

External Measurement as a Catalyst for Change in a Regional Results-Based Aid Initiative- the Salud Mesoamerica Experience

Rena Eichler
Ferdinando Regalia
Susan Gigli
Roberto Tapia Conyer
Daniel Kress
Ethan Wong
Ricardo Mujica
Miguel Betancourt Cravioto
María Cruz Ciria Matilla
María Cristina Álvarez
Emma Iriarte
Jennifer Nelson
Diego Ríos-Zertuche
Paola Zúñiga Brenes

Social Protection and
Health Division

TECHNICAL
NOTE N°
IDB-TN-1312

External Measurement as a Catalyst for Change in a Regional Results-Based Aid Initiative- the Salud Mesoamerica Experience

Rena Eichler
Ferdinando Regalia
Susan Gigli
Roberto Tapia Conyer
Daniel Kress
Ethan Wong
Ricardo Mujica
Miguel Betancourt Cravioto
María Cruz Ciria Matilla
María Cristina Álvarez
Emma Iriarte
Jennifer Nelson
Diego Ríos-Zertuche
Paola Zúñiga Brenes

September 2017



Cataloging-in-Publication data provided by the
Inter-American Development Bank
Felipe Herrera Library

External measurement as a catalyst for change in a regional results-based aid initiative-
the Salud Mesoamerica experience / Rena Eichler, Ferdinando Regalia, Susan Gigli,
Roberto Tapia Conyer, Daniel Kress, Ethan Wong, Ricardo Mujica, Miguel Betancourt
Cravioto, María Cruz Ciria Matilla, María Cristina Álvarez, Emma Iriarte, Jennifer
Nelson, Diego Ríos-Zertuche, Paola Zúñiga Brenes.

p. cm. — (IDB Technical Note ; 1312)

Includes bibliographic references.

1. Medical care-Central America-Finance. 2. Evidence-based medicine. 3. Medical
care-Decision making. 4. Maternal health services-Central America. 5. Child health
services-Central America. 6. Reproductive health-Central America. 7. Public-private
sector cooperation. I. Eichler, Rena. II. Regalia, Ferdinando. III. Gigli, Susan. IV. Tapia
Conyer, Roberto. V. Kress, Daniel. VI. Wong, Ethan. VII. Mujica, Ricardo. VIII.
Betancourt Cravioto, Miguel. IX. Ciria Matilla, María Cruz. X. Álvarez, María Cristina.
XI. Iriarte, Emma. XII. Nelson, Jennifer. XIII. Ríos-Zertuche, Diego. XIV. Zúñiga Brenes,
Paola. XV. Inter-American Development Bank. Social Protection and Health Division.
XVI. Series.
IDB-TN-1312

<http://www.iadb.org>

Copyright © 2017 Inter-American Development Bank. This work is licensed under a Creative Commons IGO 3.0 Attribution-NonCommercial-NoDerivatives (CC-IGO BY-NC-ND 3.0 IGO) license (<http://creativecommons.org/licenses/by-nc-nd/3.0/igo/legalcode>) and may be reproduced with attribution to the IDB and for any non-commercial purpose. No derivative work is allowed.

Any dispute related to the use of the works of the IDB that cannot be settled amicably shall be submitted to arbitration pursuant to the UNCITRAL rules. The use of the IDB's name for any purpose other than for attribution, and the use of IDB's logo shall be subject to a separate written license agreement between the IDB and the user and is not authorized as part of this CC-IGO license.

Note that link provided above includes additional terms and conditions of the license.

The opinions expressed in this publication are those of the authors and do not necessarily reflect the views of the Inter-American Development Bank, its Board of Directors, or the countries they represent.



scl-sph@iadb.org

www.iadb.or/health

External Measurement as a Catalyst for Change in a Regional Results-Based Aid Initiative- the Salud Mesoamerica Experience

Rena Eichler
Ferdinando Regalia
Susan Gigli
Roberto Tapia Conyer
Daniel Kress
Ethan Wong
Ricardo Mujica
Miguel Betancourt Cravioto
María Cruz Ciria Matilla
María Cristina Álvarez
Emma Iriarte
Jennifer Nelson
Diego Ríos-Zertuche
Paola Zúñiga Brenes





Contents

Introduction	1
What is SMI?	1
Methods	2
The Central Role of Data in SMI	2
Discussion	3
The Decision to Rely on External Measurement	3
Insufficient Data on the Health of the Poor	4
Inadequate Routine Data	6
Country-level Buy-in	6
Donor-level Confidence	6
Support for IDB’s Fiduciary Role	6
Country-level Design and Execution	7
Enabling the SMI Regional Focus	7
Results	7
External Measurement as a Catalyst for Strengthening Country Monitoring	7
Dashboards Leverage Routine Health Information Systems	8
Improved Monitoring & Supervision	10
Conclusion	11
Toward Creating a Sustained Evidence-Based Focus on the Health of the Poorest	11
Funding	15
References	16



External Measurement as a Catalyst for Change in a Regional Results-Based Aid Initiative- the Salud Mesoamerica Experience

Rena Eichler ⁱ	Ferdinando Regalia ⁱⁱ	Susan Gigli ⁱ
Roberto Tapia Conyer ⁱⁱⁱ	Daniel Kress ^{iv}	Ethan Wong ^{iv}
Ricardo Mujica ⁱⁱⁱ	Miguel Betancourt Cravioto ⁱⁱⁱ	María Cruz Ciria Matilla ^v
María Cristina Álvarez ^v	Emma Iriarte ^{vi*}	Jennifer Nelson ^{vi}
Diego Ríos-Zertuche ^{vi}	Paola Zúñiga Brenes ^{vi}	

Abstract

Salud Mesoamerica Initiative (SMI) is an ambitious regional results-based aid initiative in Mesoamerica that ties a portion of donor funding to the achievement of externally measured maternal, newborn and child health results—at both the micro/service-delivery and macro/population levels—in the participating countries’ poorest municipalities. SMI relies exclusively on independent (external) teams to measure results which determine funding approval. In contrast, other results-based financing initiatives typically determine payment through self-reported results that are verified. Countries have benefited from this system because external measurement and SMI support have strengthened local capacity to collect and analyze data to monitor performance, identify bottlenecks and hold people accountable. The primary decision to rely on external measurement was primarily driven by the donors’ requirement that performance payments to participating countries must be based on results that were true, as well as the Inter-American Development Bank’s requirement to minimize fiduciary risk associated with administration of these donor funds. The secondary reason to rely on external measurement was the need for comparable data across all countries to monitor overall impact and contribute to global learning.

Key words: Results-based aid; results-based financing; verification; external measurement; health information systems; evidence-based decision-making; public-private partnership; maternal and child health; reproductive health

JEL Code: I150

ⁱ Broad Branch Associates, Washington, DC, USA.

ⁱⁱ Inter-American Development Bank, Washington, DC, USA.

ⁱⁱⁱ Carlos Slim Foundation, Mexico City, Mexico.

^{iv} Bill & Melinda Gates Foundation, Seattle, WA, USA.

^v Spanish Agency for International Development Cooperation, Madrid, Spain.

^{vi} Salud Mesoamerica Initiative, Inter-American Development Bank, Panama City, Panama.

* Corresponding author: Emma Iriarte, emmai@iadb.org



Abbreviations and Acronyms

IDB	Inter-American Development Bank
IHME	Institute for Health Metrics and Evaluation
MMR	Measles, Mumps, Rubella
RBA	Results-Based Aid
RBF	Results-Based Financing
RHIS	Routine Health Information Systems
RMNCH	Reproductive, Maternal, Neonatal and Child Health
SMI	Salud Mesoamerica Initiative
TA	Technical Assistance
WHO	World Health Organization



Introduction

Salud Mesoamerica Initiative (SMI) is an ambitious regional results-based aid (RBA) initiative in Mesoamerica that links a portion of donor funding to achievement of agreed-upon and independently measured reproductive, maternal, newborn and child health (RMNCH) results in each participating countries' poorest municipalities. A distinguishing feature of SMI is the central role of external measurement (particularly the use of rigorous household and facility surveys) complemented with biometric testing to establish baselines; design results frameworks; measure performance; make payment decisions; and stimulate learning and policy dialogue within and across countries. External measurement has enhanced understanding of health conditions and service delivery gaps in poor municipalities in each country in the region and has focused senior-level health leaders and managers' efforts on removing obstacles to reaching the poorest populations. Among the most important benefits of the SMI model of RBA has been its catalytic effect on strengthening the countries' ability to monitor and manage for results, which has enhanced the performance of overall country health systems.

Exclusive reliance on external measurement to determine attainment of rewarded results differentiates the SMI RBA model from other models in the health sector that reward attainment of verified performance. Results-based financing (RBF) mechanisms—whether involving payment from donors to governments (RBA) or from funders to service providers—typically base payment on self-reported results from a government's or institution's own systems, which are then verified by a third party (either internal or external) (Ergo and Paina 2012; Naimoli and Vergeer 2010; The World Bank 2015; Department for International Development 2014; GAVI 2014; Loening and Tineo 2012; The AIDSTAR-Two Project 2011). SMI's exclusive reliance on external measurement has provided credible information to guide donor payments, catalyzed countries to strengthen the collection and use of information at the country level, and contributed to shared learning among countries in the region and globally.

What is SMI?

SMI is a regional RBA initiative operating in Mesoamerica in seven countries and the Mexican state of Chiapas. It is designed to stimulate and support countries to enhance the health of their poorest populations. SMI relies on co-financing through a public-private partnership among the eight participating governments, the Bill & Melinda Gates Foundation, the Carlos Slim Foundation and Spain's Cooperation Agency for International Development. Financial management and implementation support is provided by the Inter-American Development Bank (IDB) and its network of country representatives. Coordination, technical assistance (TA), and liaison between countries and donors is provided by an IDB coordinating unit based in Panama.

SMI conditions a portion of donor funding on achievement of RMNCH results—within a fixed timeline—in the countries' poorest municipalities. Participating governments agree upon performance indicators and targets that are in line with their RMNCH priorities to be achieved over the course of two or three phases (18-24 months each). Funding comes from three sources: a donor-funded “investment tranche”; a country-funded “counterpart tranche”; and a donor-funded “performance tranche,” which is equal to half of the countries' counterpart investment. This performance tranche is to be used within the health sector and is paid only after targets are met *as determined by external measurement*. In the first phase, five countries earned the performance tranche; one country fell short but was allowed to continue to the next phase; and two countries entered a performance improvement phase, during which they achieved targets and were allowed to continue to the second phase without receiving the performance payment.



SMI monitors and rewards process, outcome and impact level indicators. First-phase indicators and targets typically capture service readiness and the pre-conditions for reaching the poorest populations with essential services (e.g. medicines are in stock, policy is in place to include zinc with ORS for treatment of diarrhea). Subsequent phase indicators capture outputs, outcomes, and impact.

To establish reliable baselines and periodic measures of performance at both the population and service-delivery levels, SMI partnered with the University of Washington's Institute for Health Metrics and Evaluation (IHME) to measure performance. External measurement, including design of measurement approaches, training of local researchers, and oversight, amounts to 13.8% of the \$115 million of donor funding for SMI. An additional \$1 million grant from the government of Korea funded the creation of Dashboards, which enhanced countries' capacity to use routine health information systems to measure progress.

Methods

The data used to develop this paper come from key informant interviews conducted between May and June 2015 with donors, IDB team leaders, staff of the SMI Coordinating Unit (which supports countries), technical assistance providers contracted by SMI to support countries, Ministry of Health officials at national and local levels, and district health leaders. Interviews focused on respondents' positive and negative experiences with SMI; their perception of system-strengthening changes that the countries implemented to achieve the rewarded results; their views on spillover effects that benefit even non-SMI regions; their perception of the value of provided TA and of external measurement; their reflections on SMI as a regional initiative; and any suggestions they believed could strengthen the model and its implementation. These qualitative data were complemented by analysis of information included in many SMI initiative documents and a literature review of measurement and verification in results-based financing schemes.

The Central Role of Data in SMI

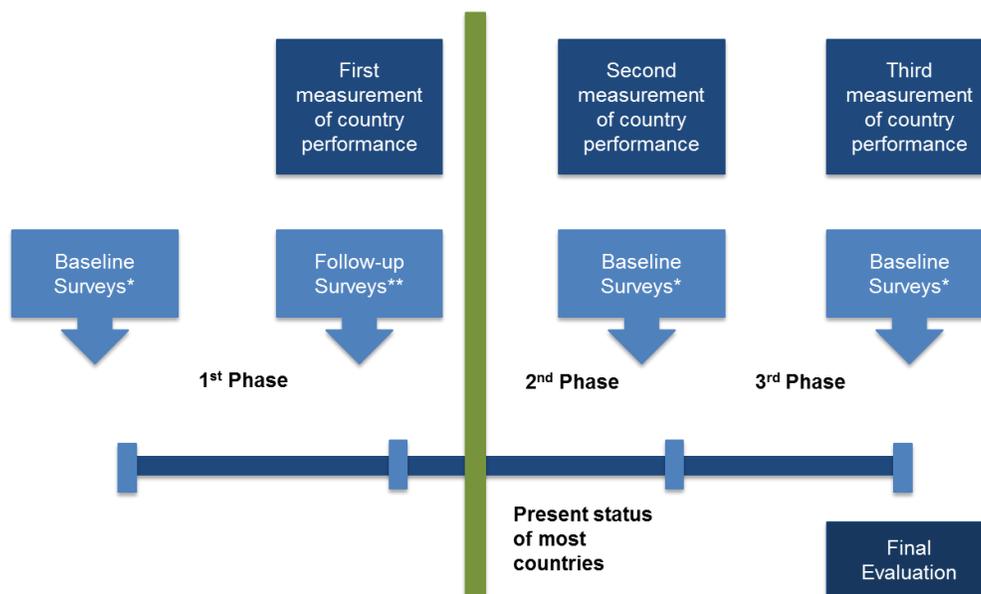
Reliable health data are at the heart of the SMI Initiative. Data have enabled attention to systems needed to enhance the health of the poorest throughout Mesoamerica and have highlighted considerable inequities. Data have reinforced recognition that national averages mask health indicators for the poorest, and that health inequities between the wealthiest and poorest populations in countries throughout Mesoamerica are considerable (The Economist 2014; Mokdad et al. 2015). Data provide guidance for determining priorities for improving health outcomes among the poorest, whether targets would be feasible, and expectations for successful funding of performance-based payments. Data have helped identify weaknesses in health service provision to the poor and deficiencies in systems such as supply chains or weak compliance with existing clinical guidelines. Reliable data on the health of the poor and on health system performance is also providing the basis for linkages among health system stakeholders within and across national and subnational levels, as they strive collectively to address health inequities in their countries.

To ensure that their money was contributing to improving the health of the poorest, donors invested in reliable data. Donor funding pays for measurement, including baseline surveys in target municipalities in each country, facility surveys at the end of each of three phases, and



population surveys after the second and third phases (see Figure 1). Surveys serve to diagnose the most urgent health priorities in the poorest municipalities, support the design of specific interventions, measure whether targets for SMI’s RBA model are reached, provide regional comparisons and benchmarking, and assess the impact of SMI at the middle and end of the program.

Figure 1: SMI External Performance Measurement



*Health Facilities and Population Based Surveys

**Facilities Surveys

Source: SMI presentation 2013.

Investment in measurement contributes to a learning agenda embedded in the overall design of SMI that includes: evaluation of the public-private initiative itself, impact evaluations of specific interventions, and process evaluations of how countries implemented the SMI RBA model. It also includes systematized sharing of knowledge, opportunities for reflective learning, promotion of best practices within and across countries, and TA to support adoption and use of data in a way that promotes pro-poor budget, policy and health intervention decisions at the country level.

Discussion

The Decision to Rely on External Measurement

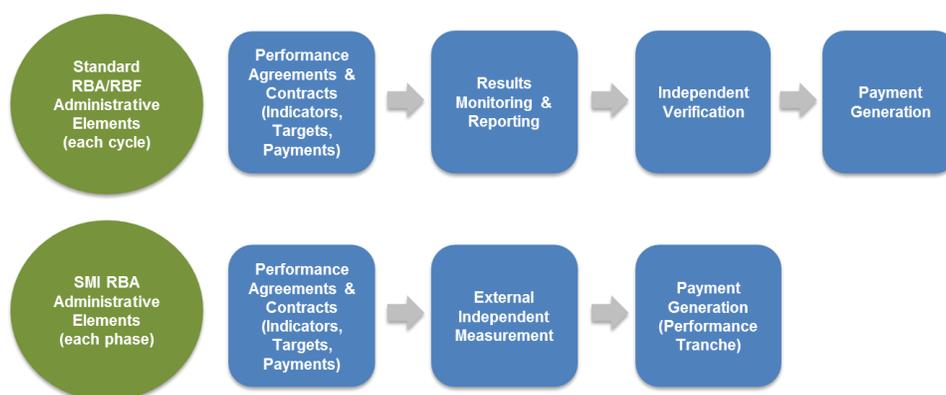
In results-based financing (RBF) schemes, including RBA, payers require credible information when payment is conditioned upon results. SMI relies on population and facility surveys to set baseline indicators and to measure performance. In contrast, the majority of RBF/RBA schemes select indicators from those that are already included in country’s routine health information systems (RHIS), then conduct audits to verify that what was reported is true. While RHIS contain information on services delivered, they don’t typically capture the population that hasn’t been reached by services, the quality of delivered services, or the availability of key inputs such as commodities and functioning equipment. In addition, RHIS data are frequently not reliable.



Various guidelines and frameworks for RBF schemes discuss the trade-offs between the credibility of information and sustainability of the measurement and verification functions, and all recognize the potential of using RBF schemes to strengthen country information systems and mechanisms for monitoring and oversight (Ergo and Paina 2012; Naimoli and Vergeer 2010; The World Bank 2015; Department for International Development 2014; GAVI 2014; Loening and Tineo 2012; The AIDSTAR-Two Project 2011). These sources suggest that relying on internal country systems for performance data (complemented with audits) contributes more to strengthening country information systems than relying solely on external measurement. In contrast, the SMI experience suggests that external measurement may be a strong feature of a RBA scheme because of its credibility and neutrality to all stakeholders, its focus on population as well as facility indicators, and its catalytic effect on strengthening country information and monitoring systems and use of data to inform actions which lead to improved health outcomes.

As shown in Figure 2, administration of RBF schemes typically includes: determination of performance agreements which include indicators, targets and payment rules; specifications of how performance on the agreed-upon indicators will be reported and how reported results will be independently verified; and systems for generating payment (Eichler 2009). In contrast, SMI relies exclusively on external measurement to determine whether targets have been reached that determine payment of the performance tranche.

Figure 2: Administration of SMI Vs. Typical RBF Schemes



Source: Authors' visualization

Insufficient Data on the Health of the Poor

SMI relied on external measurement because credible data on the health of the poorest populations in Mesoamerica was limited. If SMI was to achieve its health systems strengthening and pro-poor goals and to meet ambitious deadlines, the Initiative needed reliable data at both facility and population levels in the poorest municipalities in each country.

At the time of the Initiative's launch in 2010, few nationally representative surveys of population health in the target countries had been conducted in the previous decade (see Table 1), and those few available surveys did not fully uncover the disparities between and within countries in access and utilization of health care, health behaviors and risk factors among the poor. Previous national surveys also lacked sufficient sample sizes or approaches to generate precise estimates for the populations living in the poorest municipalities, which are often more remote and harder to reach (Mokdad et al. 2015).


Table 1. National Population Health Surveys in SMI Countries (2006-2016)

Country	Survey
Belize	Multiple Indicator Cluster Survey 5 2016 Multiple Indicator Cluster Survey 4 2011 Multiple Indicator Cluster Survey 3 2006
Costa Rica	Multiple Indicator Cluster Survey 5 2016 Multiple Indicator Cluster Survey 4 2011
El Salvador	Multiple Indicator Cluster Survey 5 2014 National Family Health Survey 2008
Guatemala	Standard Demographic and Health Survey 2015 Reproductive Health Survey 2008-9
Honduras	Standard Demographic and Health Survey 2005-06, 2011-12
Mexico	Multiple Indicator Cluster Survey 5 2015 National Survey of Health and Nutrition 2005-06, 2011-12 National Demographics Dynamics Survey 2006, 2009, 2014
Nicaragua	
Panama	Multiple Indicator Cluster Survey 5 2013 National Health and Quality of Life Survey 2007

Sources: <http://ghdx.healthdata.org/>; <http://mics.unicef.org/surveys/>; <http://dhsprogram.com/What-We-Do/survey-search.cfm?pgtype=main&SrvyTp=country>

SMI baseline surveys aimed to fill this data gap through censuses of 90,000 households, interviews among 20,225 households, and surveys of 479 health facilities in the poorest areas of the eight SMI countries. Censuses provided an accurate sampling frame for population-based measures. Household surveys concentrated on household characteristics, health status, knowledge and practices of women of reproductive age (15-49 years) and caregivers of children under 5, as well as on assessment of children under 5, including physical measurement and blood sampling. Health facility surveys involved interviews with health facility managers, an observation checklist, and medical records review to collect data on facility conditions, supplies and equipment, provision and utilization of health services, and quality of care (Mokdad et al. 2015).

Baseline surveys provided a robust picture of the health of the poor across Mesoamerica, or “for making the invisible visible,” in the words of one SMI official. By revealing discrepancies with existing data, providing new data on health service delivery and population health behavior, and linking household health practices with service delivery, SMI baseline surveys reinforced the need to go beyond RHIS data and national averages.

For example, SMI population counts differed markedly from national census data (Mokdad et al. 2015). This more accurate denominator allowed for better estimates of a total need for health services in targeted areas. Household surveys also revealed that population health conditions in the poorest municipalities were bleaker than countries realized: anemia prevalence in children under 1 was 82% among children under 1 year in Panama; and only 23% of women had institutional deliveries in Guatemala. Differences in SMI surveys versus national estimates were -32 percentage points for MMR immunization among children under 2 in Chiapas (49% versus 81%); 34 percentage points for timely initiation of breastfeeding of all births in the last five years in El Salvador (67% versus 33%); and 61 percentage points for unmet need for contraception in Panama (88% versus 27%) (Mokdad et al. 2015).



Inadequate Routine Data

Similarly, there was recognition at the outset of the Initiative that it was infeasible to rely on facility-level RHIS data to provide accurate information to inform priorities or determine performance payments. Facility production figures did not capture the proportion of the population that wasn't being reached, and accurate population data simply didn't exist. Ministries didn't have reliable systems to monitor whether essential inputs (e.g. drugs, commodities) were in stock and equipment was functioning. Medical records were rarely reviewed for compliance with clinical guidelines, and supervisors seldom provided support to strengthen clinical quality. No countries had systems to track community indicators that were not linked to public facilities.

In spite of recognition by national officials that routine information systems were weak and not integrated, baseline facility surveys revealed unexpected findings. For example, actual stock-outs of contraceptives and vaccines were more severe than routine administrative data had been capturing (Mokdad et al. 2015). This information highlighted the importance of improving availability of health commodities as a vital part of the strategy required to improve health outcomes.

Country-level Buy-in

While some governments initially expressed a preference to use their own data to report on performance, after discussion and some negotiation, governments accepted that to undertake the ambitious initiative they would need rigorous, timely and impartial data. For the country governments to agree to SMI's stringent requirements, accept decisions on time-bound performance targets, and implement health systems changes, there could be no room to question the quality of the evidence on health system performance.

Interviews with IDB officials and national and district level health officials revealed consensus on the importance of external measurement to countries' acceptance of the results.

The external measurement generated impartiality and credibility in the data ... it generated the feeling that this is something serious. It is necessary to stay more on top of certain elements that the country was not on top of, and that requires a lot more effort and obviously also acceptance by the country, given the state of health of the poor populations. — Ministry of Health official, Honduras

Donor-level Confidence

External measurement provided donors reassurance that results they were rewarding were real. The Gates Foundation, the Carlos Slim Foundation and the government of Spain insisted on external measurement to help countries design and implement interventions based on a full understanding of realities in poor municipalities. Donors also wanted to learn whether and how SMI was catalyzing system changes in countries. They also needed to be accountable to their boards by demonstrating the results they were paying for—without getting bogged down in questioning their validity.

Support for IDB's Fiduciary Role

The IDB relied on external measurement to support their role as administrator of donor funds with fiduciary responsibility. IDB legal and financial administrators required independent measurement as a condition of moving forward with SMI.



Country-level Design and Execution

SMI external surveys were also critical for establishing baselines, informing intervention strategies, setting targets and monitoring the effectiveness of interventions at the country level.

The baseline household and health facility surveys served to establish baseline levels for rewarded indicators and provided insight into challenges and interventions that could improve performance. The first-phase results from health facility surveys, which reported process-oriented indicators such as whether supplies were in stock or if the vaccine cold chain was functioning, pointed to areas that would need further improvement if second- and third-phase health output and outcome targets were to be met. The credibility and independence of the data was critical to strengthen political commitment to overcome barriers to improving health outcomes of the poor.

Hard data will strengthen the argument to improve infrastructure and delivery ... the Initiative provided a clear picture of the gaps ... Data increased political willingness to address the gaps.
— IDB official

Enabling the SMI Regional Focus

Comparable household and health facility survey data from all countries in Mesoamerica was instrumental in furthering SMI's regional monitoring learning and evaluation agenda. It also spurred competition among countries, as Ministry of Health representatives shared survey results at regional meetings. This transparency elevated the political and reputational importance of achieving results.

If you are going to compare countries and put some countries at the bottom, and at the time of the design it wasn't clear whether everyone could achieve the targets or what will happen to those who cannot achieve their goals ...—for all those discussions we saw a risk of using national systems to collect the data. ... It had to be something external and independent and objective. — IDB team leader

Results

External Measurement as a Catalyst for Strengthening Country Monitoring

As discussed, external measurement in the SMI Initiative has had multiple positive effects: filling important gaps in data on health utilization and service-delivery capacity in the poorest municipalities; providing the evidence basis to guide supply- and demand-side interventions; gaining government buy-in; measuring results for performance payments; reassuring donors of the value of their investments; and facilitating regional learning on how to improve the health of the poorest. When considering the potential longer-term impact of SMI, however, among the most important benefits of external measurement has been its catalytic effect on strengthening the countries' ability to monitor and manage their own performance.

Strengthening countries' internal monitoring took place as part of an evolution in understanding and acceptance of how the SMI RBA mechanism would work. At first, countries generally understood that participating in SMI meant taking part in a regional initiative focusing on the



poorest 20% of the population, choosing interventions in line with domestic priorities, negotiating targets that they deemed feasible, and agreeing to external measurement of their performance as a basis for performance payment. At the outset, interviews with SMI and national-level health officials revealed that countries did not anticipate difficulties in meeting the targets, and they were excited about the possible performance payment.

Findings from baseline surveys, however, served as a wake-up call for governments. Discrepancies between their understanding of health system performance in the target municipalities and baseline findings made them realize that enormous efforts would be necessary to meet process-oriented first-phase targets within 18-24 months and health output and outcome targets in the second and third phases.

Survey results on immunization coverage and care of complications surprised us ... At the beginning, the automatic response was denial. Later on it was, "Let's see what's happening." ... [SMI] has changed the way care is being provided relative to those indicators. — District health official, Nicaragua

Many of the measures that are tracked and the subset that are rewarded are not routinely monitored by Ministries of Health in the region in an integrated way. For example, routine health information systems (RHIS) don't typically capture availability of essential medicines at the facility level, whether the services provided adhered to national guidelines, or whether each service recorded represents single services provided to multiple patients or repeated services provided to a single patient. Also missing from RHIS is information on health status and utilization by the population that doesn't reach public facilities. RHIS don't capture lapses in the cold chain that compromise the quality of vaccines or prevalence of anemia in children. Health actions that take place in the community by the community are also not captured. Thus, even though data sources other than RHIS exist in countries, they are not integrated into a comprehensive management tool.

With a deeper appreciation of challenges and with reputations and incentive payments at stake, countries recognized they had to improve their ability to monitor and adjust their performance if they were to achieve results. Countries have responded to this challenge—albeit with approaches and timing varying by country—by strengthening health information systems and bolstering monitoring and supervision practices with support from SMI (see Table 2).

Dashboards Leverage Routine Health Information Systems

The TA provided through SMI helped develop dashboards (*tableros de control*) that would enable countries to monitor progress (using proxies for SMI indicators) using data from their own information systems. The initial purpose of the dashboards was to serve as an "early warning system" that would highlight where action was needed to achieve results and simultaneously foster a culture of evidence-based decision-making. To ensure country ownership of the dashboards, SMI insisted on three rules: 1) SMI would not create a parallel information system; and 2) dashboards had to exist on the countries' servers.

An open-source dashboard was first developed in El Salvador, later adapted for other SMI countries. The dashboards pull key information from various databases and display information on an accessible front-end display with color-coded tables and to highlight progress (or lack thereof). Seven of the eight countries have created customized version of the dashboard, adapting and expanding it to their needs, and making it more likely that the system will be sustained (see dashboard screenshots on Figure 3).



Table 2. SMI Support to Improve Routine Data Management and Monitoring and Supervision

	BE	CR	ES	GU	HO	CH	NI	PA
Strengthened local data reporting and recording included for first-phase performance indicators	X	X	X	X	X	X	X	
Country Dashboard implemented and used at national level		In process	X	X	X	X		In process
Digital tools (tablets) piloted for data collection	X		In process	In process	X	In process		
Dashboards used at sub-national level	X	In process	X	X	X	X		In process
Data dictionary created to clearly define HIS indicators relevant to SMI	X	X	X	X	X	X		X
New monitoring forms introduced and included in the HIS (e.g. home visit records, patient registers, supervision checklists, supportive supervision checklists, new indicators like Zinc and micronutrients)	X	X	X	X	X	X		In process
Supervision strengthened (e.g. regular, on-site facility visits to monitor performance, new standards and guidelines developed)	X	In process	X	X		X		

The online tool (Etab) started small, with information from some key interventions such as childbirth coverage, vaccination, etc. When we saw that the information could be accessed quickly, we started identifying additional information of interest beyond the SMI indicators to the healthcare system in general. Now the Etab is being proposed as a national tool for the Ministry of Health to cross-reference indicators on healthcare status in different areas. — Ministry of Health, El Salvador

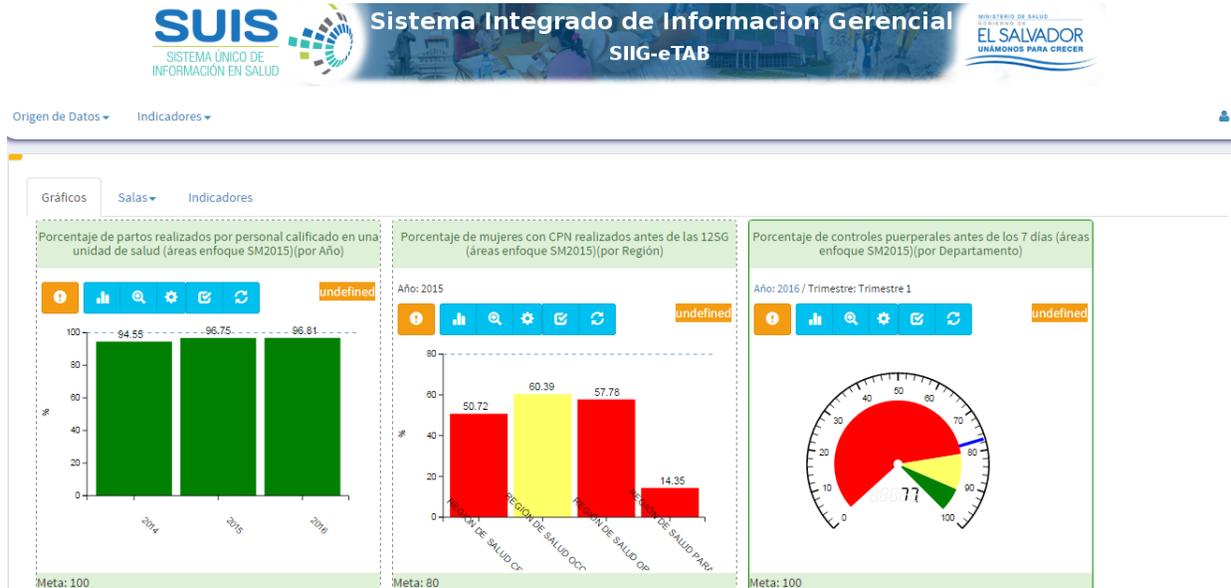
The dashboards to track SMI progress have had several spillover benefits. First, the tool that was developed to visualize SMI performance indicators is highly scalable. Several of the countries (El Salvador, Chiapas) have already expanded the tool to include

additional indicators, and several (Belize, Costa Rica, Honduras, Chiapas, Guatemala, El Salvador) are in the process of sharing health system performance information at both central and local levels. Second, a "community of practice" of developers has taken shape around the open-source tool, creating a unique regional network. Third, the dashboard has also catalyzed improvements in record-keeping and data quality. The more health officials used the data, the more they were able to flag numbers that didn't make sense, and the more they requested new variables to be tracked and data correctly entered.

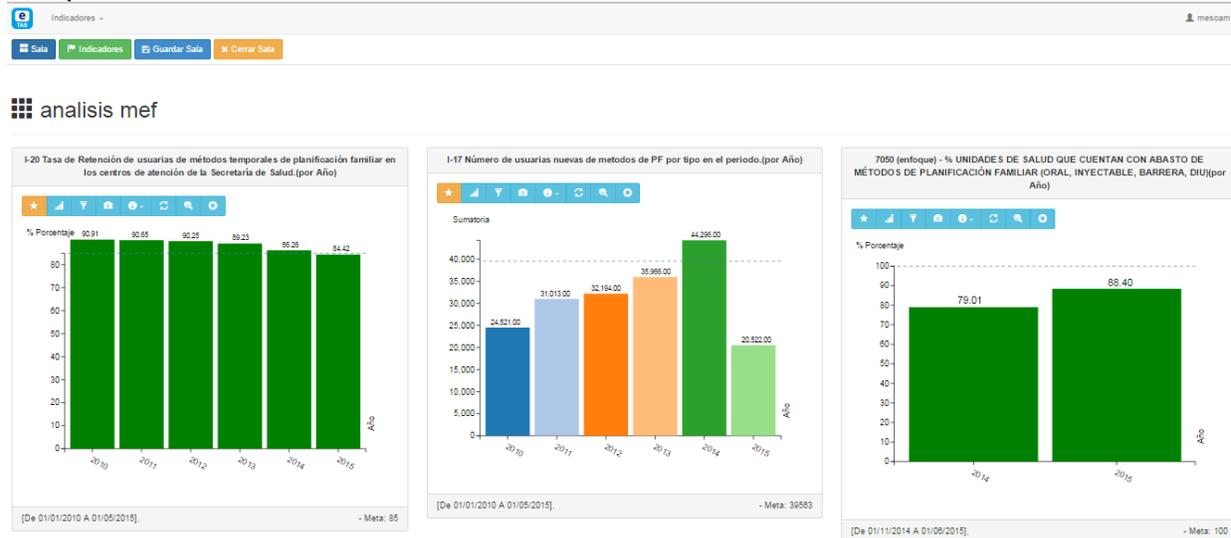


Figure 3: SMI Dashboard screenshots for El Salvador and Chiapas

El Salvador SIIG-eTAB:



Chiapas e-TAB:



Improved Monitoring & Supervision



External measurement has catalyzed strengthened oversight of service delivery by highlighting problems, while periodic snapshots of performance are provided through dashboards. This has stimulated use of data for monitoring and for supervision and to hold people accountable for their role in the health system. Thus, several countries (El Salvador, Mexico, Guatemala, and Belize) have accessed SMI TA to help strengthen monitoring and supervision. In all countries this has meant more central-level personnel making regular trips to meet with municipal health managers to discuss and address challenges. These site visits have helped convert supervision from a desk exercise to closer monitoring of the people and communities behind the data.

Having real-life experiences with our communities, the data are transformed: into patients, children, and women whose lives have changed. Monthly, we carry out an analysis of each of the indicator specified by the initiative. We see for which ones we are on target and which ones we have to improve on. — District Health Official, El Salvador

Some countries are introducing technology to monitor availability of supplies and equipment. Belize, for example, has piloted an Android-platform application to monitor availability of supplies and equipment and quality of care in hospitals and health centers. Local monitors record supplies and equipment on tablets at primary care facilities and among community health workers. This supply availability data, unavailable in the RHIS, is shared quickly—and in a visual format—with health officials at the facility, district and central levels.

The dashboard is allowing us to start making decisions. Everything is in the pilot phase, but even so, it is beginning to generate results. We're now working with measuring mechanisms in a systematic way; we're analyzing the information more; using the information to take action, to respond to the demands of the population. We are now in close daily communication with the jurisdictions, even pulling the local system into the state system, which has been fantastic. — Ministry of Health, Chiapas

Similarly in Chiapas, quality assurance teams are being created to monitor performance and solve problems using electronic tools. This is part of a broader strategy for health information management using the online dashboard to monitor all levels of health care delivery.

Conclusion

Toward Creating a Sustained Evidence-Based Focus on the Health of the Poorest

Using evidence to focus attention and stimulate action on improving the health of the poorest in Mesoamerica has been an accomplishment of SMI in its first phase of operation. Credible external measurement has catalyzed SMI countries to strengthen performance-monitoring systems and to use information to overcome bottlenecks and strengthen systems to achieve improved health performance for the poorest.

As recognized in interviews with IDB and country officials, the expense of the external measurement is not sustainable. However, in parallel with external measurement, SMI has supported countries to strengthen their monitoring systems. Country dashboards, in-country capacity to conduct household and facility surveys, and use of health information to monitor and make system-strengthening decisions are part of the legacy of SMI.



Table 3 presents country sources of routine information to capture progress on rewarded input, output and outcome measures before SMI, as a result of SMI support to strengthen country information systems. It contrasts these data sources with the approach used to externally measure results.

The use of the dashboards and learning to work with all the information in order to make decisions will be sustainable, I'm certain of that. — Ministry of Health, Chiapas

Table 3: Monitoring Performance before SMI, after SMI Support, and Comparison with External Measurement

Indicator type	Routine in-country monitoring sources	Routine in-country monitoring sources enhanced through SMI support	SMI external measurement sources
Change to national policies or norms Example: National policy updated to include zinc for the treatment of diarrhea	Written regulation, decree or policy		Written regulation, decree or policy externally reviewed by international expert to verify that the agreed-upon criteria have been met
Availability of inputs (equipment, medicines, other commodities, and supplies) Example: Health facilities that have the necessary inputs to provide child health care according to the norms	Some countries have paper-based systems to track availability of inputs, but with uneven reliability. A few countries have electronic systems; however, some track consumption and availability, while others only track distribution to regional levels. Most countries had difficulties capturing accurate data.	SMI provided technical assistance to create tools for self-reporting by facilities and verification through supervision to verify availability of inputs. Some countries used Excel, while in others, electronic systems were created and integrated into the country Dashboard.	Facility survey with direct observation of equipment and supplies and medicines, and review of stock cards for continuous availability of supplies and medicines
Human resources: Example: Numbers of each type of health worker assigned to and working at each facility	Human Resource Management Systems in each country track numbers and types of health workers assigned to each facility who are paid by the government. These are primarily Excel-based. However, these systems don't track absenteeism and don't capture workers not on the payroll such as community health workers or midwives in some countries.	Improved supervision checklist included presence of the human resource in some countries. In some countries, supervision tools were created to help monitor community health workers in a more systematic way. This was also verified using Quality Improvement Indicators as a criterion that qualified personnel provided care.	Facility survey verifies health workers that were present



Indicator type	Routine in-country monitoring sources	Routine in-country monitoring sources enhanced through SMI support	SMI external measurement sources
<p>Production (outputs) by facility</p> <p>Example: Number of family planning users; number of caregivers of children 6-23 months who received a package (60 sachets) of micronutrients</p>	<p>All countries had Routine Health Information Systems (RHIS) that were intended for capturing production of services.</p> <p>Reliability and timeliness of RHIS data is uneven. All countries have medical records, but reliability of data is uneven, and systems to analyze and act on medical record data are nonexistent.</p>	<p>RHIS were enhanced with new indicators to capture new interventions. Quality and timeliness of data was enhanced with SMI support, as well as tools for analysis and decision-making.</p>	<p>Population coverage of key health interventions captured through household surveys</p>
<p>Utilization by population</p> <p>Example: % of institutional birth; contraceptive prevalence rate</p>	<p>Can be estimated using most recent census data to construct denominators and RHIS facility production as numerator. Denominators based on census data may be out of date, and the quality and timeliness of RHIS data can be questionable.</p> <p>National household surveys such as DHS determine coverage but are infrequent. Some countries have health teams create maps of households in communities to define their target population. Many times this does not match with the census projections, and it is challenging to standardize these sources.</p>	<p>SMI reviewed and compared denominators from census estimations and local census with estimated local targets. SMI assisted countries in adjusting local targets based on the population-based targets negotiated with SMI. SMI provided tools for local teams to include local census in the Dashboards for comparison to assist in analysis.</p>	<p>Population utilization of services captured through household surveys</p>
<p>Compliance with clinical guidelines (clinical quality)</p> <p>Example: Institutional deliveries for which oxytocin was administered immediately following birth as part of Active Management of the Third Stage of Labor (AMTSL)</p>	<p>Medical record review/quality audit, direct observation by supervisors</p> <p>Few countries had tools (in Excel) that collected limited data on compliance with clinical guidelines.</p>	<p>SMI provided TA, tools, and tablets in some cases, to collect data on compliance with clinical guidelines that could be incorporated into country Dashboards.</p>	<p>Medical record review</p>



Indicator type	Routine in-country monitoring sources	Routine in-country monitoring sources enhanced through SMI support	SMI external measurement sources
<p>Outcomes</p> <p>Examples: % reduction of anemia in children 6-23 months; seroprevalence of measles antibodies (effective coverage)</p>	<p>No countries had this data with large samples for the population of interest.</p> <p>Some DHS have anemia for the poorest 20% or national average.</p>	<p>SMI assisted countries in identifying “proxy” indicators at the production level, to allow countries to have an idea of how outcome indicators were performing. For example, it was not possible or recommended for countries to track changes in anemia and seroprevalence every 1-3 months; therefore, related leading indications such as distribution and usage or micronutrients were introduced.</p>	<p>Biometric testing through household surveys</p>
<p>Community indicators (not related to facility-produced services).</p> <p>Examples: % of communities with a plan for improved community sanitation and water quality; % of health centers which have implemented a mechanism to certify vouchers for transportation and maternal waiting homes</p>	<p>No countries had systems to track community indicators such as whether a community had a written community plan. Countries needed reports from MOH official supervision visits to capture this.</p>	<p>As part of country interventions, SMI provided technical assistance to create basic systems for monitoring for certain interventions (i.e. monitor the number of vouchers distributed versus the number used).</p>	<p>Written community plan verified by expert review.</p> <p>Water is tested using chlorination and coliform tests through household surveys.</p> <p>Vouchers distributed and used are verified through health facility and household surveys in countries with voucher programs.</p>

At the end of the first phase of SMI, data is perceived as a powerful tool. Survey data has enabled countries to visualize the poor in ways not previously possible, which has helped to catalyze changes that lead to improved performance. Improving information systems reinforces the health systems-strengthening goals that lie at the heart of SMI.

The monitoring, evaluation, accountability, clear target definitions, etc. will be self-sustaining once they have been institutionalized in the system. — Ministry of Health. Belize

As suggested in the 2009 WHO guide, *Systems Thinking for Health System Strengthening*, information systems may be one of the health system building blocks with greatest potential to serve as a "tipping point" in leading to greater system-wide change, since “missing information flows are often identified as the most common cause of system malfunction (Savigny and Adam 2009).” Support provided to countries through SMI is a step in the right direction, but more needs to be done to improve the quality of routine information and the use of health information to strengthen the performance of health systems. Bolstering the flow of high-quality information to enable sustained focus on pro-poor policies and programs is the ultimate SMI *reward*, and both country systems and external measurement have contributed to performance improvement.



Funding

The study was performed as part of Salud Mesoamerica Initiative, a program supporting countries improve maternal and child health. The Initiative is funded by the Bill & Melinda Gates Foundation, the Carlos Slim Foundation, and the Spanish Agency for International Development, and administered by the Inter-American Development Bank. Funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript. The opinions expressed in this publication are those of the authors and do not necessarily reflect the views of the Inter-American Development Bank, its Board of Directors, or the countries they represent.



References

- Department for International Development. 2014. "Sharpening Incentives to Perform: DFID's Strategy for Payment by Results." London, UK: Department for International Development. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/323868/Sharpening_incentives_to_perform_DFIDs_Strategy_on_Payment_by_Results.pdf.
- Eichler, Rena. 2009. *Performance Incentives for Global Health: Potential and Pitfalls*. Washington, D.C: Center for Global Development.
- Ergo, Alex, and Ligia Paina. 2012. "Verification in Performance-Based Incentive Schemes." *Health Systems 20/20*. Bethesda, MD: Abt Associates Inc. <https://www.hfgproject.org/wp-content/uploads/2015/02/Verification-in-Performance-Based-Incentive-Schemes1.pdf>.
- GAVI. 2014. "Supporting the Introduction of Life-Saving Vaccines Is Not Enough If the Vaccines Cannot Reach the Children Who Need Them." *Health System Strengthening Support*. <http://www.gavi.org/support/hss/>.
- Loening, Esther, and Luis Tineo. 2012. "Independent Verificaiton in Results-Based Financing." *OBA Approaches*, May. https://www.gpoba.org/sites/gpoba/files/OBAApproachesNo43RBF_WB_0.pdf.
- Mokdad, Ali H, Katherine Ellicott Colson, Paola Zúñiga-Brenes, Diego Ríos-Zertuche, Erin B Palmisano, Eyleen Alfaro-Porras, Brent W Anderson, et al. 2015. "Salud Mesoamérica 2015 Initiative: Design, Implementation, and Baseline Findings." *Population Health Metrics* 13 (1). doi:10.1186/s12963-015-0034-4.
- Naimoli, Joseph F., and Petra Vergeer. 2010. "A Series of Snapshots of Experiences in Verifying Performance Linked to Financial Incentives for Results-Based Financing (RBF) Programs from Selected Countries." *Results-Based Financing for Health (RBF)*. Washington, D.C.: The World Bank. http://www.rbfhealth.org/sites/rbf/files/RBFVerification_at_a_glance.pdf.
- Savigny, Don de, and Taghreed Adam, eds. 2009. *Systems Thinking for Health Systems Strengthening*. Alliance for Health Policy and Systems Research. Geneva, Switzerland: World Health Organization. http://apps.who.int/iris/bitstream/10665/44204/1/9789241563895_eng.pdf?ua=1.
- The AIDSTAR-Two Project. 2011. "The PBF Handbook: Designing and Implementing Effective Performance-Based Financing Programs." Version 1.0. Cambridge, MA: Management Sciences for Health. <http://www.msh.org/sites/msh.org/files/AS-Two-handbook.pdf>.
- The Economist. 2014. "Misleading Means: An Alliance of Billionaires and Bureaucrats Makes a Difference." *The Economist*, November 20. <https://www.economist.com/news/americas/21633944-alliance-billionaires-and-bureaucrats-makes-difference-misleading-means?fsrc=rss%7Came>.
- The World Bank. 2015. "Program-for-Results: Two-Year Review." 95123. Washington, D.C.: Operations Policy and Country Services, The World Bank. <http://documents.worldbank.org/curated/en/624411468140040506/pdf/951230BR0R2015020Box385454B00OUO090.pdf>.