality health services, although again there is considerable diversity in strategies across Partnerships. For example, the Rwanda Partnership aims to improve the quality of service at selected health centers and extend services to community level, while Mozambique will work to strengthen district management of all services.

[19] http://www.who.int/healthinfo/statistics/toolkit_hss/en

[20] The Collaborative thanks David Peters and Shivam Gupta for their assistance in reviewing available metrics and proposing possibilities for the Collaborative.

Figure 1: A conceptual model for the PHIT Data Collaborative[1]



[1]Adapted from the CHeSS framework.

Modifications from the CHeSS framework include dropping intervention safety because Partnerships are implementing only health care services supported by evidence of safety and efficacy.

Outcomes refer to increases in service coverage and improvements in health behavior that result from the earlier components in the model. Coverage is defined as the proportion of the population who require an intervention that actually receives it and includes an important component of behavior change. All Partnerships share the aim of increasing coverage with interventions of proven effectiveness in addressing the major causes of mortality in the population; the specific causes of death to be addressed and the extent to which intervention coverage is emphasized in the implementation plan vary by Partnership. One change from the CHeSS framework is that equity is included not only as a possible impact of PHIT strategies, but also as an outcome because a shared aim of all Partnerships is to reduce inequities in service coverage as well as in population health impact.

Impact refers to changes in health status, including mortality, nutrition, morbidity and fertility. All Partnerships have designed their strategies to result in reductions in deaths among children under five. Nutritional status underlies about one-third of these deaths, and is therefore important to the achievement of Partnership aims as well as an important potential confounder[21]. Fertility is the key impact measure of family planning efforts and an important contextual factor in the five countries. There is considerable variation in the other types of health impact expected to result from Partnership activities. CHeSS elements on financial risk protection, responsiveness and efficiency have been removed to preserve the definition of impact as population health and nutrition and the equitable distribution of changes in related indicators. Although these elements are addressed by selected Partnerships, they are not the primary focus of any of the selected strategies for health system

[21] Black et al. 2008. Maternal and child undernutrition: global and regional exposures and health consequences. Lancet. 371(9608):243-260.

strengthening. The CHeSS terminology has also been modified to be consistent with the other elements in the model.

The use of a stepwise approach helps clarify the assumptions underlying the conceptual model. The questions presented at the bottom of Figure 1 are intentionally staggered from left to right, illustrating the need to achieve earlier steps before later results can be obtained.

Equity refers to the fact that programs and interventions often fail to reach those who need them most, and that overall progress in health outcomes or impact metrics can hide important disparities in progress by gender, socioeconomic or ethnic group.[22] The Collaborative has therefore incorporated equity into both the outcome and impact components of its conceptual framework and core metrics in each of these components will be reported by wealth quintile as well as overall. Standard approaches using principal component analyses of household assets to classify families into five equal groups, or wealth quintiles, will be adopted by all PHIT teams for the analysis of household survey data.[23] Teams will use the list of assets included in the most recent national survey in their respective countries as a basis for reporting socioeconomic data to the Collaborative; each team may also opt to rerun principal components analysis on their data and/or elect to stratify results by age, gender and ethnic group. Decisions about weighting procedures and the selection of summary measures of equity (ratios, absolute differences, slope index, concentration index) will be made as the Collaborative evolves.

III Methodological challenges in cross-site learning

The Collaborative has taken on responsibility for generating new knowledge based on the implementation of five diverse strategies for health systems strengthening in five different African countries. In this section we highlight three of the most important methodological issues that will need to be addressed.

A Defining priority cross-site research questions

Each of the PHIT Partnerships is aiming to answer the following questions in their site(s):

- Are we saving lives?
- Is the health system delivering to the population?
- Does the quality of care being delivered meet established standards?
- What are the costs of delivering each Partnership strategy?

The Collaborative is designed to complement the Partnership-specific studies by addressing research questions that can only be answered using data from multiple sites. There are many potential cross-site research questions; the Collaborative will focus on a limited number of priority questions determined in part by data availability. The types of questions that might be addressed will include some focused on the teams' strategies as a whole and others focused on component parts, and are expected to

[22] Victora CG, Walker D, Johns B, Bryce J. Evaluation science. In Merson MH, Black RE, Mills AJ. *Global Health: Diseases, Programs, Systems, and Policies.* Third Edition. Sudbury, MA: Jones & Bartlett Learning, forthcoming.

[23] O'Donnell O, Van Doorslaer E, Wagstaff A, Lindelow M. Analyzing Health Equity Using Household Survey Data: A Guide to Techniques and Their Implementation: World Bank Publications; 2007.

contribute to multiple levels of learning (e.g., policy, organizational, process, and impact on enhancing health and reducing mortality). Examples of potential questions are provided in Box 2; these questions represent those that can be addressed by the Collaborative conceptual model. They will be refined and plans of analysis will be developed to address them in future meetings of the Collaborative.

Box 2

Examples of priority cross-site questions

- *What are the implementation barriers and enablers/facilitating factors to the various Partnership strategies for health system strengthening?*
- *To what extent do the various Partnership strategies for health system strengthening result in improvements in the quality of health services received by the target population?*
- *To what extent do the various Partnership strategies lead to increases in population coverage with interventions that are effective in reducing mortality? Do partnership strategies contribute to reducing inequities in intervention coverage?*
- *How effective are the various strategies introduced by the teams for addressing human resource constraints on improving coverage and reducing mortality?*
- *Do baseline levels or changes in nutritional status or fertility levels influence the effectiveness of interventions in reducing mortality?*

B Design Issues for Cross-Site Analyses

Organizing the Collaborative data to address the priority questions requires consideration of research design issues as they apply to cross-site data analysis. Two key issues are described here; others will be defined as the work proceeds.

1 Data aggregation across sites

Traditional multi-site evaluations often pool data collected in different sites for analysis. This is unlikely to be possible across Partnerships in the Data Collaborative because each Partnership has planned distinct, although occasionally overlapping, interventions and approaches, and has proposed a specific research design that will not necessarily produce data comparable to those collected by other Partnerships. There may be opportunities for more traditional meta-analyses or even analyses using pooled data for selected variables in the Collaborative data sets that are measured in consistent ways and fall toward the impact end of the conceptual model presented in Figure 1. Opportunities for and the feasibility of specific types of cross-site analyses will be discussed over time as the Collaborative evolves.

2 Causal inference across sites

The Zambia team plans a randomized roll-out of its intervention and Tanzania is implementing a cluster randomized controlled trial, traditionally the strongest approach for establishing a causal relationship between a study intervention and observed changes in population health. Plausibility designs as proposed by the other Partnerships may be effective in capturing system-wide changes and their effects on population health. These designs use comparisons of inputs, processes, outputs, outcomes and impact in intervention areas with those in (non randomized) non-intervention areas, and ecological dose-response designs that take into account possible confounding, as well as mediating factors and effect modifiers, to assess project results.

C Measurement Approaches for Cross-Site Analyses of Health System Strengthening

Because health system change is difficult to measure, we plan to supplement the tracking of core and common metrics with supplementary documentation on program implementation and contextual factors that may affect the causal chain reflected in the conceptual model. Over time and in collaboration with other health systems initiatives, it may be possible to define additional metrics.

Plans for collecting standard metrics are summarized in the next section of the document. Plans for documentation are summarized in Section V.

IV. Metrics

Definitions of "core" and "common" metrics are provided in Box 1 (p. 1). In this section we describe the Collaborative metrics and the process through which they were selected.

We begin with the metrics for population health impact, and move progressively back through the conceptual model (Figure 1) to describe metrics for outcomes, outputs and inputs and processes. A tabular summary of the Collaborative metrics is available in Table 1 (p. 11); full definitions of core and common metrics are provided in Appendix B. Additional topic areas and metrics that were reviewed but not selected as core or common are available in Appendix C.

A Selection Process and Criteria

Metrics related to the elements in the conceptual model were generated by reviewing the recommendations of both the health systems frameworks reviewed above and those developed for specific public health purposes (e.g., Millennium Development Goals target indicators, coverage metrics used by Countdown to 2015 for Maternal, Newborn and Child Survival,[24] disease-specific metrics recommended by Roll Back Malaria, Stop TB, UNAIDS and the Global Fund for AIDS, TB and Malaria, WHO and the Lancet series on chronic diseases). In addition, Collaborative members consulted with the TAG and other health systems and measurement experts about their experience in using these metrics, and to generate additional alternatives.[25]

[24] Indicators used in the various cycles of Countdown are presented in the Annexes to the Countdown reports, available at http://www.countdown2015mnch.org/reports-publications.

[25] Experts consulted include Ties Boerma (WHO), Mickey Chopra (UNICEF), Rena Eichler (BroadBranch Associates), David Peters (JHSPH) and members of the Child Health Epidemiology Reference Group.

The Collaborative worked through group meetings, telephone conferences and email exchanges to review these metrics and narrow them by applying the following criteria:

- ***Validity.*** The metric must be an accurate indicator of the phenomenon, and its measurement should produce data that are reliable across Partnership settings and over time.
- ***Relevance to PHIT Partnership aims, public health importance, and sensitivity (likelihood of change as a result of Partnership inputs and processes).*** The metric must address an important element of the conceptual model and be expected to change during the project period as a result of Partnership inputs and processes.
- ***Feasibility for measurement.*** The metric must be able to be measured with resources available through the Partnership grants or through collaboration with other activities planned or under way in each Partnership setting, with at least two measurements occurring within the time frame of the PHIT projects.
- ***Consistency with global standards***. The metric should be consistent with existing global consensus indicators where they exist, to promote global learning beyond the AHI.

In addition, the set of core metrics should be:

- ***Limited in number.*** Not all possible metrics were included to prevent the Collaborative data bases from becoming unwieldy and unnecessarily duplicative with the data sets developed and maintained by the individual Partnerships.
- ***Amenable to linked hierarchical analysis.*** The units of analysis for the core metrics vary across the topic areas to be addressed by the Collaborative. For example, individuals are the most appropriate unit for measurements of population health, but health facilities may be the most appropriate unit for measurements of service delivery and quality. The set of core metrics will need to be organized in ways that permit the linking of measurements across these various types of units, referred to as hierarchical analysis, when possible.

Table 1 presents the core and common metrics defined by the Collaborative using this process. Additional metrics may be defined over the course of the project.

Table 1: Core and common metrics for the PHIT Data Collaborative by conceptual model component

Inputs & Processes	Outputs	Outcomes	Impact
Governance and leadership: **Financing:** ▪ **Total costs in intervention areas** **Health Information systems:** ▪ **Recent HMIS report available at facility** **Human resources:** ▪ **Health workers *per capita* (physicians, nurses/midwives, pharmacy staff)** **Medicines, Equipment, Commodities:** ▪ **Continuous stocks of essential commodities (Tracer equipment and commodities at health center level; Tracer medicines for all health facilities; Tracer medicines for health facilities providing specific services)**	**Service access, readiness & quality:** ▪ Quality of child health care by providers ▪ Service utilization	**Coverage of services:** ▪ **Contraceptive prevalence rate** ▪ **Antenatal care (1+ visits)** ▪ **Intermittent preventive treatment for malaria in pregnancy (IPTp)** ▪ **Skilled attendant at birth** ▪ **C-section prevalence rate (urban, rural)** ▪ **Exclusive breastfeeding** ▪ **Childhood immunizations** ▪ **Reported treatment of priority childhood illnesses** ▪ **Vitamin A supplementation (2 doses)** ▪ **Insecticide-treated net use** ▪ TB treatment (DOTS) success rate ▪ Antenatal care (4+ visits) ▪ ART coverage ▪ Post-natal care for mother ▪ HIV testing for pregnant women ▪ Stillbirth ratio: fresh/macerated ▪ Unmet need for family planning **Equity:** ▪ **Core coverage metrics reported by wealth quintile**	**Mortality and undernutrition:** ▪ **Under 5 mortality rate** ▪ **Cause of death distribution for under-fives in intervention areas** ▪ **Child undernutrition (height for age and weight for height)** ▪ Adult mortality rate ▪ Neonatal mortality rate **Morbidity:** **Fertility:** ▪ **Total Fertility Rate** **Equity:** ▪ **Core impact metrics reported by wealth quintile**

B Metrics for Population Health Impact

All metrics in this component have population denominators, and will be measured at project baseline and endline with additional intermediate measurements for the nutritional status and fertility metrics. Midline measures will be collected for the mortality metrics where possible. Box 3 presents the core indicators; common indicators are summarized below.

Box 3

Core Metrics for Population Health Impact

1) Under-five mortality rate (the probability of dying before five years of age). Household surveys or demographic surveillance to measure this metric are included in Partnership plans in all five participating countries. Methods of estimation of this measure may vary depending on data collection approach.

   Distribution of causes of death in children under five. This metric will serve as a key contextual variable and aid in the interpretation of project results. All teams are planning to measure cause of death for under-five children at two time points during the project, although final budgets for this activity are not yet approved by DDCF.

2) Child undernutrition (height for age and weight for height). Stunting is a contributing cause of about a quarter of all child deaths, and severe acute malnutrition (wasting) has a high case fatality that can be addressed through timely treatment of infections and therapeutic feeding. Nutritional status is also an important contextual factor; if the intervention areas experience famine during the project period, for example, this is likely to undermine health gains achieved in other areas. This will be measured using standard anthropometric techniques, defined using the WHO 2006 standards.

3) Total Fertility Rate (the average number of children that would be born to a woman if she were to live to the end of her child-bearing years and bear children at each age in accordance with prevailing age-specific fertility rates). The total fertility rate is the key measure of impact of family planning programs. It is also an important contextual factor; high fertility levels may reduce the effect of efforts to improve maternal and newborn health in the intervention areas.

Two common metrics have been identified within this component:

- adult mortality rate (the probability of dying between the ages of 15 and 60). Adult mortality rates are driven by injury, non-communicable disease and, in some settings, HIV/AIDS. Although it is not clear that the samples sizes of populations under study by the PHIT Partnerships will permit detection of changes in adult mortality rates, adult health is an important indicator of the ability of health systems to address the health transition to non-communicable disease. This metric will be reported by all Partnerships except Mozambique, where estimates will be available only at national level rather than for the subpopulation in the PHIT Partnership intervention area.
- neonatal mortality rate (the probability of dying in the first 28 days of life). The proportion of under-five deaths that occur in this period is large and, as under-five mortality declines, increasing in low-income countries. Although there are problems with under-

reporting[26,27,28], its measurement is more useful than infant mortality rate (the number of deaths of infants under one year of age in a given year per 1,000 live births in the same year). This metric will be used in Rwanda, Tanzania and Ghana. Measurement is not possible in Mozambique because oversampling of the DHS would be required. Increases in the sample size for the household surveys would also be necessary in Zambia, and planned Partnership activities are not likely to have an impact on neonatal survival.

C. Metrics for Outcomes

All metrics in this component have population denominators, and will be measured at project baseline, mid-line and endline either through household surveys in representative samples of the population or by applying standard analytical methods to program data.

Box 4 presents the core indicators; common indicators are summarized below.

The common coverage metrics that will be measured by at least two Partnerships are:

- Antenatal care (4+ visits) (The proportion of women attended at least four times during pregnancy by any provider (skilled or unskilled) for reasons related to the pregnancy). This will be measured in Tanzania, Rwanda, Ghana, and Zambia.

  Post-natal care for mother. (The proportion of mothers who received a post-natal care visit within two days of childbirth). This will be measured in Tanzania, Ghana, and Zambia.

- TB treatment (DOTS) success rate. (The proportion of new smear-positive TB cases registered under DOTS in a given year who successfully completed treatment, whether with bacteriologic evidence of success ("cured") or without ("treatment completed")). This will be measured in Mozambique, Rwanda, Zambia and Ghana.

- ART coverage. (The number of people on ARTs/estimated number who need them; denominator modeled using Spectrum). This will be measured in Mozambique and Zambia.

- HIV testing for pregnant women. (The proportion of pregnant women who are tested for HIV during antenatal care contacts). This will be measured in Zambia and Mozambique.

- Stillbirths. (The ratio of fresh stillbirths to macerated stillbirths). This will be measured in Tanzania and Zambia.

- Unmet need for family planning. (the proportion of women that are currently married/in union that have an unmet need for contraception). This will be measured in Zambia, Mozambique, Tanzania and Ghana.

[26] Lawn J, Cousens S, Zupan J, Lancet Neonatal Survival Steering Committee. 2005. 4 million neonatal deaths; When? Where? Why? Lancet. 365(9462):891-900.

[27] Thatte N. Kalter HD, Baqui AH, Williams EM, Darmstadt GL. 2009. Ascertaining causes of neonatal deaths using verbal autopsy: current methods and challenges. Journal of Perinataology. 29: 187-194.

[28] Ronsmans C, Chowdhury ME, Koblinsky M, Ahmed A. 2010. Care seeking at time of childbirth, and maternal and perinatal mortality in Matlab, Bangladesh. Bulletin of the World Health Organization. 88(4): 289-296.

Box 4

Core Metrics for Outcomes

Coverage of interventions:

All coverage indicators are measured through household surveys with the exception of TB treatment, which is based on administrative records.

1) Antenatal care (at least one visit) (The proportion of pregnant women attended at least once during pregnancy by skilled health personnel for reasons related to the pregnancy)
2) Intermittent preventive treatment for malaria in pregnancy (IPTp) (The proportion of women who received intermittent preventive treatment for malaria during their last pregnancy)
3) Skilled attendant at birth. (The proportion of live births attended by skilled health personnel (doctor, nurse, midwife or auxiliary midwife))
4) Exclusive breastfeeding (The proportion of infants aged 0-5 months who are exclusively breastfed)
5) Childhood immunizations.(The proportion of children aged 12-23 months: immunized with measles containing vaccine; who received 3 doses of DPT vaccine)
6) Reported treatment of priority childhood illnesses. (The proportion of children aged 0-59 months: with fever receiving appropriate anti-malarial drugs; with suspected pneumonia receiving antibiotics; with diarrhea receiving oral rehydration with continued feeding – this measure will include zinc in countries where this is national policy). Teams will consider analyzing by point of treatment if global consensus is reached on indicators.
7) Vitamin A supplementation (2 doses) (The proportion of children aged 6-59 months who received two doses of Vitamin A supplement in the last 12 months)
8) Insecticide-treated net use (The proportion of children aged 0-59 months sleeping under an insecticide-treated mosquito net)
9) Contraceptive prevalence rate (the proportion of women currently married or in union aged 15-49 that are using (or whose partner is using) a contraceptive method (either modern or traditional)).
10) Caesarean section prevalence. (The proportion of live births delivered by caesarean section) can serve as a proxy for access to emergency obstetric care in low resource settings. Partnerships will report this indicator for total, and urban and rural populations where possible. The global consensus indicator is based on women living in rural areas.

D. Metrics for Outputs

Measures of service readiness and service quality require assessments at the point of service delivery. All Partnerships plan to conduct such assessments, although observations of care are planned only in Zambia and Rwanda. Partnerships vary in the frequency with which outputs will be assessed, but all sites will report on these metrics at least annually. Output (as well as input and process) metrics will be assessed only from public (government) health services.

At present there are no core or common metrics for outputs, but the Data Coordinator has requested teams to consider the feasibility of adding metrics in two areas:

1. Quality of sick child care. Observation-based measures of child health care by the type of provider has been identified as a common metric in all sites except Mozambique, meaning that there is currently no core metric of service quality. The Data Coordinator has proposed that this decision be reconsidered, and that a core outcome metric on the quality of sick child care be developed that does not require observations of case management and can therefore be assessed and reported on by the Mozambique team as well as all others.
2. Service utilization. All teams agree that service utilization is an important output to measure, but no core metric has been defined because Teams have had difficulties in agreeing on a common definition and measurement approach across sites. The Data Coordinator has asked that this decision be reconsidered.

E. Metrics for Inputs and Processes

Input and process indicators are critical for determining how the Partnership strategies are achieving measurable effects on the health system and health outcomes. The Collaborative has defined only a few core metrics for this component to date. There are several reasons for this. First, the strategies for health systems strengthening vary widely across Partnerships, despite the important areas of common activity identified through the mapping exercise. Second, global consensus on a single set of indicators that meet our criteria for use in monitoring and evaluating health systems strengthening does not yet exist,[29] although considerable progress has been made.[30] Third, any of the indicators being proposed for use at global level have limited applicability at the district, village and health facility level where Partnership measurement will occur. We therefore have adopted a practical approach. HSS inputs and processes will be documented carefully by Partnership teams, and the current short list of metrics will be measured and reported. After this first period of experience, we will revisit the metrics as well as the Collaborative conceptual model and further technical advances in this area by other groups, and refine the Collaborative plans as needed. Box 5 presents the core metrics defined to date; no common metrics have been selected.

[29] Shakarishvill G. Building on Health Systems Frameworks for Developing a Common Approach to Health Systems Strengthening. Prepared for the World Bank, Global Fund to Fight AIDS, Turberculosis and Malaria, and AVI Alliance, Technical Workshop on Health Systems Strengthening, Washington DC, June 25-27, 2009.

[30] Boerma T, Abou-Zahr C, Bos E, Hanswen P, Addai E, Low-Beer D. Monitoring and evaluation of health systems strengthening: An operational framework.

Box 5

Core Metrics for Inputs and Processes

1) Total costs in intervention areas. (Total costs in intervention area plus incremental cost of implementing PHIT Partnership strategy per capita in the project area). The incremental costs are measured by dividing the PHIT-specific financial inputs by the total population of the PHIT project area.
2) Recent HMIS report available at facility (The percent of facilities that can produce for inspection the HMIS report that includes their data for the previous year). Assessment of this metric requires inspection of records in health facilities. Each PHIT team will identify the form to be used in their setting and how this will be measured.
3) Health workers *per capita* (physician, nurse/midwife, pharmacy staff) (Ratio of health workers by cadre to 1,000 population in intervention and comparison areas, reported annually). Assessment is based on population, personnel and training records. PHIT teams will report community health worker density separately.
4) Continuous stocks of essential commodities (The percentage of health facilities that have all tracer medicines and commodities in stock and prior to their expiration dates: on the day of visit and in the last three months). This metric is recommended by the WHO Health Systems Strengthening Toolkit. The Collaborative has identified a list of tracer drugs to be tracked in all health facilities, a list to be tracked in health facilities providing specific services, and a list of tracer equipment and commodities to be tracked in all health facilities.

The Collaborative has established an Economic Analysis Working Group to develop a basic approach to measuring costs and to further explore metrics related to financial inputs. After extensive review, the Partnership teams have determined that cost-effectiveness analyses are not feasible.

The continuous stocks of essential commodities core metric was proposed by the WG-HSS/SQ in November, 2009. The process for defining this metric involved review of the essential tracer medicines list prepared by the Rwanda team in early 2010, the current WHO essential medicines guidelines for adults[31] and children, WHO toolkit recommendations, and current essential drug lists for all Partnership countries. Based on this review, a set of criteria were developed for selecting each item: 1) public health importance (i.e., evidence of effectiveness in reducing morbidity/mortality), 2) recommended by WHO at the health center level and up, 3) included in essential drug list of all PHIT countries, 4) reasonable probability of valid/reliable measurement, 5) measured by sites or readily available in routine records. Three indicators were developed and are comprehensive across major program areas addressed by PHIT teams: Tracer medicines for all health facilities (health centers and above; 9 topic areas proposed), tracer medicines for health facilities providing specific services (1 for TB; 1 for HIV), and tracer equipment and commodities at health center level (8 topic areas

[31] http://www.who.int/selection_medicines/committees/expert/17/sixteenth_adult_list_en.pdf

proposed). A list of items included in each summary metric is provided in Appendix B. Partnership teams will review their country policies and essential drug lists to identify the specific medicines and equipment to be assessed in their sites and provide this information to the Collaborative. Each team will define the measurement strategy for each tracer medicine and equipment to be tracked. (i.e., report-, record- or inspection-based; quantity of stocks needed to support a "yes" response on availability). Assessment will occur annually. The data will be used to develop unweighted summary indicators (e.g., x/9 tracer medicines available at the time of the assessment).

V. Supporting Documentation

Analyses of core metrics will have limited usefulness unless they are accompanied by clear descriptions of what was implemented by each Partnership, how activities were implemented, and contextual factors that may have affected either how the strategy was implemented or its effectiveness. Information on these areas is requested in the reports that teams submit annually to DDCF. In 2010 the reporting template was revised with input from the Collaborative to obtain more consistent and detailed documentation across the Partnerships.

A Documentation of program implementation

Documentation of program implementation focuses on inputs and processes. It includes describing the intensity of program activities and how it varies across geographic areas. This information is needed for interpreting results obtained from the measurement of core and common metrics for outcomes and impact, highlighting the strengths and weaknesses of various Partnership strategies. Details on program implementation processes is also important for determining how things are working, whether changes need to be made to specific program activities during the implementation period, and which activities are linked with improvements in coverage and population health.

Documentation of inputs will include the resources invested into the team strategies and encompass funding, strategies for procurement and distribution of commodities and project funds, partner coordination including relationship building with the MoH, harmonization, and the planning and policies supporting or hindering the implementation of the Partnership strategies. Documentation of processes will include descriptions of the activities implemented by each Partnership, (e.g., training and supervision activities, activities to build district-level management capacity, strengthening the supply chain management system, and improving information systems), and any other challenges or facilitating factors to successful project implementation.

The regular use of supplemental process evaluation approaches such as concept mapping and event structure analysis, modeling activities to determine the expected impact of activities based on the level of investment, and qualitative methods to document the perceptions of health care staff and the catchment population to assess the success and sustainability of team strategies will be discussed as the Collaborative evolves.

B Documentation of contextual factors

Documentation of contextual factors (baseline and ongoing) is needed to identify positive and negative confounders that may affect the internal validity of the evaluation results, and potential effect modifiers that may enhance or diminish program implementation efforts and that can affect the generalizability of

the evaluation results.[32] Documentation of contextual factors is also essential for understanding why specific program activities may work in some settings and not others.

Documentation of contextual factors involves reporting on key demographic, epidemiologic, socio-economic, political, and environmental factors likely to have a public health impact. Details on the existing health care structure (e.g., user fees, health insurance programs, policy changes, etc.) and other health programs and partners operating in the study setting with potential health impact should also be reported on. The Partnership teams have already provided substantial contextual information in their original proposals and in their first annual progress reports. This information will be included as part of the baseline documentation data. The Data Coordinator has worked with DDCF to develop a standard table included in the annual report template on contextual factors that can be adapted in each site for relevance.

VI Database Construction and Maintenance

The Collaborative databases will be developed and maintained under the supervision of the Data Coordinator in consultation with the Collaborative Management Committee.

Each Partnership will be responsible for submitting their data sets along with sufficient explanatory information to allow reanalysis. Ordinarily, these will be at the lowest level of data (individuals or individual interviews) from which metrics are estimated. This will include documentation of the variables in the data sets (names, origins) as well as the methods and formulas used to construct the metrics from these variables. To facilitate documentation, the annual report template will include an annex with a table listing the core and common metrics for the teams to complete. The Data Coordinator will perform a series of quality control checks, and consult with the Partnerships as needed. Each Partnership will be able to access and check data related to their site.

Details on procedures for data sharing and use are provided in a companion document on Collaborative principles, policies and procedures.

VI Next Steps and Collaborative Timetable

This document reflects the status of the PHIT Data Collaborative at the end of 2010. These plans will continue to evolve as more experience is gained, and these developments will be captured in later Collaborative updates. Box 7 presents the initial milestones for the Data Collaborative, with time frames, that will be used to assess progress and document achievements. These milestones will be updated and refined on an ongoing basis as the work of the Collaborative proceeds.

[32] Victora CG, Armstrong Schellenberg J, Huicho L, Amaral J, Arifeen SE, Pariyo G, Manzi F, Scherpbier RW, Bryce J, Habicht J-P. Context matters: Interpreting impact findings in child survival research. *Health Policy and Planning* 2005; **20-S1**:i18-i31

Box 6

Initial Milestones for the PHIT Data Collaborative

	Objective/Product	Target date for completion*
1	Finalize a consensus document that 1) defines the goals and objectives of the Data Collaborative, core and common metrics and how they will be measured; 2) describes how Partnerships will document program implementation and contextual factors. *Product: Final Concept Paper and Scope of Work for the Collaborative*	December, 2010
2	Formulation of cross-partnership priority research questions to be addressed by the Data Collaborative. *Product: List of priority research questions.*	October 2010 and ongoing[33]
3	Construct the Collaborative data bases for core and common metrics. *Product: Data bases for core and common metrics & associated documentation.*	July 2010 and ongoing[34]
4	Enter the baseline information on core and common metrics data on contextual factors, and program documentation received from Partnerships, and work with Partnerships to ensure they are correct and complete. *Product: Interim report describing the Collaborative data sets and available baseline data.*	January 2012
5	Maintain data bases and interact with Partnership teams to ensure they are complete and up to date. Prepare annual reports including tabular summaries for all core metrics and narrative summary of documentation and progress. *Product: Annual reports from the Data Collaborative.*	Annually, date TBD
6	Publish papers addressing the priority cross-partnership research questions for the Collaborative in high-impact peer-reviewed journals. Prepare policy briefs and participate in and possibly host workshops. *Product: Papers based on Collaborative Publications Plan (to be developed and updated at annual meetings).*	Beginning January 2014

[33] Possible focus for next meeting of the Collaborative?

[34] Based on completion of baseline data. See "PHIT Partnership Data Collaborative Principles, Policies, and Procedures" document for sample timeline for data submission.

Appendix A:

Results of mapping Partnership activities onto the WHO six health systems building blocks

PHIT Partnership	Governance and Leadership	Financing	Health Information Systems	Human Resources	Medicines, Equipment, Commodities	Service Delivery
Mozam-bique	• Ensure district management teams are fully staffed • Regular training and ongoing mentoring for district and provincial management teams to fulfill and improve routine management duties • Support development and financing of annual district and provincial annual operational plans • Include community leaders in semi-annual facility performance review meetings and annual district planning and funds allocation exercise • Improve province→district and district→facility oversight and Supervision	• Support development and financing of annual district and provincial annual operational plans • Mentoring for provincial and district administration and finance staff to improve use and reporting of funds	• Ongoing assessments and feedback to strengthen HIS accuracy and consistency • Training, mentoring and supervision for HIS managers, facility staff to improve data quality • Develop tools to facilitate use of routine data for identifying bottlenecks and guide decision making (i.e. Supervision guides, facility checklists, OR models)	• Ongoing updates to routine HR information system • Develop simulation and optimization models to identify bottlenecks and guide efficient allocation of health personnel • Training and ongoing supervision for district and facility staff on management and leadership, other targeted themes • Ongoing mentoring for provincial HR managers	• Develop simulation and optimization models to identify bottlenecks and solutions for medicine and commodity logistics systems • Mentoring for provincial pharmacy managers to improve system functioning • Training and supervision to support district and facility pharmacy staff	• Improve availability and acceptability of health services by more efficient personnel allocation, reducing outages of medicines/commodities, more integrated and efficient facility workflow, and providing directed financial inputs into the system
Rwanda	• Support the MoH to implement the Rwanda strategic health plan for rural districts: • Foster good governance and effective	• With the MoH, determine from the district work plan gaps in funding and identify both internal or external sources to fill those gaps (see also governance and	• With the MoH, establish a robust M&E system for Hospital, Health Center, and Community health systems, including making the system electronic: • Strengthen the health	• Establish well-trained and adequately compensated cohort of health care providers (doctors, nurses, lab techs, social workers, CHWs…etc): • Strengthen human	• Strengthening of supply chain management through a district pharmacy system: • Build a comprehensive supply chain & procurement system for drugs, diagnostics and	• To implement the MoH norms in terms of services offered in rural health districts and ensure effective quality services accessible to all: • Support full district

	management through training and on the ground management support at the district, hospital, health center and community level; • Engage district health leaders in identifying resource gaps (see financing HSS activities); • Increase use of information technology and data in the delivery of healthcare with a robust quality assurance and monitoring & evaluation system and provision of training; • Build Rwandan capacity for effective monitoring, evaluation, research, and analysis of health related data at the Rwandan institutions of the Ministry of Health (MOH), National Institute of Statistics (NIS), and National University of Rwanda School of Public Health (NUR SPH)] and local health management levels.	leadership): • Identify resource needs to assure adequate infrastructure exists at both health centers and Hospitals; • Identify critical financial gaps for human resources and provide support to meet as much as possible MoH health center and Hospital staffing norms (assuring adequately compensated and highly trained personnel); • Strengthen a cost recovery system for comprehensive supply chain & procurement system for drugs, diagnostics and other commodities; • Strengthen existing mutual health insurance system to assure health care is accessible to all. • Establish a long-term financing scheme for a well-trained compensated cadre of community health workers (CHWs). • Provide financial support for indigent and vulnerable patients focusing on nutrition issues in under 5's, HIV patients, TB patients, and indigent patients (monitor to provide evidence of cost and efficacy of approach to argue for sustainability).	facility's and district level management's ability to report and use routinely collected health for improvement and planning; • Identify HIS gaps and work with health management to design and implement additional data collection systems to strengthen utilization of data for ongoing quality improvement and interim program evaluation, allowing for mid-course corrections • Establish a primary care registry/basic electronic medical record (EMR); • Link the HIS at health centers with the health mutual insurance system. • Strengthen data quality, collection and utilization of monthly reporting of key indicators from CHWs through existing national monthly reports, registers. • Use a CHW household chart in southern Kayonza.	resources at all supported facilities through training, clinical mentoring and supportive supervision; • Use IMAI, IMCI, IMPAC, HIV, TB, Chronic Care, and IMEESC protocols at health centers • Monitor health care providers' knowledge and ability to use approved clinical protocols; • As feasible, meet MoH staffing norms for hospitals and health centers (see MoH norms for specific numbers of doctors, nurses…etc) • Establish a network of trained, supervised and compensated CHWs of approximately 75 per health center in southern Kayonza; • Strengthen district level health management capacity (also see Governance and leadership HSS activities) • Build local and national capacity for effective monitoring, evaluation and research (locally and at MOH and Rwanda University School of Public Health).	other commodities; • Improve management of district pharmacy and assure adequate staffing. • Establish an electronic system for stock control at the district pharmacy • Assure adequate infrastructure including space, shelves, and a transportation mechanism for drug deliveries to health facilities. • Ensure compliance with MOH established Essential drugs List for o Hospitals; o health centers; o IMCI community; • Electronic stock monitoring at the health center level with dedicated staff for pharmacy services; • Training for medicine dispensing and stock management at all health facilities. • Ensure minimum equipment stocking at supported health centers (BP, stethoscopes, sterilization, scales etc) • Ensure minimum supplies for CHWs (tape measures, charts, other supplies).	Hospital services and infrastructure (see Rwanda MOH norms) ; • Establish/strengthen full health center services at designated health centers: o Children IMCI o Adult IMAI o Chronic care o ART and HIV care o TB services o Women' Health (deliveries + IMPAC) o Pre-natal care o VCT o Family planning o Nutrition services for U5 (plumpy nut), HIV (BMI<18.5), and Socio Economic cases o Nutrition of Hospitalized patients o Emergency and wound care o Simple Hospitalizations o Social consult services • Establish Health Center infrastructure (water, electricity, maternity ward, consult room space, 10 hospital beds) • Implement CHW services (Community IMCI, Accompaniment of chronic disease and pregnancy).

Tanzania-Ghana Health Partnership (Tanzania EMPOWER+ Project component)	• Number of Council Assembly meetings with health agenda items • Number of district supervisors having undergone peer leadership training for supportive and effective supervision • Number of community demonstration and political engagement activities conducted • Number of community health committees convened • Number of meetings of governance committees (by level in the system)	• Alignment of Council health budgets with local burden of disease • Difference between budgetary plan and final utilization of funds • Per capita expenditure by component of the burden of disease and by health system level (district hospital/health centre/community)	• Proportion of facilities completing monthly reporting on time • Proportion of missing data in facility reports, by variable • Proportion of monthly reports with more than 5% discrepancy compared to patient records, by variable • Proportion of supervisors trained in data use • Proportion of communities with access to health facility data	• Number of Physicians, medical assistants deployed to district hospital/health centers • Number of community nurses deployed to community health service zone • Number of midwives deployed to health centers/community health service zones • Number of volunteers deployed to community health service zone • Number of health personnel receiving in-service training per cadre and training content	• Time in months since latest facility renovation (hospital/health centre/community health zone) • Availability of essential equipment (checklist including medical equipment, communication tools, transportation) • Availability of tracer drugs at quarterly intervals (= frequency of stock-outs) • Number of health workers trained in drug management	• Average patient waiting time at hospital/health centre/community health zone • Number of service days lost because of unavailable staff/facility closed
Tanzania-Ghana Health Partnership (Ghana Essential Health Intervention Project component)	• Number of District Assembly meetings with health agenda items • Number of district supervisors having undergone peer leadership training for supportive and effective supervision • Number of community demonstration and political engagement activities conducted (i.e., durbars) • Number of community health committees convened • Deployment of MPH	• Alignment of district health budgets with local burden of disease • Difference between budgetary plan and final utilization of funds • Per capita expenditure by component of the burden of disease and by health system level (district hospital/health centre/community)	• Proportion of facilities completing monthly reporting on time • Proportion of missing data in facility reports, by variable • Proportion of monthly reports with more than 5% discrepancy compared to patient records, by variable • Proportion of supervisors trained in data use • Proportion of communities with access to health facility data	• Number of Physicians, medical assistants deployed to district hospital/health centers • Number of community nurses deployed to community health service zone • Number of midwives deployed to health centers/community health service zones • Number of volunteers deployed to community health service zone • Number of health personnel receiving in-service training per cadre and training content	• Time in months since latest facility renovation (hospital/health centre/community health zone) • Availability of essential equipment (checklist including medical equipment, communication tools, transportation) • Availability of tracer drugs at quarterly intervals (= frequency of stock-outs) • Number of health workers trained in drug management	• Average patient waiting time at hospital/health centre/community health zone • Number of service days lost because of unavailable staff/facility closed

	graduates to district administrations					
Zambia PHIT	• Hire, train, and mentor six district-based clinical quality improvement teams • Provide intensive mentoring and performance monitoring of facilities • Mentor existing district management staff through annual planning for district action plans; integrate PHIT activities in district action plans • Engage neighborhood health committees to conduct quarterly reviews with clinic managers of community-based health events and clinic performance	• Direct clinic inputs (equipment, supplies, renovations, clinic extender staff, community health workers) • Performance-based financing to districts in years 6 and 7 initially planned, currently removed due to budget cuts	• Electronic patient-level data produces routine HIS reports as well as clinic and community health worker performance reports • Clinic teams have quarterly quality improvement plans based on clinic performance reports	• 110 Clinic Extenders and 240 Community Health Workers • 18 district-based clinical quality improvement staff • Nurse Leadership training for quality improvement and district management staff at UAB • Ongoing clinical mentoring for district and facility based clinical staff • Management mentoring by health systems experts	• Back-up supplies of essential drugs and test kits • Mentoring for district pharmacy managers • District-based project pharmacy technician to support district pharmacy manager • Availability and correct use of drugs part of clinic performance reports	• Establish clear clinical protocols for primary health care, provide training and mentoring in these protocols, measure the care that is provided by electronic data entry, provide ongoing feedback on performance according to protocol, and mentor clinicians to improve the quality of care provided.

Appendix B: Definitions for Collaborative Metrics (Core and Common)

Table B-1. Definitions of Collaborative Core Metrics

Indicator Name and Type		Indicator Definition	Numerator	Denominator	Data Source	Notes
Public Health Impact						
1	Under-five mortality	Probability of dying before 5 years of age (expressed as a rate per 1,000 live births)	Number of under five deaths during time X	Number of live births during time X	Vital registration, household surveys, direct and indirect methods	MDG 4 indicator, Countdown indicator
2	Cause of death distribution for children under five	Percentage of deaths in children under five attributed to a specific cause	Number of under five deaths due to cause X	Total number of under five deaths	Verbal/social autopsy, interviews	Plans still in development.
	Child undernutrition					
3	Stunting prevalence	Percentage of children under five with chronic malnutrition (height for age z score less than -2 SD)	Number of children (0-4 years) that are stunted	Total number of children aged 0-4	Standard anthropometric techniques; using WHO 2006 growth standards	Countdown indicator
4	Wasting prevalence	Percentage of children under five with severe acute malnutrition (height for weight z-score less than -2 SD)	Number of children (0-4 years) that are wasted	Total number of children aged 0-4		Countdown indicator;
5	Total fertility rate	The average number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children at each age in accordance with prevailing age specific fertility rates			Household surveys	UNICEF and UNFPA profiles
Outcomes						

6	Antenatal care (at least one visit)	Percentage of women attended at least once during pregnancy by skilled health personnel for reasons related to the pregnancy	Number of women attended at least once during pregnancy by skilled health personnel (doctor, nurse, midwife or auxiliary midwife) for reasons related to the pregnancy in the X years prior to the survey	Total number of women who had a live birth occurring in the same period	Household surveys in representative samples of the population; incorporation of program data using standard methods for selected indicators	Countdown indicator, MDG 5 indicator
7	Intermittent preventive treatment for malaria in pregnancy	Percentage of women who received intermittent preventive treatment for malaria during their last pregnancy	Number of women at risk for malaria who received two or more doses of a sulfadoxine-pyrimethamine (Fansidar™) to prevent malaria during their last pregnancy that led to a live birth	Total number of women surveyed who delivered a live newborn within the last two years		Countdown indicator, Roll Back Malaria indicator
8	Skilled attendant at birth	Percentage of live births attended by skilled health personnel	Number of live births to women ages 15–49 years in the X years prior to the survey attended during delivery by skilled health personnel (doctor, nurse, midwife or auxiliary midwife)	Total number of live births to women ages 15–49 years in the X years prior to the survey[c]		Countdown indicator, MDG 5 indicator

9	Caesarean section rate (total, urban and rural where possible)	Percentage of live births delivered by Caesarean section	Number of live births to women ages 15–49 years in the X years prior to the survey delivered by caesarean section	Total number of live births to women ages 15–49 years in the X years prior to the survey		Countdown indicator
10	Contraceptive Prevalence rate	Percentage of women currently married or in union ages 15–49 that are using (or whose partner is using) a contraceptive method (either modern or traditional)	Number of women currently married or in union ages 15–49 years that are using (or whose partner is using) a contraceptive method (either modern or traditional)	Total number of women ages 15–49 that are currently married or in union		Countdown indicator, MDG 5 indicator
11	Exclusive breastfeeding	Percentage of infants ages 0–5 months who are exclusively breastfed	Number of infants ages 0–5 months who are exclusively breastfed	Total number of infants ages 0–5 months surveyed		Countdown indicator
	Childhood immunizations					
12	Measles	Percentage of infants immunized with measles containing vaccine	Number of children ages 12–23 months who are immunized against measles	Total number of children ages 12–23 months surveyed		Countdown indicator/MDG 4 indicator

13	DPT3	Percentage of infants who received three doses of diphtheria/pertussis/tetanus vaccine	Number of children ages 12–23 months receiving three doses of diphtheria/pertussis/tetanus vaccine	Total number of children ages 12–23 months surveyed		Countdown indicator
	Reported treatment of priority childhood illnesses					
14	Antimalarial treatment	Percentage of children ages 0–59 months with fever receiving any appropriate antimalarial drugs	Number of children ages 0–59 months reported to have fever in the two weeks prior to the survey who were treated with any appropriate antimalarial	Total number of children ages 0–59 months reported to have fever in the two weeks prior to the survey		Countdown indicator
15	Antibiotic treatment for pneumonia	Percentage of children ages 0–59 months with suspected pneumonia receiving antibiotics	Number of children ages 0–59 months with suspected pneumonia in the two weeks prior to the survey receiving antibiotics	Total number of children ages 0–59 months with suspected pneumonia in the two weeks prior to the survey		Countdown indicator
16	Oral rehydration and continued feeding	Percentage of children ages 0–59 months with diarrhoea receiving oral rehydration therapy and continued feeding	Number of children ages 0–59 months with diarrhoea in the	Total number of children ages 0–59 months with diarrhoea in the two		Countdown indicator

			two weeks prior to the survey receiving oral rehydration therapy (oral rehydration solution and/or recommended homemade fluids or increased fluids) and continued feeding	weeks prior to the survey		
17	Vitamin A supplementation (2 doses)	Percentage of children ages 6–59 months who received two doses of vitamin A during the calendar year	Number of children ages 6–59 months who received two doses of vitamin A during the calendar year	Total number of children ages 6–59 months		Countdown indicator
18	Insecticide-treated net coverage (U5)	Percentage of children ages 0–59 months sleeping under an insecticide-treated mosquito net	Number of children ages 0–59 months sleeping under an insecticide-treated mosquito net the night before the survey	Total number of children ages 0–59 months surveyed		Countdown indicator, Roll Back Malaria indicator
Outputs						
19	Quality of child health care by providers	Proportion of children presenting to health facilities who are diagnosed with pneumonia, diarrhea, or malaria who are prescribed treatment correctly	The number of children presenting to health facilities who are diagnosed with pneumonia, diarrhea, or malaria who are	The total number of facilities	Health facility assessments; routine administrative records	Agreed this would be "common" rather than "core"; Data Coordinator has asked that this decision be reconsidered.

			prescribed treatment correctly			
20	Service utilization	Monthly service volume by age in 1st level facilities and from community based providers for selected programs in intervention and comparison areas. Services measured could include all contacts (rather than first-visit-for episode or first-for service), or be program specific.			Health facility assessments; routine administrative records	Teams are working with the Data Coordinator on developing a common definition and measurement approach across sites.
Inputs and processes						
21	Total costs in intervention areas	Total costs in intervention areas plus incremental cost of implement PHIT Partnership strategy per capita in the intervention area				Standard approach for economic analysis
22	Recent HMIS report available at facility	Percentage of facilities which can produce for inspection the HMIS report that includes their data for the previous year	Number of facilities which can produce for inspection the HMIS report that includes their data for the previous year	Total number of facilities inspected	Health facility assessments	
23	Health workers *per capita* (by cadre)	Ratio of health workers to population in the PHIT intervention area, by cadre and training status	Number of health workers at a given time in a given location	Total population in the same geographical location	Routine administrative records	WHO toolkit indicator; Data Coordinator will work with the teams on further defining this indicator.
24	Continuous stocks of essential commodities	Percentage of health facilities that have all tracer medicines and commodities in stock and prior to their expiration dates: on the day of the visit and in the last three	The number of facilities with the selected tracer drugs in stock	The total number of facilities	Health facility assessments; routine administrative records	WHO toolkit indicator; see tables B1a, B1b, and B1c for more details

		months	(present and non-expired) on the day of the visit and in the last three months			

Table B1a. Continuous stocks of essential commodities: Tracer medicines for all health facilities (health centers and above)

Topic area		Proposed item
Infectious diseases		
1	Pneumonia	1st line antibiotic (child)
2	Malaria	ACTs (child and adult)
3	Diarrhea	Low osmolarity ORS + zinc (child)
4	Nutrition	Ready to use therapeutic fluids
Prevention/family planning		
5	Vaccine-preventable	DPT3 (child)
6	Vaccine-preventable	TT vaccine (delivered to the mother for the benefit of the child)
7	Family planning	Oral or injectable contraceptive (adult)
8	Maternal health	1st line uterotonic (adult)
Chronic diseases		
9	Hypertension	Anti-hypertensive (adult)

Table B1b. Continuous stocks of essential commodities: Tracer medicines for health facilities providing specific services

Topic area		Proposed item
Health facilities providing TB services		
1	TB	1st line combination tablet (adults)
Health facilities providing HIV services		
2	HIV	1st line treatment (adults)

Table B1c. Continuous stocks of essential commodities: Tracer equipment and commodities at health center level

Topic area		Proposed item
1	HIV	HIV test availability (all test kits needed for the national algorithm)
2	HIV/FP	Condoms
3	Hypertension	Sphygmomanometer (blood pressure cuff) and stethoscope
4	Pneumonia	Watch or timer or stethoscope
5	Vaccine –preventable	Refrigerator/cold box; Sterilization equipment
6	Nutrition – child	Infant/child weighing scale, MUAC
7	Nutrition – maternal	Tests for hematocrit or hemoglobin
8	Delivery care	Neonatal ambubag

Table B2. Definitions of Common Collaborative Metrics

Indicator Name and Type		Indicator Definition	Numerator	Denominator	Data Source	Will be measured and reported in:
Public Health Impact						
1	Adult mortality rate	The probability of dying between ages 15 and 60 (expressed as a rate per 1,000 people aged 15 to 60)	Number of deaths in persons between the ages of 15 and 60 years	Total number of persons between the ages of 15 and 60 years at time X	Vital registration, household surveys, direct and indirect methods	Rwanda, Zambia, Tanzania, Ghana

			at time X			
2	Neonatal mortality rate	The probability of dying in the first 28 days of life (expressed as a rate per 1,000 live births)	Number of deaths in the first 28 days of life at time X	Total number of live births at time X		Rwanda, Tanzania, Ghana
3	Cause of death distribution in adults	Percentage of deaths in adults under five attributed to a specific cause	Number of adult deaths due to cause X	Total number of adult deaths	Verbal/social autopsy, interviews	Zambia, Tanzania
Outcomes						
4	Antenatal care (4+ visits)	Percent of women attended at least four times during pregnancy by any provider (skilled or unskilled) for reasons related to the pregnancy	Number of women attended at least four times during pregnancy by any provider (skilled or unskilled) for reasons related to the pregnancy in the X years prior to the survey	Total number of women who had a live birth occurring in the same period	Household surveys in representative samples of the population; incorporation of program data using standard methods for selected indicators	
5	Postnatal care for the mother	Percentage of mothers who received a postnatal care visit within two days of childbirth	Number of women who received a postnatal care visit within two days of childbirth (regardless of place of delivery)	Total number of women ages 15-49 years with a last live birth in the x years prior to the survey (regardless of place of delivery)		Tanzania, Ghana, Zambia
6	TB treatment (DOTS) success rate	Proportion of new smear-positive TB cases registered under DOTS in a given year that successfully completed treatment whether with bacteriological evidence of success (“cured”) or without (“treatment completed”)	Number of new smear-positive TB cases registered under DOTS in a given year that successfully completed	Total number of new smear-positive TB cases registered under DOTS in a given year		Stop TB/MDG6/CHeSS platform indicator; Rwanda, Zambia, and Ghana

			treatment whether with bacteriological evidence of success			
7	ART coverage	Proportion of the people on ART who need them	Number of people on ARTs at time X	Modeled by Spectrum		Mozambique, Zambia
8	HIV testing for pregnant women	The proportion of pregnant women who are tested for HIV during antenatal care contacts	Number of pregnant women tested for HIV during antenatal care contacts	Total number of pregnant women attending antenatal care	Health facility surveys; household surveys in representative samples of the population	UNGASS indicator, Zambia, Mozambique
9	Stillbirth ratio	The ratio of fresh to macerated stillbirths			Health facility surveys	Tanzania and Zambia
10	Unmet need for family planning	Percentage of women who are currently married or in union that have an unmet need for contraception	Number of women who are currently married or in union that are fecund and want to space their births or limit the number of children they have but that are not currently using contraception	Total number of women who are currently married or in union	Household surveys in representative samples of the population; incorporation of program data using standard methods for selected indicators	Countdown indicator, MDG 5 indicator. Mozambique, Ghana, Tanzania, Zambia
Outputs						
Inputs and processes						

Appendix C: Additional topic areas and metrics considered but not selected

We reviewed and discussed many topic areas and metrics not included in the list of "core" and "common" metrics in Table 1. These are listed below, along with the reason why the metric was not adopted as either a "core" or "common" metric.

These decisions may be revisited if there is a good justification for doing so; additional metrics may also be proposed, reviewed and adopted as the project continues.

Part I. Impact, outcome, output and input and process metrics

Although all of these metrics are relevant to the PHIT team strategies, none of them are currently included on the list of core or common metrics because of concerns about feasibility or challenges with developing standard definitions and measurement approaches. Individual teams will consider including variations of these metrics for their own program monitoring and evaluation purposes.

Impact

1. Maternal mortality ratio (the number of maternal deaths per 100,000 births during a specified time period, usually 1 year) was considered for inclusion into the Collaborative because of its public health importance; at present the sample sizes needed are prohibitive but alternative methods requiring smaller sample sizes are being investigated.

2. Morbidity measures (chronic disease and related to child health). No core or common impact metrics have been identified for morbidity, despite an extensive review of possible metrics (especially for chronic disease) and consideration of the use of biomarkers. At present these are not considered to meet the selection criteria (especially feasibility), but will be reconsidered if there are technical or methodological advances during the project period. Childhood morbidity measures, for example, are important for interpreting the nutritional status indicators and would be useful to collect.

Outcome

1. Post-natal newborn care (proportion of newborns receiving a post-natal check within two days of delivery, with a denominator that includes both home and facility births). The Data Coordinator has asked teams to reconsider including this metric as common.
2. Morbidity measures. PHIT teams and TAG members recommended limiting the scope of chronic disease morbidity metrics to those related to HIV/AIDS, TB and hypertension because changes in indicators related to these conditions are expected to result from project activities. Changes in outcome indicators related to other chronic diseases such as cancer and COPD are either not expected to occur or are not` feasible to measure across sites given existing monitoring and evaluation plans.

   Hypertension treatment (the proportion of adults with hypertension receiving appropriate treatment). Because of the lack of specificity in the definition of existing consensus indicators treatment coverage is not included as a core or common outcome metric, but treatment for hypertension is captured in the core list of tracer medicines described in the input/process metric section.

PMTCT. Indicators related to the prevention of maternal-to-child transmission of HIV were reviewed by the teams and not included because their measurement is based on a combination of program and population survey data.

Outputs

1. A measure of retention of trained workers (the percentage of trained workers remaining in post, annually) or position vacancy rate (the percentage of health posts by cadre (physician, nurse/midwife, community-based health workers) that are filled, reported at 6-month intervals).
2. Functional health facility management committee
3. Staff with defined training in last 3 years
4. Facilities supervised in previous 3 months
5. Health workers with current salary payment
6. Patient satisfaction (may have limited validity/reliability across teams)
7. Job satisfaction (proposed by the TAG and may require special methods for some teams)
8. Hours/days of operation of facilities (proposed by the TAG and requires defining which services and valid sources of data)
9. Quality of obstetric care
10. Antenatal care service integration index to assess the extent to which women presenting for antenatal care received the full range of recommended services.
11. Correct management of chronic disease

Inputs and processes

1. Patient satisfaction
2. Job satisfaction
3. Hours/days of operation of facilities
4. Functional health facility management committee
5. Staff with defined training in last 3 years
6. Facilities supervised in previous 3 months
7. Health workers with current salary payment

PART II: Additional potential indicators by health system building block

1. **Governance and Leadership:**
   - Population trust in health system index

2. **Financing:**
   - Management of budget at health facility (%). This indicator is recommended by the WHO (source: WHO health system monitoring) for monitoring improvement in financial transparency and management at operational levels.

   - Percent of target population enrolled in health insurance scheme. This indicator is recommended by the WHO (source: WHO health system monitoring) and IHP+ (source: CHeSS indicators) for assessing improvement in financial risk protection and coverage for vulnerable groups. Out of pocket expenditure as % of total health expenditure is another possible indicator of financial risk protection.

- Distress spending (selling assets and borrowing) for health.
- Catastrophic spending on health (%) (>40% of non-food spending on health).

3. Health information systems:

- Clinical guidelines visible at health facilities (index). The teams need to define a standardized set of guidelines to include in the index (e.g., guidelines on specific service areas such as ANC, delivery, family planning, immunization, sick child care, PMTCT, ART treatment or follow up, TB treatment or follow up). (Source: Measure 2007. Guidance for selecting and using core indicators for cross country comparisons of health facility readiness to provide services).
- Standardized information system complete (% of facilities).
- Births recorded in vital registration system (%). This indicator is included in the WHO toolkit for health system strengthening for monitoring health information system performance.
- Accuracy of HMIS data.
- Data utilization measures. i.e., % health facilities/CHWs that maintain up-to-date and complete records of sick children under five years of age (age, diagnosis, treatment) AND show evidence of data use (Source: Measure 2008. Profiles of health facility assessment methods).

4. Medicines, equipment, commodities:

- Functional infrastructure index. The teams would need to define the term "functional" and the range of indicators included in the index.

5. Human Resources

- Health worker satisfaction index. Instruments to measure health worker motivation are available.
- Outpatients + admission days/professional staff.

6. Service delivery and service quality:

- Average time per new curative consultation with provider.
- Quality of history, physical exam, and counseling index (adult or child).
- Equity index of utilization of curative care (by wealth ratios, male/female ratios, or other measures of relative disadvantage selected by the teams).
- Equity index of skilled delivery care (by wealth ratios, male/female ratios, or other measures of relative disadvantage selected by the teams).

- Satisfaction index for health services (users or community based)
- Measures capturing system failures in providing care.

PART III: Metrics for financial risk protection.

No core or common metrics were retained in this topic area, but this decision can be reconsidered at a later date and as part of the scope of work of the Economic Analysis WG. Examples of potential metrics include the presence of user fees, out-of-pocket expenditures for health or the percentage of the population with health insurance coverage.

Appendix D: Contextual Factors - optional variables for the Documentation component of the Data Collaborative

Category	Variable	Definition	Notes on Optional Sources	Periodicity
Environmental characteristics	Average annual rainfall	Average amount of rainfall (CMS) per year	Ministry of Agriculture, National Geographic Bureau (e.g., National Meteorological Institute in Mozambique)	Annually
	Percentage of the population living in malaria endemic areas	Percentage of children <5yrs of age living in a malaria endemic area	Malaria indicator surveys (Zambia, one underway in TZ); DHS with biomarker data (Ghana DHS 2003; Rwanda 2005, TZ DHS 2004 and AIS 2007-8); rollback malaria http://www.rollbackmalaria.org/	Baseline, endline
	Use of improved drinking water source; use of improved sanitation facilities	Percentage of the population using improved drinking water sources; Percentage of the population using improved sanitation facilities	Countdown to 2015; childinfo.org; Joint monitoring program for water supply and sanitation http://www.wssinfo.org/	Baseline, endline
Exogenous 'shocks' impacting health status	Epidemics (e.g., cholera, hemorrhagic fevers, etc.)	Percentage of the population affected by an epidemic (specify type)	Key informant interviews; UNICEF humanitarian action reports; WHO surveillance data; national institute of statistics	Dates when epidemic (s) occurred
	Humanitarian crises (e.g., conflict, famine, flooding, other unusual weather patterns)	Percentage of the population affected by a humanitarian crisis	Key informant interviews; Uppsala conflict data project (www.pcr.uu.se/research/UCDP); Conflict barometer of the Heidelberg institute for international conflict research (www.hiik.de/en/Konflictbarometer/index.htm); Project ploughshares armed conflict report (http://ploughshares.ca/); UNICEF humanitarian action reports; WHO surveillance data.	Dates when crisis occurred
Socio-economic characteristics	Women's educational level	Percentage distribution of women by highest level of education attended (primary, secondary, higher); or Median number of years of education of women	HH surveys (respondent characteristics)	Baseline, endline
	Equity	Percentage distribution of the population in intervention and non-intervention areas by wealth quintiles (developed using the same country-adapted asset index used to generate the national quintiles)	HH survey	Baseline, endline
	Ethnicity	Percentage distribution of the ethnicity of head of household. i=1,…,I ethnicities, as many as it takes to cover at least 90% of the population	HH survey if data is available	Baseline, endline

Demographic characteristics	Population density	Total population	Census, possibly DSS (Tanzania and Ghana)	Baseline, endline
	Urbanization	Percentage of the population living in urban, peri-urban, and rural areas as defined by the country	Census	Baseline, endline
HIV prevalence	Adult (15-49 years) HIV prevalence rate, %	Percentage of adults (15-49) living with HIV. Estimated number of adults (15–49 years) living with HIV divided by the 2009 adult population (15–49 years)	Sentinel surveillance; www.unaids.org;	Baseline, endline
Health system characteristics	% of population within 5 km of a health facility	Population living within 5 km of a facility	Linking health facility with health survey data; GIS mapping (Zambia); HH survey (TZ questions on distance to health facility); Key informant interviews with district planning personnel; Teams can download GPS data available through DHS, AIS, and SPA surveys and run analyses for their sites (Rwanda, 2005, 2007 2010 DHS; Tanzania 2007-8 AIS, 2010 DHS; Zambia 2007/8 DHS; Ghana 2008 DHS)	Baseline, endline
	User Fees 1.Hospital 2.Health Centers 3.Community	Do public sector hospitals, health centers, community clinics charge any user fees for services or drugs?	Key informant interviews	Baseline, endline, and when changes occur (if any) during the project period