

METHODOLOGY USED FOR ESTIMATION OF EFFECT OF HSS STRATEGIES ON EFFECTIVE COVERAGE OF INTERVENTIONS FOR ACTING ON THE CALL 2017 REPORT

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Conceptual Framework

Key concepts

Interventions and impact

In EQUIST (www.equist.info) “intervention” refers to specific preventive and curative services or care practices that have direct effect on child and maternal health and nutrition. The interventions included have proven efficacy and are directly linked to the interventions included in LiST (www.livessavedtool.org).

“Impact” in the EQUIST model refers to the specific effect on health nutrition outcomes (decrease in mortality or malnutrition rates, number of deaths averted, etc.) resulting from a change in coverage of a given intervention or group of interventions.

Delivery Platforms and Intervention packages

To systematically analyse and address health system bottlenecks EQUIST organises health, nutrition, and water and sanitation interventions into nine intervention packages further grouped into four service delivery platforms.

The service delivery platforms represent distinct approaches for delivery of healthcare services. Within each platform, interventions are grouped into packages based on their similarity, delivery mode, and/or beneficiaries. The critical assumption for delivery platforms is that interventions delivered via the same delivery mode and for similar beneficiaries share similar bottlenecks. For example, if a shortage of skilled health personnel is a problem for immunization activities, the same problem probably exists for vitamin A supplementation since both interventions are usually delivered by the same type of health worker.

The four delivery platforms are Family Practices, Preventive Services, and two types of Clinical Services.

Family practices refer to interventions that families and communities can provide/practice by themselves or with limited inputs. A skilled service provider is not required, though a community-based worker may receive some training and guidance from professional health workers to support coverage of these interventions through information, education and other communication strategies. Three intervention packages are included under family practices: *Water, Sanitation and Hygiene; Environmental Safety; and Infant and Neonatal Feeding and Care Practices*.

Preventive schedulable services refer mainly to preventive care services that are delivered in facilities to a target group according to a schedule (i.e., not based on illness) and/or through outreach. Three intervention packages are included under Preventive schedulable services: *Family Planning; Antenatal Care; and Immunization Plus*.

Clinical services refer to childbirth delivery services and individual illness management interventions provided by trained healthcare professionals in a healthcare facility. To be effective, interventions are regularly and continually available to respond to illnesses, child birth, or complex treatment as they arise. These in turn are organised into two sub-platforms: *Delivery Care* (which includes two packages: *Normal Delivery; and Emergency Obstetric and Neonatal care*); and *Curative Care for Children* (which includes a single package: *Integrated management of Newborn and Child Illnesses*).

Table 1 - Classification of interventions included in EQUIST by service delivery platform and package

Family Practices	Preventive Schedulable Services	Clinical Care	
		Delivery Care	Curative Care for children
Water, Sanitation and Hygiene Improved Water Water connection in the home Improved sanitation Safe disposal of child feces Hand washing with soap	Family Planning Contraceptive use Pre-pregnancy Folic acid supplementation/fortification Antenatal Care TT- tetanus toxoid vaccination IPTp- pregnant women protected via intermittent preventive treatment of malaria or sleeping under an insecticide treated bednet (ITN) Syphilis detection and treatment Calcium supplementation Multiple micronutrient supplementation Iron folate supplementation	Normal Delivery Care Skilled birth attendance (SBA) Institutional delivery Clean birth practices Immediate assessment and stimulation AMTSL- Active Management of the Third Stage of Labor KMC - Kangaroo Mother Care Chlorhexidine	Integrated management of Newborn and Child Illnesses Oral Antibiotics for neonates Injectable antibiotics for neonatal sepsis ORS - oral rehydration solution Antibiotics - treatment for dysentery Zinc - treatment of diarrhea Oral antibiotics - case management of severe pneumonia in children Vitamin A - treatment of measles Antimalarials - Artemesinin compounds for malaria Therapeutic feeding for severe wasting (Severe acute malnutrition (SAM))
Environmental Safety Ownership of insecticide treated bednets (ITN)	Balanced energy supplementation Hypertensive diseases case	Emergency Obstetric and Neonatal care Labor and delivery in BEmOC	Treatment for moderate acute malnutrition (MAM) Cotrimoxazole
Infant and neonatal feeding and care practices Exclusive breastfeeding			

<p>Any breastfeeding (12-23 Months)</p> <p>Complementary feeding - education and supplementation</p> <p>Any breastfeeding (6-11 Months)</p> <p>Thermal care.</p> <p>Clean postnatal care practices</p>	<p>management</p> <p>Diabetes case management</p> <p>Malaria case management</p> <p>management of pre-eclampsia</p> <p>FGR- fetal growth restriction detection and management</p> <p>PMTCT – Prevention of mother to child transmission of HIV</p> <p><i>Immunization Plus</i></p> <p>Vitamin A supplementation</p> <p>Zinc supplementation</p> <p>BCG</p> <p>Polio</p> <p>DTP3</p> <p>Hib</p> <p>HepB</p> <p>Pneumococcal</p> <p>Rotavirus</p> <p>Measles</p>	<p>facilities</p> <p>Labor and delivery in CEmOC facilities</p> <p>Neonatal resuscitation</p> <p>Antenatal corticosteroids for pre-term labor</p> <p>Antibiotics for PRoM</p> <p>MgSO4- management of eclampsia</p> <p>Induction of labor for pregnancies lasting 41+ weeks</p> <p>Maternal sepsis case management</p> <p>Full supportive care for premature babies</p> <p>Full supportive care for sepsis/pneumonia</p> <p>Ectopic Pregnancy Management</p> <p>Safe abortion services</p> <p>Post abortion case management</p>	<p>ART (for children)</p>

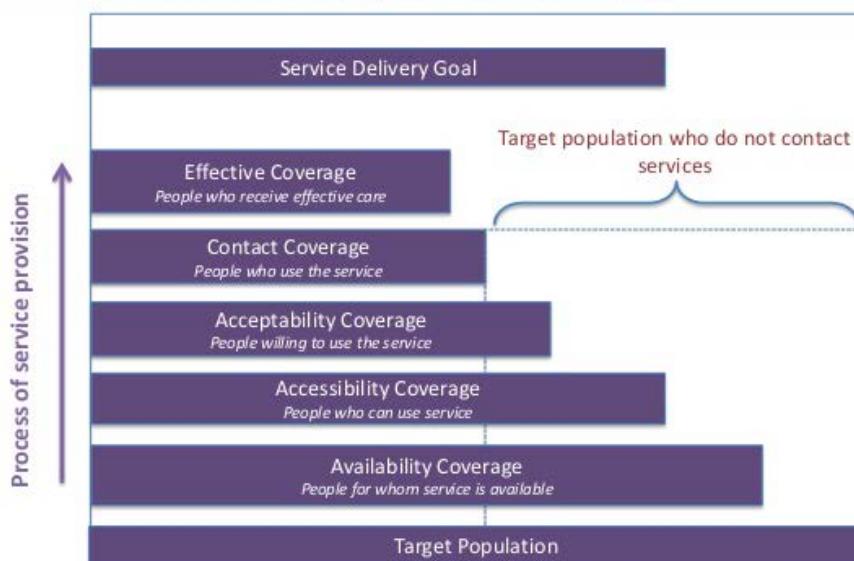
Adaptation of the Tanahashi's approach for assessing determinants of effective coverage and analysing health system bottlenecks

Tanahashi (1978) defined a hierarchical series of 5 quantitative measures of "coverage" that reflected the conditions required for effective coverage. These measures are organized hierarchically so that each reflects a more constraining definition of coverage than the previous.

- Availability Coverage: People for whom the service is available
- Accessibility Coverage: People who can use the service
- Acceptability Coverage: People who are willing to use the service
- Contact Coverage: People who use the service
- Effective Coverage: People who receive effective care

Figure 1: Tanahashi framework (source: <https://www.slideshare.net/jimcampbell311493/tanahashi-results-afg15sep12>, adapted from WHO Bulletin 1978)

The Tanahashi model of evaluating health service coverage



By comparing the relative compliance with of each of these "conditions" one can identify the largest "bottleneck". In other words, the greatest obstacle to effective coverage is where the biggest drop exists between one measure of coverage and the next.

Over the past 30 years the Coverage Determinant framework has been refined through extensive use. Changes include:

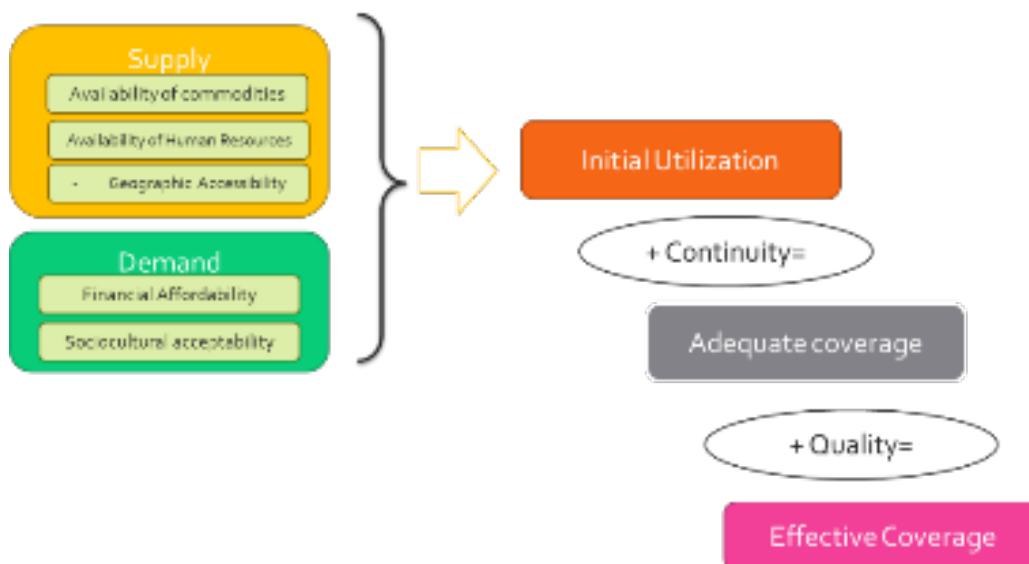
- To reflect the importance of adequate timing and continuity in usage of services, "contact coverage" was divided into "**initial utilization**" and "**adequate coverage**".
- To highlight the importance of out of pocket expenditure for health, "**financial affordability**" was added as a key determinant.

- It was found that there were two different types of relationships between the determinants, therefore a distinction was made between:
 - “**Determinants of coverage**” are inter-related conditions that influence the initial utilization, timing & continuity of use and quality of care namely: **availability of commodities, availability of human resources, accessibility, affordability and acceptability**.
 - “**Measures of coverage**” constitute a genuine “hierarchy (i.e. each higher determinant is a sub-set of the lower determinant), namely: **initial utilization, adequate and effective coverage**.

Whereas we assess directly the bottlenecks for each determinant of coverage, we infer indirectly the bottlenecks related to the “measures of coverage”:

- The continuity bottleneck is assessed by comparing the relative “drop-off” between initial utilization and adequate coverage
- The quality bottleneck is assessed by comparing the relative “drop-off” between adequate coverage and effective coverage, as illustrated in Figure 24.

Figure 2: Logical interactions among determinants of effective coverage



We can illustrate this through a description of antenatal services. A pregnant woman's preliminary contact with antenatal services constitutes the **initial utilization**. **Adequate coverage** can be assessed as her continuous and timely use of the services, such that she completes at least four antenatal visits. If adequate coverage is substantially lower than initial utilization, there is a continuity bottleneck.

Effective coverage can then be measured as four plus visits performed by a skilled nurse, fulfilment of a ninety day intake of ferrous sulphate and folic acid, and the quality of care urine test. If there is a big difference between adequate and effective coverage we identify a quality bottleneck.

Table 2: Categories of Determinants in our analysis Framework

	Determinants	Definitions
Supply	Availability of Essential Commodities/Inputs	Essential commodities/ inputs required to deliver a service or adopt a practice
	Geographical Accessibility	Physical access (services, facilities, information)
	Availability of Human Resources	Availability of adequate amount of human resources required
Demand	Financial Access	Ability to afford (services/practices), both direct and indirect costs
	Social and Cultural Practices and Beliefs	Individual/ community beliefs, awareness, behaviours, practices, attitudes
Quality	Timing and Continuity of Use	Completion/continuity in service, practice
	Quality of Care	Adherence to required quality standards (national or international norms)

Note that while the original MBB (Marginal Budgeting for Bottlenecks) coverage determinant framework had six determinants we have disaggregated the “demand” determinants to explicitly analyse the costs of changes in financial affordability and sociocultural acceptability. While these factors were already considered in the original MBB, they were bundled within the “initial utilization” and “adequate timely continuous utilization”. This alteration reflects the higher prominence of these factors in recent years, and aims at a better understanding of them

Enabling Environment

In our conceptual framework the enabling environment is understood mainly as a key determinant of status and changes in bottlenecks, and therefore effective coverage. However, it may also influence health and nutrition outcomes in other ways, not mediated through intervention coverage (I.e. Social Determinants of health).

Following UNICEF’s general Monitoring Results for Equity System (MORES) framework the enabling environment is analysed through 4 main components. For each of this components we selected indicators based on globally available and validated data, with available time series for the period analysed. In some instances these indicators were adjusted so that they all are in comparable scale (0%-100%, where 100% represents ideal enabling environment situation) and can be aggregated.

Table 3 - Enabling Environment Factors

	Enabling Environment factors	Definitions
Enabling	Social Norms	Widely followed social rules of behaviour
	Legislation/Policy	Adequacy of laws and policies
	Budget/Expenditure	Allocation and disbursement of required resources

Environment	Management /Coordination	Roles and Accountability/ Coordination/ Partnership
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Modelling software used

While the analysis has been based on EQUIST 1.0 (www.equist.info), a web based tool for equity focused evidence based strategic analysis and planning for RMNCH, the current exercise was carried out using an Excel based prototype of EQUIST 1.5, specially developed for this purpose. The main differences between the EQUIST 1.5 prototype and EQUIST 1.0 are:

- EQUIST 1.0 is fully web based tool, while EQUIST 1.5 is an excel based application.
- EQUIST 1.0 goes through a seven step process as described below:

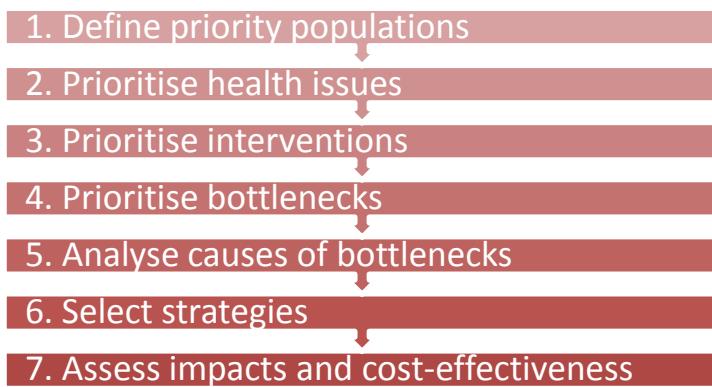
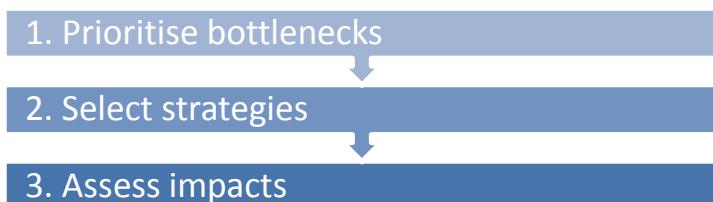


Figure 3- Seven steps in EQUIST 1.0

The EQUIST 1.5 prototype only includes steps 4, 6 and only part of 7 (estimation of impact but not of cost-effectiveness).

Figure 4 – Three steps in EQUIST 1.5 prototype



- EQUIST 1.0 is strongly equity-focused while the EQUIST 1.5 prototype only looks at national aggregates.
- EQUIST 1.5 incorporates recent findings from an exhaustive literature review on quantified effectiveness of health system strengthening strategies, not yet incorporated into the mainstream EQUIST 1.0.

Sources of data used

Intervention coverage

The sources used to assess or estimate intervention coverage are based on the recommendations included in LiST:

- For a large part of interventions coverage was extracted from the most recent household surveys (DHS or MICS).
- For those interventions for which there exist a globally validated UN estimation, this was used as a preference (vaccination coverage, WASH intervention coverage, HIV prevention and treatment, etc.).
- For interventions for which no validated source of data existed, we followed the assumptions proposed in LiST – in some cases estimated on the basis of the coverage of a related interventions; in other cases assumed to be zero.
- Full details available in Annex 1

Indicators used for Initial utilization, adequate coverage and effective coverage

The indicators used to assess initial utilization, adequate coverage and effective coverage for each intervention package were extracted from the most recent DHS or MICS surveys. The indicators were then averaged for the packages included in each delivery platform to provide a composite measure for each level of coverage.

Table 4- Indicators used for Initial utilization, adequate coverage and effective coverage

DELIVERY PLATFORM: FAMILY PRACTICES	
INITIAL UTILIZATION	<i>Average of Proportion of population using improved drinking water sources / Household with any net / Partial Breastfeeding (0-5 Mo)</i>
ADEQUATE COVERAGE	<i>Average of Percentage of population with access to improved sanitation / Proportion of households that own at least one ITN / Predominant Breastfeeding (0-5 Mo)</i>
EFFECTIVE COVERAGE	<i>Average of Safe disposal of stools / Slept under an ITN the previous night / Exclusive breastfeeding (0-5Mo)</i>
Intervention Package: Water, Sanitation and Hygiene	
INITIAL UTILIZATION	Proportion of population using improved drinking water sources
ADEQUATE COVERAGE	Percentage of population with access to improved sanitation
EFFECTIVE COVERAGE	Safe disposal of stools
Intervention Package: Environmental Safety	
INITIAL UTILIZATION	Household with any net
ADEQUATE COVERAGE	Proportion of households that own at least one ITN
EFFECTIVE COVERAGE	Slept under an ITN the previous night
Intervention Package: Infant and neonatal feeding and care practices	

INITIAL UTILIZATION	Partial Breastfeeding (0-5 Mo)
ADEQUATE COVERAGE	Predominant Breastfeeding (0-5 Mo)
EFFECTIVE COVERAGE	Exclusive breastfeeding (0-5Mo)
DELIVERY PLATFORM: PREVENTIVE SERVICES	
INITIAL UTILIZATION	<i>Average of Married women with FP contact / ANC1+ (Antenatal care from Skilled provider) / Proportion of children age 12-23 months who received DPT1/Penta 1</i>
ADEQUATE COVERAGE	<i>Average of Proportion of currently married women (or in union) age 15-49 who currently use any contraceptive method / ANC4+ / All vaccines</i>
EFFECTIVE COVERAGE	<i>Average of Modern contraceptive methods / ANC 4 and Urine sample / Fully vaccinated + vaccination card</i>
Intervention Package: Family Planning	
INITIAL UTILIZATION	Married women with FP contact
ADEQUATE COVERAGE	Proportion of currently married women (or in union) age 15-49 who currently use any contraceptive method
EFFECTIVE COVERAGE	Modern contraceptive methods
Intervention Package: Antenatal Care	
INITIAL UTILIZATION	ANC1+ (Antenatal care from Skilled provider)
ADEQUATE COVERAGE	ANC4+
EFFECTIVE COVERAGE	ANC 4 and Urine sample
Intervention Package: Immunization Plus	
INITIAL UTILIZATION	Proportion of children age 12-23 months who received DPT1/Penta 1
ADEQUATE COVERAGE	All vaccines
EFFECTIVE COVERAGE	Fully vaccinated + vaccination card
DELIVERY PLATFORM: DELIVERY CARE	
INITIAL UTILIZATION	<i>Institutional deliveries</i>
ADEQUATE COVERAGE	<i>Deliveries in BEmOC or CEmOC Facilities</i>
EFFECTIVE COVERAGE	<i>Deliveries in CEMOC facilities only</i>
Intervention Package: Normal Delivery Care	
INITIAL UTILIZATION	Proportion of live births attended by a skilled provider
ADEQUATE COVERAGE	Proportion of live births attended by a skilled provider in a health facility
EFFECTIVE COVERAGE	Institutional delivery + PNC within 2 days
Intervention Package: Emergency Obstetric and Neonatal care	
INITIAL UTILIZATION	Institutional deliveries
ADEQUATE COVERAGE	Deliveries in BEmOC or CEmOC Facilities
EFFECTIVE COVERAGE	Deliveries in CEMOC facilities only
DELIVERY PLATFORM: CURATIVE CARE FOR CHILDREN	

INITIAL UTILIZATION	<i>Among children under age five who had diarrhea in the two weeks preceding the survey percentage given ORT or increased fluids</i>
ADEQUATE COVERAGE	ORT (ORS or RHF)
EFFECTIVE COVERAGE	ORS

Indicators used to assess coverage determinants

The indicators used to assess Availability of Commodities, Geographical Access, Availability of Human Resources, Financial Affordability and Sociocultural Acceptability were extracted from facility surveys available for each country:

- SARA (Service Availability and Readiness Assessment)
- SPA (Service Provision Assessment)
- Service Delivery Point Survey
- SDI (Service Delivery Indicators)
- RMNCH Landscape Analysis (Life Saving Commodities).

Certain indicators were extracted from DHS or MICS.

Table 5 - Sources of information used for assessment of coverage determinants

		SARA (Service Availability and Readiness Assessment)	SPA (Service Provision Assessment)	Service Delivery Point Survey	SDI (Service Delivery Indicators)	Other	RMNCH Landscape Analysis (Life Saving Commodities)
Family Practices	Availability of Commodities	% of facilities with ITNs				% of Households with at least one ITN (DHS)	% of facilities with ORS
	Geographical Access					Water within 30 minutes (DHS)	
	Availability of Human Resources					Nurses and Midwives per 1000 pop (compared to norm 2.3) - WHO	
	Financial Affordability					Population not extreme poor (World Bank)	
	Sociocultural Acceptability					Female Literacy (DHS)	

		<i>SARA (Service Availability and Readiness Assessment)</i>	<i>SPA (Service Provision Assessment)</i>	<i>Service Delivery Point Survey</i>	<i>SDI (Service Delivery Indicators)</i>	<i>Other</i>	<i>RMNCH Landscape Analysis (Life Saving Commodities)</i>
	Quality						
Preventive Services	Availability of Commodities	% of Facilities with Stock of Contraceptive Pill	% of Facilities with Stock of Contraceptive Pill				% Facilities with stock of Implant
		% of Facilities with Stock of Measles Vaccine	% of Facilities with Stock of Measles Vaccine		Availability of vaccines		
		% of Facilities with Iron supplements (for ANC)	% of Facilities with Iron supplements (for ANC)				
	Geographical Access	% of Facilities offering Family Planning	% of Facilities offering Family Planning	% of Facilities offering Family Planning		Distance not a problem for accessing care (DHS)	
		% of Facilities offering ANC	% of Facilities offering ANC				
		% of Facilities offering Immunization Services	% of Facilities offering Immunization Services				
	Availability of Human Resources	% of Facilities with Staff Trained on FP	% of Facilities with Staff Trained on FP (at any time)				

		<i>SARA (Service Availability and Readiness Assessment)</i>	<i>SPA (Service Provision Assessment)</i>	<i>Service Delivery Point Survey</i>	<i>SDI (Service Delivery Indicators)</i>	<i>Other</i>	<i>RMNCH Landscape Analysis (Life Saving Commodities)</i>
	% of Facilities with Staff Trained on ANC	% of Facilities with Staff Trained on ANC (at any time)				Nurses and Midwives per 1000 pop (compared to norm 2.3) - WHO	
	Financial Affordability					Money not a problem for accessing care (DHS)	
	Sociocultural Acceptability					Need for permission not a problem for accessing care (DHS)	
	Quality	% facilities with ANC guidelines					
	Availability of Commodities	% of Facilities with Stock of Oxytocin	% of Facilities with Stock of Oxytocin	% of facilities with stock of essential drugs	Availability of drugs for mothers		% of Facilities with Stock of Oxytocin
Delivery care	Geographical Access	% of Facilities offering Normal Delivery care	% of Facilities offering Normal Delivery care	% of Facilities offering Normal Delivery care		Distance not a problem for accessing care	
	Availability of Human Resources	% of Facilities with Staff Trained on Normal Delivery	% of Facilities with Staff Trained on Normal Delivery (Any Time)			Met Need for Midwives (SOWMW)	
	Financial Affordability					Money not a problem for accessing care (DHS)	
	Sociocultural Acceptability					Need for permission not a problem for	

		<i>SARA (Service Availability and Readiness Assessment)</i>	<i>SPA (Service Provision Assessment)</i>	<i>Service Delivery Point Survey</i>	<i>SDI (Service Delivery Indicators)</i>	<i>Other</i>	<i>RMNCH Landscape Analysis (Life Saving Commodities)</i>
						accessing care (DHS)	
	Quality	% facilities with IMPAC guidelines	% facilities with IMPAC guidelines		Diagnostic Accuracy (Nurses)		
Curative Care for Children	Availability of Commodities	% of Facilities with Stock of Amoxicillin	% of Facilities with Stock of Amoxicillin	% of facilities with stock of essential drugs	Availability of drugs for children		% of Facilities with Stock of Amoxicillin
	Geographical Access	% of Facilities offering Curative care for Children				Distance not a problem for accessing care	
	Availability of Human Resources	% of Facilities with Staff Trained on Curative care for Children	% of Facilities with Staff Trained on Curative care for Children (At any time)			Nurses and Midwives per 1000 pop (compared to norm 2.3)	
	Financial Affordability					Money not a problem for accessing care (DHS)	
	Sociocultural Acceptability					Need for permission not a problem for accessing care (DHS)	
	Quality	% facilities with IMCI/Curative care for Children guidelines	% facilities with IMCI/Curative care for Children guidelines		Diagnostic Accuracy (Nurses)		

Table 6 - Sources of information used for coverage determinants by country

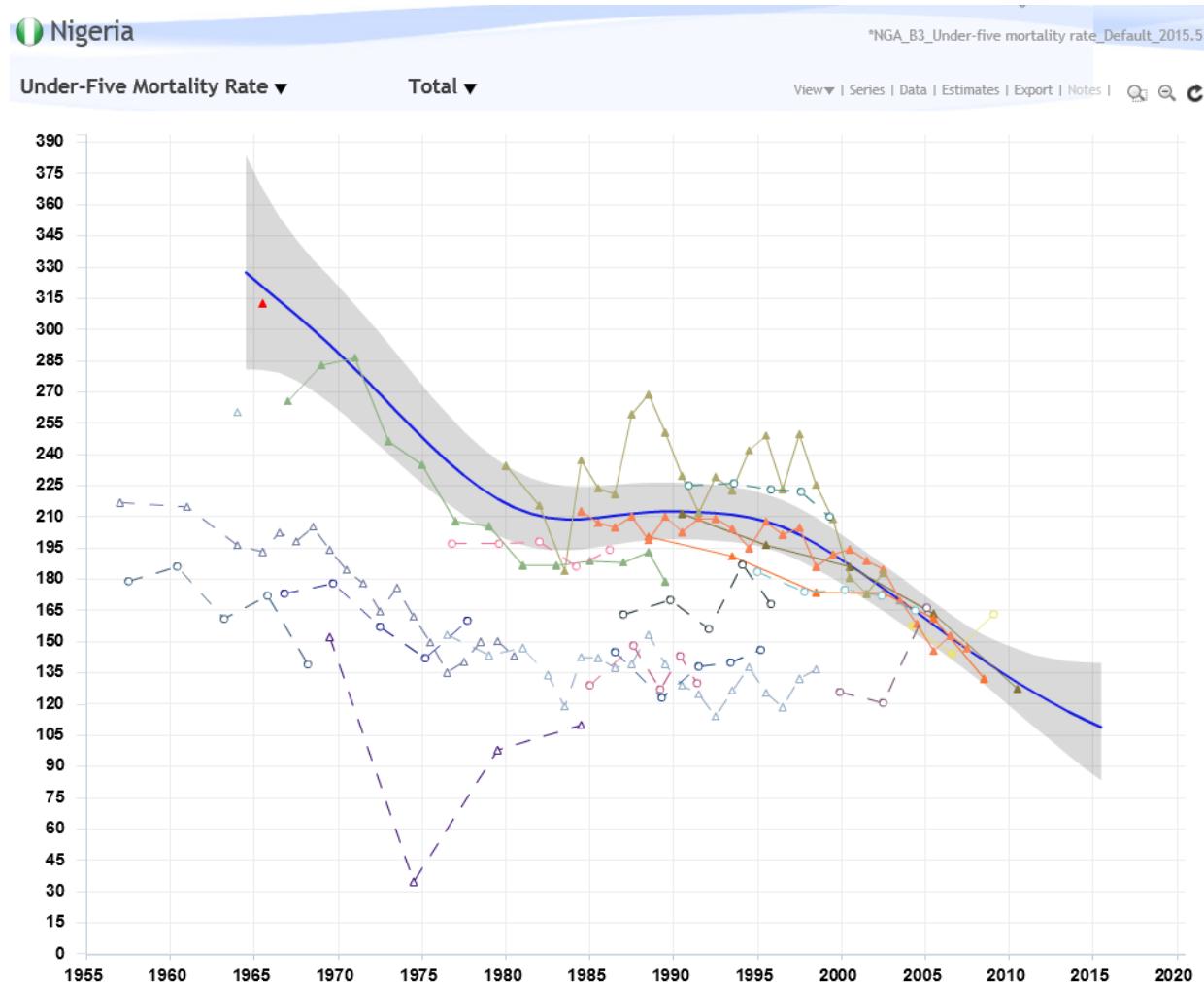
Country	Main source
Ethiopia	SPA (Service Provision Assessment) 2014
Kenya	SARA (Service Availability and Readiness Assessment) 2013
Madagascar	Service Delivery Point Survey 2011
Malawi	SPA (Service Provision Assessment) 2013-14
Mozambique	SDI (Service Delivery Indicators) 2016
Rwanda	SPA (Service Provision Assessment) 2007
South Sudan	South Sudan's first national health facility assessment
Tanzania, United Republic of	SPA (Service Provision Assessment) 2014-15
Uganda	SARA (Service Availability and Readiness Assessment) 2014
Zambia	SARA (Service Availability and Readiness Assessment) 2010
Congo, Democratic Republic of the	SARA (Service Availability and Readiness Assessment) 2014
Ghana	ABCE (Access Bottlenecks Costs and Equity) 2014
Liberia	Service Delivery Point Survey 2013
Mali	Service Delivery Point Survey 2013
Nigeria	Service Delivery Point Survey 2014
Senegal	SPA (Service Provision Assessment) 2016
Yemen	5 governorate facility survey
Haiti	SPA (Service Provision Assessment) 2013
Afghanistan	Country qualitative assessment
Bangladesh	SPA (Service Provision Assessment) 2014
India	District Level Health and Facility Survey
Nepal	Country qualitative assessment
Pakistan	HFA (Health Facility Assessment)
Indonesia	Country qualitative assessment
Myanmar	UNICEF HFA

Mortality rates and causes

Rates of under-5, infant and neonatal mortality for each country are extracted from the levels at national level are extracted from the “Child Mortality Estimates” database containing the latest child mortality estimates based on the research of the UN Inter-Agency Group for Child Mortality Estimation (IGME). (<http://www.childmortality.org/>)

In the absent of robust vital registration systems, measuring mortality rates for children presents serious challenges. As illustrated in the chart below for Nigeria, different surveys may produce quite different estimates. The IGME has devised a methodology to use different sources of information to produce a better estimation of the levels and trends of mortality rates for children at national level. These estimates are available as time series with medium higher and lower thresholds. In EQUIST we take from IGME the medium estimate for the year for which the main survey (usually DHS/MICS) used to assess coverage and other indicators.

Figure 5 - Example of estimation of U5MR by IGME - Nigeria



In order to break NMR and post neonatal U5MR down by specific cause, EQUIST uses national data on cause-specific child mortality, which were estimated by the Child Health Epidemiology Reference Group (CHERG). The CHERG has estimated total and cause specific mortality rates for neonates and

children aged 1-59 months. CHERG uses data from vital registration (where available) and verbal autopsy data to generate cause specific estimates. For countries lacking vital registration data, CHERG has estimated missing data from a predictive model. These national estimates were available for all countries for the country specific “baseline year.” These data are consistent between CHERG and IGME, available on WHO and UNICEF Websites and have been published in papers by Liu et al. (2015, Cousins et al etc.)

Step 1. Identification of Health System Bottlenecks

To facilitate identification and prioritisation of bottlenecks a 2-stage approach was set up. Initially EQUIST 1.5 prototype estimated a preliminary assessment of bottleneck severity based on available information; then country teams were requested to revise, update and complement if additional data was available, and recheck the qualitative assessment of bottleneck severity.

Preliminary assessment of health system bottleneck severity

Using the indicators and sources as described above for the difference coverage determinants well as for the initial utilization, adequate and effective coverage of each service delivery platform, the EQUIST 1.5 prototype provided a simple preliminary assessment of the apparent severity of bottlenecks for each delivery platform.

The assessment was done through a simple 2-stage calculation.

Step 1 – Calculation of the quantitative severity of the bottleneck.

Bottlenecks	Quantitative Calculation of bottleneck severity
Availability of Commodities	100% - Availability of Commodities (as measured by proxy indicator)
Geographical Access	100% - Geographical Access (as measured by proxy indicator)
Availability of Human Resources	100% - Availability of Human resources (as measured by proxy indicator)
Financial Affordability	100% - Financial Affordability (as measured by proxy indicator)
Sociocultural Acceptability	100% - Sociocultural acceptability (as measured by proxy indicator)
<i>Continuity</i>	<i>100% - (ADEQUATE COVERAGE/INITIAL UTILIZATION)</i>
<i>Quality</i>	<i>100% - (EFFECTIVE COVERAGE/ADEQUATE COVERAGE)</i>

Note that while for *Availability of Commodities, Geographical Access, Availability of Human Resources, Financial Affordability, Sociocultural Acceptability* the bottlenecks' severity were simply estimated as the absolute gap (from the current level to the 100% optimum level), the severity of

continuity and quality bottlenecks was assessed as the relative “drop-off” between *Adequate Coverage/Initial Utilization* and *Effective Coverage/Adequate Coverage*, respectively.

Step 2 – Qualitative assessment of severity of each bottleneck.

For each of the seven determinants in each of the four delivery platforms the severity of the bottlenecks was then translated into a simple preliminary qualitative scale as follows:

Quantitative bottleneck severity	Preliminary Qualitative Assessment
0%-25%	Low
25%-50%	Medium
50%-100%	High

In-country assessment, adjustment and complementation of

The information gathered and the preliminary analysis from EQUIST 1.5 prototype was sent to each country. Country teams were requested to:

1. Review the indicators selected to assess the different bottlenecks. If they have a more updated or adequate indicator, they were requested to substitute the indicator, source and value.
2. Based on the preliminary bottleneck assessment, teams were requested to indicate to what degree this is a critical bottleneck for their context (High, Medium, or Low). Even where no quantitative data was available to assess a given bottleneck was available, country teams were encouraged to provide their own expert opinion as to the severity of the bottleneck.

Final adjustment for missing information

In cases where no quantitative assessment of the severity was available – either from a validated data source or from the expert opinion of country teams – the modelling team made the assumption that there would be of “medium” severity – in order to mitigate the potential bias into the further calculations made in the model.

Step 2. Selection of health system strengthening strategies

List of strategies included in EQUIST 1.5 prototype

Table 7- List of strategies included in EQUIST 1.5 prototype

Core HSS function	Strategy
Financing	Conditional cash transfers
	Contracting out
	Health insurance

Core HSS function	Strategy
	Supply-side financial incentives
	User fees and exemptions
	Vouchers
Governance/ Leadership	Health System Accountability
Health workforce	Enhanced supervision Leadership and Management training Task sharing/task shifting Pre-service training and recruitment of new staff In service training Redeployment/relocation of existing staff
Information	Health information systems strengthening Patient reminders
Medical products, vaccines and technologies	Pharmaceutical cost control Pharmaceutical quality regulation Pharmaceutical stock management Ensure timely procurement of key commodities Ensure availability of equipment
Service Delivery	Accreditation Community education and outreach Emergency access interventions - Ambulance/Radio/Mat. Waiting Homes Emergency access interventions - Emergency funds Lay/CHW service delivery Non-facility service provision Quality improvement Service integration Building/rehabilitations of facilities

EQUIST 1.5 generated assessment of potential impact of strategies

Based on a series of parameters related to the existing evidence base, the severity of different bottlenecks, as well as enabling environment factors, EQUIST 1.5 prototype calculated the potential effectiveness of the strategies as listed above.

In-country discussion on appropriate strategies

Selection of appropriate strategies

Informed from the “potential impact” of each strategy for each delivery platform, as well as from the actual understanding of the feasibility and support for each strategy in the particular country contexts, the country teams identified (marking with an “x”) the strategies that could be introduced or scaled up in each country. These were meant to approximate a “realistic best case scenario.”

Assessment of plausible scale / intensity of implementation

On the same basis for each of the strategies selected, the country teams indicated (in a scale 1-5) the potential scale or intensity of implementation of each strategy in each country. This factor was intended to reflect the technical and institutional limitations for fully scaling up certain strategies in the given timeframe (2016-2020).

Assessment of relevant delivery platforms where strategy could be applied

Some strategies may apply to all interventions (e.g. training of providers may be relevant for the four delivery platforms in a given country; while others may only be relevant in specific intervention (user fee abolition may only be relevant for facility based interventions such as delivery care a curative care for children). To reflect that, finally each country team indicated for each of the selected strategies which delivery platform it would apply to.

Step 3. Estimation of effectiveness of health system strengthening strategies on coverage of high impact interventions

Evidence base for potential effectiveness of health system strengthening strategies.

Based on a thorough systematic evidence review and a high-level expert meeting carried out in 2016 (research article forthcoming), estimations of quantified effect sizes were derived for a series of health system strengthening strategies. These effect sizes were expressed in relative risk ratios. Differentiated effect sizes were derived for each of the four delivery platforms. Wherever several sources where available, the effect size was expressed as a range [max-min]. Effects of strategies were measured on changes in coverage or utilization of different interventions.

Transformation of relative risk ratios into coverage gaps reduction.

A limitation of using this form of evidence for modelling purposes is that relative ratios are quite dependent on the level of the baseline coverage. For example, in the original study, a strategy showed to increase coverage from the 35% to 70% in the intervention group, thus resulting in a relative risk ratio of 2.0; applying this relative risk ratio to an intervention with a baseline coverage of 5% would result in an increase on coverage of only 5%; if however baseline coverage was 80%, the expected endline target coverage would be 160%, which is illogical. To overcome this inconsistency we have converted the RRR into relative reduction in coverage gap; in our example the coverage gap was 65% at baseline (100-35%), and was reduced to 30% (100%-70%) once the strategy was introduced. Thus, the coverage gap reduced by 54% $[(65-30\%)/65\%]$. In our examples, this would result in an increase from 5% to 56%, and from 80% to 91%.

Detailed data on the original RRR ranges and adjusted effect range (expressed as reduction in coverage gaps) can be found in Annex 2.

Estimation of country-specific effectiveness of individual HSS strategies

To estimate the expected effectiveness in a given country three factors were taken into account:

1. The potential effect size derived from the evidence review (as explained above).
2. The enabling environment score for each country. This score was derived by averaging four indicators representing each of the main dimensions of the described above:

Enabling Environment factors	Definitions	Example country X
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Social Norms	Gender Gap Index	63%
Legislation/Policy	Countdown Policy Score	100%
Budget/Expenditure	Government Effectiveness index (translated to 100% scale)	25%
Management /Coordination	Abuja Target (Gov expenditure in health as proportion of target 15% of)	45%
Enabling Environment Score (Average)		58%

3. The relevance to the specific bottlenecks identified in each country.

This was done in 3 steps:

3.1 Assessing the potential effectiveness of a strategy on different bottlenecks, as per the following matrix (Direct Impact=1; Indirect Impact=0.5):

Table 8 - Potential effectiveness of strategies against bottlenecks

Core HSS function	Short, standardized strategy name		Availability of Commodities		Financial Affordability	Sociocultural Acceptability	Continuity	Quality
			Availability of Human Resources	Geographical Access				
Financing	<i>Conditional cash transfers</i>			0.5	1		0.5	
	<i>Contracting out</i>		1	1				0.5
	<i>Health insurance</i>				1			
	<i>Supply-side financial incentives</i>		1		0.5	0.5	0.5	1
	<i>User fees and exemptions</i>				1			
	<i>Vouchers</i>		0.5	0.5	1	0.5		
Governance/ Leadership	<i>Health System Accountability</i>	0.5	0.5	0.5				1
Health workforce	<i>Enhanced supervision</i>	0.5	0.5	0.5				1
	<i>Leadership and Management training</i>	0.5	0.5	0.5				0.5
	<i>Task sharing/task shifting</i>		1	1				
	<i>Pre-service training and recruitment of new staff</i>		1					1
	<i>In service training</i>		0.5			0.5		1
	<i>Redeployment/relocation of existing staff</i>		1	1	0.5			
Information	<i>Health information systems strengthening</i>	0.5	0.5	0.5			0.5	0.5
	<i>Patient reminders</i>					0.5	1	
Medical products, vaccines and	<i>Pharmaceutical cost control</i>	1			0.5			
	<i>Pharmaceutical quality regulation</i>	0.5						1
	<i>Pharmaceutical stock management</i>	1			0.5			

Core HSS function	Short, standardized strategy name	Availability of Commodities	Availability of Human Resources	Geographical Access	Financial Affordability	Sociocultural Acceptability	Continuity	Quality
technologies	<i>Ensure timely procurement of key commodities</i>	1			0.5			0.5
	<i>Ensure availability of equipment</i>							1
Service Delivery	<i>Accreditation</i>		0.5	0.5				1
	<i>Community education and outreach</i>			0.5		1	0.5	
	<i>Emergency access interventions - Ambulance/Radio/Mat. Waiting Homes</i>			1	0.5		1	
	<i>Emergency access interventions - Emergency funds</i>			0.5	1		0.5	
	<i>Lay/CHW service delivery</i>		1	1	0.5	0.5	0.5	
	<i>Non-facility service provision</i>		1	1	0.5	0.5		
	<i>Quality improvement</i>	0.5	0.5			0.5		1
	<i>Service integration</i>		1	0.5				
	<i>Building/rehabilitations of facilities</i>			1	0.5			

3.2 Converting the relative severity of bottlenecks into a quantified value: where “high severity” was given a value of 2, medium severity a value of 1, and low severity a value of 0.

3.3 Calculating the “aggregate severity” of all the bottlenecks for a given delivery platform, e.g.

Table 9 - Calculation of aggregate bottleneck severity score

Bottleneck	Severity	Bneck severity score
Availability of Commodities	Low	0
Geographical Access	High	2
Availability of Human Resources	High	2
Financial Affordability	High	2
Sociocultural Acceptability	Medium	1
Continuity	Low	0
Quality	Low	0

Aggregate Severity Score (sum)

7

3.4 Estimating the relevance of a given strategy in the country context.

Based on steps 3.1, 3.2, and 3.3 described above, we can assess how relevant is a given strategy for a specific country, in view of the type of bottlenecks that the strategy addresses, and the actual bottlenecks that the country faces. We do this by multiplying the potential effectiveness to the bottleneck severity and divided it by the aggregate severity score. For example, for Building and rehabilitation of facilities:

Bottleneck	<i>Bneck severity score</i>	<i>Potential effectiveness</i>	
Availability of Commodities	0		0x0=0
Geographical Access	2		2x0=0
Availability of Human Resources	2	1	2x1 = 2
Financial Affordability	2	0.5	2x0.5=1
Sociocultural Acceptability	1		1x0=0
Continuity	0		0x0=0
Quality	0		0x0=0

Aggregate Severity Score (sum) 7

(Unadjusted) Relevance of Building and rehabilitation of facilities for this specific context= 3/7= 42%

Assuming that in the actual studies from which the effect size was derived, these strategies were addressing the main bottlenecks (say, those that explain 2/3 of the overall coverage gaps), we then adjust the relevance by dividing it by 66%. In our example= $42\% / 66\% = 65\%$

3.5 Estimating full effect size adjusted for relevance and enabling environment

From the evidence range derived from the literature (say, 10%-53%), we estimate the full effect size through the following approach:

Full effect size = {lower bound of potential effect +[(upper-lower bound of effect range)*Enabling Environment Score]}*Relevance Score.

In our example:

Full effect size of building and rehabilitation of facilities={10%+[(53%-10%)*58%]}*65%=23%

That is: if implemented at full scale, building and rehabilitation of facilities could solve 23% of the current coverage gap for the example delivery platform.

3.6 Estimating adjusted effect size, considering the planned scale/intensity of implementation

As each country identified the expected scale/intensity of implementation (on a scale 1-5), then “full effect size” was then further adjusted as follows

Adjusted effect size = Full effect size * (scale of implementation/5)

In our example, say the team decided to assign a “3” as scale of implementation, then:

Adjusted effect size of building and rehabilitation of facilities = 23% * (3/5)=14%

Residual addition of different HSS strategies on a given intervention

In our approach a strategy has an effect in reducing the coverage gap. When several strategies are applied to the same group of interventions, their effectiveness is aggregated in a residual way, that is:

- The effect of the first strategy is applied to the full coverage gap of the interventions. For example if the initial coverage was 30%, the initial coverage gap was 70%. A strategy with an effectiveness of 14% will reduce the coverage gap from 70% to 60%.
- A second strategy with an effectiveness of 35%, will then be applied to the remaining coverage gap that is 60%, bringing it to 45%.
- And so on when including additional strategies to the same group of interventions.

Note that the order in which the effectiveness of strategies is calculated does not affect the final result.

Adjustments of coverage increases for complementary interventions

There are a few interventions which are complementary – that is a person can only have access to one of them. These groups of complementary interventions follow a hierarchy, that is, one of the interventions is considered superior or preferable to the rest – for example multi-micronutrient supplementation is considered superior to iron folic acid supplementation (IFA), as the former includes IFA plus other micronutrients. More specifically these are:

Table 10 - Complementary intervention groups

Intervention group	Interventions included - In hierarchical order from preferred to less preferred
Micronutrient Supplementation	Multimicronutrient Supplementation Iron folic acid supplementation
Case management of neonates with sepsis/pneumonia	Full supportive care for NN pneumonia/sepsis Injectable antibiotics Oral antibiotics
Case management for premature babies	Full Supportive Care for prematurity Kangaroo mother care Thermal Care

In these cases the process followed was:

1. The full expected reduction in coverage gap was applied to the superior intervention as per following formula.
2. Endline coverage = [baseline coverage + (baseline gap)*Gap reduction]

For example if full supportive care for prematurity had a baseline coverage of 25%, (gap=75%) and a gap reduction of 60%:

Endline coverage of full supportive care for prematurity = $25\% + (75\% * 60\%) = 60\%$

3. For the rest, in hierarchical order the following formula was applied:

Endline coverage = [baseline coverage + (baseline gap)*Gap reduction] * (100%-endline coverage of superior interventions)

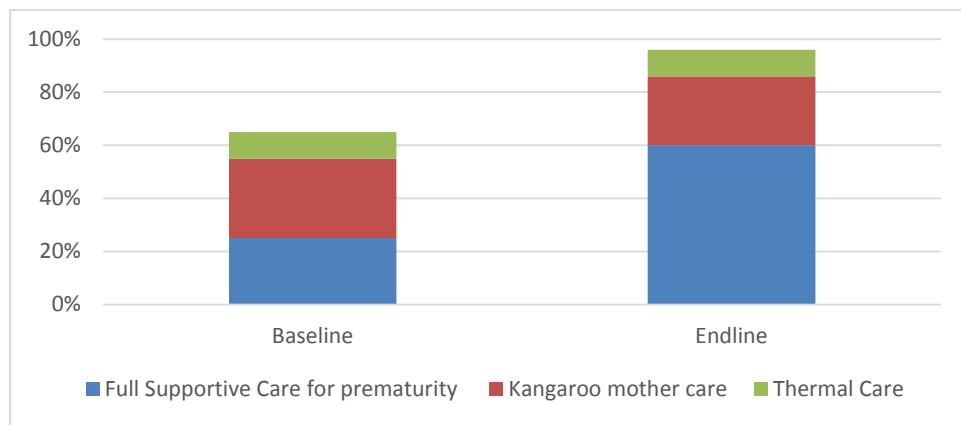
For example of Kangaroo mother care had a baseline coverage of 30% (gap=70%) and a gap reduction of 50%:

Endline coverage of Kangaroo mother care= $[30\% + (70\% * 50\%)] * (100\% - 60\%) = 26\%$

If Thermal care had a baseline coverage of 10% (90% gap) and a bottleneck reduction of 65%:

Endline coverage of Thermal care = $[10\% + (90\% * 65\%)] * (100\% - 60\% - 26\%) = 11\%$

Figure 6- Example - Increase in coverage of complementary interventions



Impact estimation

The Lives Saved Tool (LiST) (Version 5.53beta2) was used to estimate the potential impact in terms of maternal and child mortality reduction as a result of expanded coverage of key maternal, newborn, and child health (MNCH) interventions. Analyses were conducted based upon values for baseline and projected target coverage in each country provided by EQUIST.

DATA SOURCES

The LiST module uses the most updated data available for mortality rates, causes of death, baseline health status, and coverage levels for effective interventions in order to create country-specific projections.

Estimates for under-five and neonatal mortality rates are produced by the Interagency Group for Child Mortality Estimation ([IGME](#)), comprised of UNICEF, WHO, World Bank, and the United Nations Population Division, and cause of death profiles are produced by the Maternal and Child Epidemiology Estimation (MCEE) [project](#). Maternal mortality ratios are drawn from the most recent [report](#) from WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division and the distribution of maternal deaths by cause are based upon a systematic [analysis](#) conducted by WHO.

ANALYSIS APPROACH

Baseline (year = 2016) and final (year = 2020) coverage of key interventions and contraceptive prevalence rates (CPR) were based upon EQUIST outputs. Trends to reach designated intervention coverage targets were modeled in a pattern of linear increase for the period from 2016 (baseline) to 2020 (target). Childbirth interventions provided at or around the time of delivery were modeled as a packaged scale-up according to expanded skilled birth attendance and health facility delivery percentages. The prevalence of exclusive breastfeeding was modeled uniformly for the <1 month and 1-5 month age groups. Trends for HIV/AIDS programming were based upon intervention scale-up as projected within the AIDS Impact Module (AIM). Increases in CPR were linear and set to reach 2020 target levels as specified by the EQUIST platform.

The resulting difference in the number of child and maternal deaths with scale-up of MNCH interventions and contraceptive use was calculated as the total number of lives saved compared to a baseline model which incorporated no coverage change over time. The impact of contraceptive use, described as the “family planning” or “demographic impact,” reflects the concurrent reduction in the number of deaths due to the CPR-driven decrease in fertility or reduction in the overall number of births projected. For the lives saved attributable to specific MNCH interventions, impact by intervention was grouped according to four EQUIST categories: family practices, preventive services, delivery care, and curative care for children.

Allocation of impact to HSS Strategies

Whereas it is virtually impossible to clearly differentiate the impact of individual health system strengthening strategies on mortality, as they all work in synergistic fashion, for this analysis we have attempted to find an indirect way of having a general idea of the overall relative potential of different strategies in each country context. This takes into account the overall observed effectiveness of strategies in global analyses as well as the actual situation (health system bottlenecks) in each specific country.

In order to have a sense of the relative contribution of different HSS strategies to the impact estimated, the following process was followed:

1. For each delivery platform the projected impact (number of deaths averted) for all interventions included in the platform was aggregated.

2. For each of the strategies applied to that the delivery platform, the adjusted effect size was calculated as explained above (i.e. taking into account the global evidence on strategy effectiveness as well as the local health system bottlenecks).
3. Then we calculated the proportion of the effect size of each strategy included as a percentage of the sum of the effect sizes of all interventions.
4. Finally we distributed the number of deaths averted for that delivery platform to that percentage calculation.

Note that, in the aggregation was not residual but direct.

For example, if the total deaths averted for the curative care for children in country X was 5,400, the attribution would be as follows:

Table 11 - Example of attribution of deaths averted to health system strengthening strategies

HSS Category	HSS Strategy	Adjusted Effect Size	As a % of total	Attribution of deaths averted
Financing	Conditional cash transfers	-	0%	-
	Contracting out	-	0%	-
	Health insurance	0.10	6%	320
	Supply-side financial incentives	-	0%	-
	User fees and exemptions	-	0%	-
	Vouchers	-	0%	-
Governance/Leadership	Health System Accountability	-	0%	-
Health workforce	Enhanced supervision	0.23	14%	742
	Leadership and Management training	0.05	3%	151
	Task sharing/task shifting	0.08	5%	251
	Pre-service training and recruitment of new staff	0.04	2%	134
	In service training	0.06	4%	201
	Redeployment/relocation of existing staff	0.08	5%	268
Information	Health information systems strengthening	-	0%	-
	Patient reminders	-	0%	-
Medical products, vaccines and technologies	Pharmaceutical cost control	-	0%	-
	Pharmaceutical quality regulation	0.03	2%	84
	Pharmaceutical stock management	0.12	7%	397
	Ensure timely procurement of key commodities	0.05	3%	151
	Ensure availability of equipment	0.03	2%	101

<i>HSS Category</i>	<i>HSS Strategy</i>	<i>Adjusted Effect Size</i>	<i>As a % of total</i>	<i>Attribution of deaths averted</i>
Service Delivery	Accreditation	0.02	1%	59
	Community education and outreach	-	0%	-
	Emergency access interventions - Ambulance/Radio/Mat. Waiting Homes	-	0%	-
	Emergency access interventions - Emergency funds	-	0%	-
	Lay/CHW service delivery	0.32	20%	1,062
	Non-facility service provision	-	0%	-
	Quality improvement	0.21	12%	675
	Service integration	0.18	11%	604
	Building/rehabilitations of facilities	0.06	4%	201
	<i>Sum of effect sizes of all strategies</i>	1.64	100%	5,400

Main Limitations of the methodology applied

There are assumptions and limitation in such modelling exercises, and the results must be interpreted with much caution.

The most fundamental limitation of our study relates to the set **assumptions we had to adopt on order to estimate the expected effect of HSS interventions on coverage**, taking into account:

- The effect sizes as published in the literature: While our analysis was based on very thorough and systematic review of the literature, the published evidence is quite uneven (some areas are much better studied than others); furthermore, where ranges of effect sizes were found the literature does not provide systematically a clear identification of the factors that explain these differences in effectiveness; lastly there isn't a strict "taxonomy" of HSS strategies, so deciding which strategies must be considered comparable was in itself an exercise that implied certain assumptions; finally even studies that look at strategies that have the same "name" in different context may be comparing substantially different "versions" – i.e. the specific design decision of policy makers (who received the cash transfer the mother or the father?, how much is the cash transfer?, etc.) may have critical influence on the actual effectiveness of strategies
- The specific health system bottlenecks present in each particular country: We used a combined methodology to try to assess the relative importance of different bottlenecks in each country; firstly we obtained as much quantified information as was publicly available; then, understanding that this information may be incomplete or not fully reflective of the actual problematic in each country we requested country teams to incorporate their own understanding by assessing from a qualitative perspective the severity of the bottlenecks; this naturally allows for certain level of subjectivity. In some countries, the sources of quantitative data for assessment of the bottlenecks were scarce.
- The broader country context as depicted by the "Enabling Environment": It is generally accepted that the enabling environment conditions have a substantial influence on the effectiveness of HSS strategies, however there is not global agreement on which may be the key factors within the enabling environment nor which are the best indicators and information sources to assess such factors. The indicators used have been based on statistical analysis of their association with health system performance. Nonetheless, further research is required to better understand this matter.

Other important limitations were:

- **Use of the Lives saved tool:** While it is a generally accepted tool, the Lives Saved Tool includes a series of assumptions and has its own limitations.
- **Assumptions adopted for the attribution of impact to specific HSS strategies.** The attribution of impact to a specific health system strengthening strategy is a somewhat "artificial" process that has been included in this exercise as an illustration, to start a conversation. While the main argument is undoubtedly valid – appropriate health system strengthening strategies have a critical role in ending preventable deaths- the attribution of deaths averted to *specific* HSS strategies is subject to many assumptions and must therefore be interpreted with caution.

Annex 1. Sources of data and assumptions for estimation of baseline coverage of interventions included

Service Delivery Platform	Packa ge	Intervention	Sources and assumptions for baseline coverage
SDL1	Pkg1	Improved Water	DHS/MIC
SDL1	Pkg1	Improved sanitation	DHS/MIC
SDL1	Pkg1	Safe disposal of child feces	DHS/MIC
SDL1	Pkg1	Water connection in the home	DHS/MIC
SDL1	Pkg1	Hand washing with soap	DHS/MIC
SDL1	Pkg2	Ownership of insecticide treated bednets (ITN)	DHS/MIC
SDL1	Pkg3	Exclusive breastfeeding	DHS/MIC
SDL1	Pkg3	Any breastfeeding (12-23 Months)	DHS/MIC
SDL1	Pkg3	Complementary feeding - education and supplementation	DHS/MIC
SDL1	Pkg3	Any breastfeeding (6-11 Months)	DHS/MIC
SDL1	Pkg3	Early Initiation of Breastfeeding	DHS/MIC
SDL1	Pkg3	Thermal care.	Assumed that all neonates receiving a preventive postnatal visit within 48 hours of delivery (From HH survey)
SDL1	Pkg3	Clean postnatal care practices	DHS/MIC
SDL2	Pkg4	Contraceptive use	DHS/MIC
SDL2	Pkg4	Pre-pregnancy Folic acid supplementation/fortification	DHS/MIC
SDL2	Pkg5	TT- tetanus toxoid vaccination	DHS/MIC
SDL2	Pkg5	IPTp- pregnant women protected via intermittent preventive treatment of malaria or sleeping under an insecticide treated bednet (ITN)	DHS/MIC

SDL2	Pkg5	Syphilis detection and treatment	<p>LiST Assumptions - calculation on basis of ANC4+</p> <ul style="list-style-type: none"> - If ANC4+ is less than 40%, then this indicator will equal 20% of ANC4+ - If ANC4+ is between 40% and 75%, then this indicator will equal 50% of ANC4+ - If ANC4+ is between 75% and 95%, then this indicator will equal 70% of ANC4+ - If ANC4+ is 95% or greater, then this indicator will equal 100% of ANC4+
SDL2	Pkg5	Calcium supplementation	DHS/MIC
SDL2	Pkg5	Multiple micronutrient supplementation	List Assumption = Zero
SDL2	Pkg5	Iron folate supplementation	DHS/MIC
SDL2	Pkg5	Balanced energy supplementation	List Assumption = Zero
SDL2	Pkg5	Hypertensive diseases case management	Lisat Assumption: 5% of ANC4+
SDL2	Pkg5	Diabetes case management	Lisat Assumption: 5% of ANC4+
SDL2	Pkg5	Malaria case management	Lisat Assumption: 5% of ANC4+
SDL2	Pkg5	management of pre-eclampsia	Lisat Assumption: 5% of ANC4+
SDL2	Pkg5	FGR- fetal growth restriction detection and management	Lisat Assumption: 5% of ANC4+
SDL2	Pkg5	PMTCT – Prevention of mother to child transmission of HIV	UNAIDS - Gap Report
SDL2	Pkg6	Vitamin A supplementation	DHS/MIC
SDL2	Pkg6	IMMUNIZATION PLUS - Zinc supplementation	List Assumption = Zero
SDL2	Pkg6	BCG	National: WHO/UNICEF global estimate
SDL2	Pkg6	Polio	National: WHO/UNICEF global estimate
SDL2	Pkg6	DTP3	National: WHO/UNICEF global estimate
SDL2	Pkg6	Hib	National: WHO/UNICEF global estimate
SDL2	Pkg6	HepB	National: WHO/UNICEF global estimate
SDL2	Pkg6	Pneumococcal	National: WHO/UNICEF global estimate
SDL2	Pkg6	Rotavirus	National: WHO/UNICEF global estimate
SDL2	Pkg6	Measles	National: WHO/UNICEF global estimate

SDL3.1	Pkg7	Skilled birth attendance (SBA)	DHS/MIC
SDL3.1	Pkg7	Institutional delivery	DHS/MIC
SDL3.1	Pkg7	Delivery by skilled professional - Essential care	<ul style="list-style-type: none"> - If FacilDeliv is less than 30%, then Essential care deliveries are 90% of FacilDeliv - If FacilDeliv is between 30% and 50%, then Essential care deliveries are 50% of FacilDeliv - If FacilDeliv is between 50% and 95%, then Essential care deliveries are 25% of FacilDeliv - If FacilDeliv are 95% or greater, then Essential care deliveries are 0% of FacilDeliv
SDL3.1	Pkg7	Delivery by skilled professional - Assisted deliveries at home (SBA)	DHS/MIC
SDL3.1	Pkg7	Delivery by skilled professional - Labor and delivery management	DHS/MIC
SDL3.1	Pkg7	Clean birth practices	List Assumptions: Equal to SBA
SDL3.1	Pkg7	Immediate assessment and stimulation	List Assumptions: Equal to SBA
SDL3.1	Pkg7	AMTSL- Active Management of the Third Stage of Labor	List Assumptions: Bemoc+Cemoc
SDL3.1	Pkg7	KMC - Kangaroo Mother Care	List Assumption = Zero
SDL3.1	Pkg7	Delivery by skilled professional - Chlorhexidine	List Assumption = Zero
SDL3.2	Pkg8	ORS - oral rehydration solution	DHS/MIC
SDL3.2	Pkg8	Oral Antibiotics for Neonates	List Assumption = Zero
SDL3.2	Pkg8	Injectable antibiotics for neonatal sepsis	List Assumption = Institu deliveries
SDL3.2	Pkg8	Antibiotics - treatment for dysentery	DHS/MIC
SDL3.2	Pkg8	Zinc - treatment of diarrhea	DHS/MIC
SDL3.2	Pkg8	Oral antibiotics - case management of severe pneumonia in children	DHS/MIC
SDL3.2	Pkg8	Vitamin A - treatment of measles	List Assumption = Vit A supplementation
SDL3.2	Pkg8	Antimalarials - Artemesinin compounds for malaria	DHS/MIC
SDL3.2	Pkg8	Therapeutic feeding for severe wasting (Severe acute malnutrition (SAM))	List Assumption = Zero

SDL3.2	Pkg8	Treatment for moderate acute malnutrition (MAM)	List Assumption = Zero
SDL3.2	Pkg8	Cotrimoxazole	UNAIDS - Gap Report
SDL3.2	Pkg8	ART (for children)	UNAIDS - Gap Report
SDL3.1	Pkg9	CEmOC	<p>List Assumptions:</p> <ul style="list-style-type: none"> - If FacilDeliv is less than 30%, then BEmOC deliveries are 0% of FacilDeliv - If FacilDeliv is between 30% and 50%, then BEmOC deliveries are 30% of FacilDeliv - If FacilDeliv is between 50% and 95%, then BEmOC deliveries are 15% of FacilDeliv - If FacilDeliv are 95% or greater, then BEmOC deliveries are 0% of FacilDeliv
SDL3.1	Pkg9	Neonatal resuscitation	List Assumption = Inst Del.
SDL3.1	Pkg9	BEmOC	<p>List Assumptions:</p> <ul style="list-style-type: none"> - If FacilDeliv is less than 30%, then BEmOC deliveries are 0% of FacilDeliv - If FacilDeliv is between 30% and 50%, then BEmOC deliveries are 30% of FacilDeliv - If FacilDeliv is between 50% and 95%, then BEmOC deliveries are 15% of FacilDeliv - If FacilDeliv are 95% or greater, then BEmOC deliveries are 0% of FacilDeliv
SDL3.1	Pkg9	Safe abortion services	DHS/MIC
SDL3.1	Pkg9	Post abortion case management	List Assumption = Zero
SDL3.1	Pkg9	Ectopic Pregnancy Management	List Assumption = Zero
SDL3.1	Pkg9	Antenatal corticosteroids for pre-term labor	List Assumption = Zero
SDL3.1	Pkg9	Antibiotics for pPRoM	List Assumptions: Bemoc+Cemoc
SDL3.1	Pkg9	MgSO4- management of eclampsia	List Assumptions: Bemoc+Cemoc
SDL3.1	Pkg9	Induction of labor for pregnancies lasting 41+ weeks	List Assumptions: Bemoc+Cemoc
SDL3.1	Pkg9	Maternal sepsis case management	List Assumption = Zero
SDL3.1	Pkg9	Full supportive care for premature babies	List Assumption = Zero
SDL3.1	Pkg9	Full supportive care for sepsis/pneumonia	List Assumption = Zero

Annex 2. Effect Ranges for health system strengthening strategies included in EQUIST 1.5 prototype

Core HSS function	HSS Strategies	Family Practices		Preventive Services		Clinical Care			
						Delivery Care		Curative Care for children	
		Min	Max	Min	Max	Min	Max	Min	Max
Financing	Conditional cash transfers	0%	53%	0%	53%	0%	53%	0%	53%
	Contracting out			40%	40%	34%	47%	32%	58%
	Health insurance			0%	60%	53%	53%	0%	60%
	Supply-side financial incentives	15%	50%	0%	34%	18%	45%	0%	46%
	User fees and exemptions			30%	72%	21%	21%	35%	74%
	Vouchers	50%	73%	26%	62%	0%	72%	0%	28%
Governance/ Leadership	Health System Accountability	35%	35%	32%	41%	45%	45%		
Health workforce	Enhanced supervision			62%	62%	62%	62%	62%	62%
	Leadership and Management training	0%	25%	0%	25%	0%	25%	0%	25%
	Task sharing/task shifting	0%	25%	0%	25%	0%	25%	0%	25%
	Pre-service training and recruitment of new staff	0%	50%	0%	25%	0%	25%	0%	25%
	In service training	0%	50%	0%	25%	0%	25%	0%	25%
	Redeployment/relocation of existing staff	0%	25%	0%	25%	0%	50%	0%	25%
Information	Health information systems strengthening	0%	25%	0%	25%	0%	25%		
	Patient reminders	0%	25%	0%	68%	0%	68%	0%	68%
Medical products, vaccines and	Pharmaceutical cost control			0%	25%	0%	25%	0%	25%
	Pharmaceutical quality regulation			0%	25%	0%	25%	0%	25%

Core HSS function technologies	HSS Strategies	Family Practices		Preventive Services		Clinical Care			
						Delivery Care		Curative Care for children	
		Min	Max	Min	Max	Min	Max	Min	Max
Service Delivery	Pharmaceutical stock management	21%	64%	21%	64%	21%	64%	21%	64%
	Ensure timely procurement of key commodities	0%	25%	0%	25%	0%	25%	0%	25%
	Ensure availability of equipment	0%	25%	0%	25%	0%	25%	0%	25%
Service Delivery	Accreditation			0%	25%	0%	25%	0%	25%
	Community education and outreach	6%	73%	8%	73%	52%	52%	49%	52%
	Emergency access interventions - Ambulance/Radio/Mat. Waiting Homes					0%	67%		
	Emergency access interventions - Emergency funds					44%	64%		
	Lay/CHW service delivery	43%	43%	44%	44%			43%	43%
	Non-facility service provision	33%	33%	33%	33%				
	Quality improvement			48%	72%	48%	72%	48%	72%
	Service integration	47%	72%	56%	63%	56%	63%	56%	63%
	Building/rehabilitations of facilities			0%	50%	0%	50%	0%	50%