

PROGRESS IN THE FACE OF INSECURITY

IMPROVING HEALTH OUTCOMES
IN AFGHANISTAN



FULL REPORT

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ACRONYMS

AHS	Afghanistan Health Surveys
ANC	Antenatal Care
ARI	Acute Respiratory Infection
ARTF	Afghanistan Reconstruction Trust Fund
BCG	Bacillus Calmette-Guerin
BHPS	Basic Package of Health Services
BRD	Battle Related Death
BSC	Balance Scorecard
CCI	Composite Coverage Index
CCT	Conditional Cash Transfer
CHS	Community Health Supervisor
CHW	Community Health Worker
CI	Contracting-in
CMW	Community Midwives
CO	Contracting-out
CPU	Contraceptive Use (any method)
CPUM	Contraceptive Use (any modern method)
DHS	Demographic and Health Survey
DPT	Diphtheria, Pertussis, and Tetanus
EHIS	Evaluation and Health Information System
EPHS	Essential Package of Hospital Services
FGD	Focus Group Discussion
FHA	Family Health Action
FHAG	Family Health Action Group
FHH	Family Health House
FMIC	French Medical Institute for Mothers and Children
FPS	Family Planning Needs Satisfied
HMIS	Health Management Information Systems
HP	Health Practitioners
IDI	In-depth Interview

MCH	Maternal Child Health
MDG	Millennium Development Goal
MeSH	Medical Subjects Headings
MHT	Mobile Health Team
MICS	Multiple Indicator Cluster Survey
MoPH	Ministry of Public Health
NGO	Non-Governmental Organization
NMR	Newborn Mortality Rates
ORT	Oral Rehydration Therapy
PHD	Provincial Health Department
PNC	Postnatal Case
RBF	Results-based financing
RMNCH	Reproductive, Maternal, Neonatal and Child Care Health
SBA	Skilled Birth Attendance
TT	Tetanus Toxoid
UCDP	Uppsala Conflict Data Programme
UNDSS	United Nations Department of Safety and Security
UNFPA	United Nations Population Fund
USAID	United States Agency for International Development

EXECUTIVE SUMMARY

CONTEXT

In recent years, armed insecurity in Afghanistan has intensified, putting health at greater risk. Since 2010, there has been a clear uptick in instability and insecurity in Afghanistan and an increasing share of the population lives in areas that are affected by high levels of insecurity. Maintaining service delivery and responding to intensified health needs under these circumstances is a key challenge facing Afghanistan's health system. Scaling up service delivery strategies that are security-adaptive will be critical in order to maintain and expand coverage with high quality services.

Afghanistan has been at the forefront of establishing a large scale, public-private model for service delivery. All of the publicly funded health services in Afghanistan today involve some form of contracting with private entities or individuals. Two models predominate:

- ◆ **Contracting-out (CO) or service delivery contracts with NGOs.** Most services are delivered by Non-Governmental Organizations (NGOs) under service delivery contracts with the Ministry of Public Health (MOPH).
- ◆ **Contracting-in (CI) managers.** In addition, in three provinces near Kabul, namely Parwan, Panjshir, and Kapisa, the MOPH contracts in managers to help strengthen services delivered using MOPH staff.

After nearly a decade and a half of implementation, policy makers in Afghanistan are interested in understanding the extent to which these models are delivering good results and how current approaches can be further improved. These concerns set the stage for this study.

OBJECTIVES AND METHODOLOGY

This study is motivated by four main questions:

- ◆ Is the Afghan health system delivering good results to women and children in terms of service coverage and health systems performance?

- ◆ How has the escalating insecurity influenced these trends?
- ◆ Which model—CO or CI—delivered better results?
- ◆ How can service delivery in Afghanistan be improved and made resilient to insecurity and instability?

To answer these questions, the study focuses mainly on quantitative analyses of household surveys (Multiple Indicator Cluster Surveys 2003 and 2010, as well as the Afghanistan Health Surveys 2012 and 2015) and health facility surveys (Afghanistan Balanced Scorecard Datasets, 2004–2016). In addition, sensitivity analyses were conducted with Demographic and Health Survey 2015 data.

The study examines both service coverage and health systems performance results. Service coverage outcomes examined span the continuum of care: contraceptive coverage, antenatal care, skilled birth attendance, measles immunization, and use of oral rehydration salts for diarrhea. Health systems performance indicators examined correspond to performance domains used by the MOPH to monitor NGO contracts. These include client satisfaction and community involvement, human resources, physical capacity to deliver quality care, quality of service provision (i.e., process measures of quality), management systems at health facilities, and overall mission (i.e., equity of service use and in-patient satisfaction).

Levels of insecurity over time were measured using battle-related deaths from the Uppsala Conflict Data Program, the international gold standard in analyses of conflict. The quantitative analyses focus on two main time windows: 2003–2010 and 2010/2011 to 2015/2016. The number of battle-related deaths in each period was used to classify provinces into three categories: minimal, moderate, and high insecurity.

Panel data linear and logistic regression methods were used to estimate the potential impact of contracting model; security and NGO types on changes in selected Reproductive Maternal Neonatal and Child Health (RMNCH) indicators for 2003–2010 and 2010–2015 periods; and health facility performance systems indicators for 2004–2010 and 2011–2016. The coverage models were adjusted for female illiteracy, percent rural population, and battle-related deaths. Health systems outcome models were adjusted for patient volumes, facility type, distance from provincial center, and region.

KEY FINDINGS

Afghanistan has made strong gains in health outcomes, coverage, and health systems performance

All told, Afghanistan has made notable progress towards achieving the Millennium Development Goal (MDG) targets for improving maternal (MDG5) and child health (MDG4). According to United Nations (UN) estimates, maternal mortality rates (MMR) declined from 1,100 to 396 deaths per 100,000 live births from 2000 to 2015 (Alkema and others 2016). According to the latest Afghanistan Demographic Health Survey, the under 5 child mortality rate (U5MR) is now 55 per 1,000 live births, a significant reduction from the very high levels recorded in the early 2000s.

Mirroring improvements in outcomes, there have been good gains in the coverage of maternal and child health services since 2003. Coverage of contraceptives increased until 2010 (+1.4 percent points per year), and declined between 2010 and 2015 (–0.5 percent points per year). All other

maternal and child health service coverage indicators examined showed improvements across the 2000–2015 period (range: +0.3 percent points to +5.3 percent points per year), barring Tetanus Toxoid (TT) coverage, which declined over 2003–2010 and increased thereafter. **Almost all provinces registered improvements in coverage between 2003 and 2015.** The exceptions were in the Nimroz and Nuristan provinces during the years 2003–2010 and in Khost and Zabul over 2010–2015.

Improvements achieved in health outcomes and service coverage in Afghanistan compare very favorably with improvements achieved by comparators. Afghanistan has achieved greater improvements in key maternal and child health outcomes and service coverage than regional comparators. Improvements over time have also exceeded the global median for low and low-middle income countries over similar period of time (Akseer and others 2016; Arur and others 2011). Progress on Diphtheria Pertussis and Tetanus (DPT3) coverage in Afghanistan, however, lagged behind the global median, but not behind regional comparators. **Nevertheless, in absolute terms there is considerable room for progress on both health outcomes and service coverage.**

Over 2004–2010, health systems performance improved considerably across the board. The rate at which individual health systems performance domains improved between 2004 and 2010 varies. The client and community performance domain shows the most remarkable improvements. Steep improvements were noted in physical capacity to deliver care, as well. Management systems and human resources for health domains also improved considerably. Overall mission and quality of service provision remained relatively stable. **Throughout 2011–2016, health systems performance continued to improve, although at a slower pace, with the exception of large improvements in physical capacity to deliver quality care.**

Service delivery has been resilient to insecurity

Insecurity clearly presents a challenge to service delivery. In descriptive analyses, health facilities in low security provinces typically achieved greater increases in service coverage. **However, improvements in coverage and health systems performance are apparent across the security spectrum with a few exceptions.**

Evidence of resilience to insecurity remains even after the analysis adjusts for confounders

This holds true for service coverage as differences in improvement between higher (i.e., moderate and severe insecurity) and minimal insecurity provinces are small. Higher insecurity provinces show striking resilience to insecurity over 2003–2010 and made similar or statistically significantly greater gains relative to minimal insecurity provinces in improving coverage for all the measures examined, with the exception of relative progress on childhood vaccines coverage. Severe insecurity provinces made the largest gains in Oral Rehydration Therapy (ORT) use relative to minimal insecurity provinces (+8.2 percent points per year). During 2010–2015, higher insecurity areas achieved similar or greater relative improvements in Skilled Birth Attendance (SBA); DPT3 and measles coverage; and care seeking for ARI as compared to minimal insecurity provinces (range: no difference to +4.4 percent points per year). However, gains in contraceptive coverage, ANC, Bacillus Calmette-Guerin (BCG), and ORT coverage were statistically significantly smaller in more insecurity prone provinces as compared to minimal insecurity provinces after controlling for

confounders (range: -1.0 to -4.9 percent points per year), with ORT coverage most substantially affected by insecurity.

Insecurity negatively impacted improvements in infrastructure, client assessment, and provider knowledge in higher security facilities in 2011–2016 after adjusting for confounders (range: -1.8 to -2.8 percent points per year). There were no statistically significant differences in improvements between severe, moderate, and minimal security facilities on other health systems performance domains examined, with moderate and high security facilities achieving similar or greater improvements than minimal security facilities on functioning equipment, drugs and vaccine availability, patient counseling, and presence of a female health worker (range: no difference to +3.1 percent points per year).

Contracting-in and contracting-out deliver comparable results

Findings from the contracting model comparisons must take on board an important caveat. CI provinces are much closer to Kabul and smaller than are most CO provinces. This makes CI facilities easier to staff, supply, and manage on average than CO facilities and therefore easier to improve coverage in these provinces, as well. **The analysis methods cannot control for these systematic advantages which are likely to bias findings in favor of CI provinces.**

CI provinces achieve greater improvements in maternal and child health coverage relative to CO provinces, but the absolute difference in improvements is small. Both CO and CI provinces achieved improvements in maternal and child health coverage over years 2003–2010, as well as over 2010–2015 with a few exceptions. Unadjusted comparisons of relative improvements in maternal and child health coverage find that CI provinces made greater gains in coverage over periods 2003–2010 and 2010–2015 as compared to CO provinces. After adjusting for confounders, CI provinces still achieved statistically significantly greater improvements on many service coverage indicators relative to CO provinces in over periods 2003–2010 and 2010–2015. However, the absolute difference in improvements achieved by the two approaches is relatively small, with the exception of ORT use where CI facilities achieved substantially greater improvements relative to CO facilities during 2010–2015 (range: no difference to +6.9 percent points per year).

The two contracting approaches also deliver similar results in terms of improvements in health systems performance, except in the case of drug availability. Adjusted comparisons of improvements over time show that CO facilities achieved similar or greater improvements in health systems performance over 2004–2010 relative to CI facilities (range: no difference to +3.1 percent points per year) with the exception of drug availability (-2.5 percent points per year). By contrast, over 2011–2016, CO facilities achieved greater improvements over time relative to CI comparators on several indicators, including functioning equipment, availability of drugs and vaccines, client physical assessment and client counseling (range: +1.6 percent points per year to +8.4 percent points per year). The availability of drugs in CO facilities increased to the greatest extent over this period.

Contracting-out has performed well in high security settings and may present benefits over Contracting-in for such settings

Insecurity resilience of service delivery seems to reflect Non-Governmental Organization (NGO) strategies, notably links with local communities and stakeholders. Links with local

communities and stakeholders were identified as a key potential drivers of insecurity resilience in service delivery in this study. NGOs recruit staff from local communities and build relationships with local powerbrokers, such strategies enabling NGOs to maintain service delivery in difficult contexts where there might be few alternative sources of medical services. **This suggests that going forward there are likely benefits to embedding services closer to communities and strengthening ties with and accountability to local communities.**

The CO approach has clearly performed well in high and escalating security settings and NGO ability to respond quickly and with flexibility may explain good CO model performance. Since CI provinces are largely more secure than CO provinces, no evidence is currently available on the insecurity resilience of the CI model in high insecurity settings. The CO approach may have intrinsic benefits that explain these findings, notably nimble recruitment, timely salary payments, and flexibility with staff pay and flexible/ decentralized procurement. **In addition, NGOs may be better able to access and deliver services in more insecure areas.**

International reviews of CO on the use of health services also find that the CO approach is effective in low- and middle-income countries, particularly in under-served areas and post-conflict settings. A recent systematic Cochrane (2009) review of the impact of CO in low- and middle-income countries (Lagarde and others 2009) finds that CO is an effective option particularly in settings where governments may have difficulties reaching populations. A literature review focused on contracting for primary care and nutrition services with broader inclusion criteria (Loevinsohn and others 2005) also concludes **that successful approaches tend to maximize provider autonomy, and the review highlights that a focus on outputs and outcomes, rather than inputs, tends to lead to better results.** Both reviews underscore the importance of robust evaluation and results monitoring.

In light of this, it is important to shift back to true lump sum budgets for contracted NGOs. The current contracts given to NGOs are lump-sum, however, in actual fact, NGOs say they have to seek permission from the MOPH in order to transfer funds between line items, a cumbersome and time-consuming process. This is troubling given the known benefits of provider autonomy to delivering good results, assuming that providers are held accountable for their performance, as is the case with current contracting models in Afghanistan.

Substantially greater improvements in pharmaceutical and vaccine availability in CO facilities points to the importance of continuing decentralized procurement and supply chains. At the same time, there is a need to oversee drug quality through drug quality surveys and other approaches that independently assess whether drugs actually available at service delivery points meet quality standards.

THE WAY FORWARD

Effective purchasing of health services is key to delivering results: this involves a greater focus on outputs and outcomes. In general, effective purchasing of health services is more critical to delivering better health results and improving value from health spending than the question of public or private ownership of health service providers. The fundamental building block for this is the availability of good performance data and purchaser capacity to use these data to better oversee provider performance.

The Afghanistan health sector generates a wealth of data: these could be better used to drive performance improvements. The health sector in Afghanistan generates a wealth of data, including third party evaluation survey data and data generated by routine reporting systems. These could be used more extensively by the MOPH and Provincial Health Departments to actively drive improvements in performance in both CO and CI areas. There is also potential to expand the role of Provincial Health Departments to providing technical support to improving service delivery and decision making, rather than their more limited current focus on coordination and monitoring. In addition, the involvement of MOPH technical departments in monitoring service delivery could be strengthened.

Strengthening citizen accountability and monitoring could improve both CO and CI performance. Findings on health systems performance improvement trends indicate that the Afghan health system has done very well on client and community engagement, and a key finding from this study is that links to communities may explain insecurity resilience. Increasing citizen involvement in monitoring service delivery may be a promising approach both to build insecurity resilience in service delivery and as a part of a broader democratic state building policy agenda. Rigorous research from other settings also points to the demonstrated value of community scorecard/citizen engagement approaches in improving service delivery (Nygqvist and others 2017). Going forward, it may be worthwhile testing innovative approaches that enable service beneficiaries to collect performance data as a complement to existing monitoring data sources, particularly in high security areas.

INTRODUCTION AND STUDY OBJECTIVES

Afghanistan has been at the forefront of establishing large scale public-private model for service delivery. The end of the Taliban regime in 2001 left Afghanistan with amongst the highest levels of maternal and child mortality in the world and an almost non-existent state provided health system. Much of the limited health care was being provided by NGOs, many of which were well established, but chronically underfunded. In this context, building upon this model made sense, especially with the political imperative to establish essential services across the country. Innovative approaches, such as the definition of a core basic package of health services (BPHS) at the primary level, and, later on, essential package of hospital services (EPHS) and the contracting out of the basic packages to local and international NGOs by the Ministry of Public Health (MOPH) through the use of donor resources, allowed Afghanistan to both re-establish services and to very rapidly increase access to women, children, and the poor.

All of the publicly funded health services in Afghanistan today involve some form of contracting with private entities or individuals. Two models of contracting predominate in Afghanistan:

- ◆ **Contracting-out (CO) or service delivery contracts with NGOs.** Most services are delivered by Non-Governmental Organizations (NGOs) under service delivery contracts with the Ministry of Public Health (MOPH). All NGO contracts firstly focus on delivery of standardized packages of services defined by the MOPH; secondly, assign clear geographical responsibility to the NGOs (typically for whole provinces with populations ranging from about 150,000 to one million); and, thirdly, employ competitive selection of NGOs. As time has progressed, an increasing proportion of contracts have been awarded to Afghan NGOs: of 49 contracts awarded for service delivery, 72 percent are with local NGOs.
- ◆ **Contracting-in (CI) managers.** In addition, in three provinces near Kabul, namely Parwan, Panjshir and Kapisa, the MOPH contracts in managers to help strengthen services delivered using MOPH staff. This model involves the competitive recruitment of managers who are paid market-based salaries; a procedure for selectively increasing the salaries of MOPH health workers and field managers; provision of a level of funding similar to that provided to the NGOs; and the use of the same monitoring and evaluation mechanisms as in other provinces.

Since the contracting models were introduced, Afghanistan has made significant gains in the health sector. Significant gains have been made in improving maternal, newborn, and child

survival; nutrition, health interventions coverage; and service availability to its populations. The large influx of financial assistance; strong local stewardship; development of sound and stable health policy frameworks; prioritization of investments in primary care and the introduction of a basic package of health services (BPHS); and essential package of hospital services (EPHS) delivered by non-governmental organizations (NGOs) have been among some of enablers of success (Akseer 2016 [1]).

Afghanistan has achieved substantial improvements in health, but poor health status and services still threaten its economic development and ability to achieve the sustainable development goals (SDGs). Afghanistan has made significant progress on improving the health of its population over the last 15 years. These gains have been important of themselves, but have also contributed to the socio-economic development of the country. Healthier children will gain more from education and will turn into more productive workers. Healthier adults will suffer less absenteeism and earn higher incomes. While the improvements in health have been impressive given the context, there are some critical remaining challenges. These include very high levels of malnutrition (stunting), a persistently high fertility rate, and getting basic health services to under-served rural communities. Reducing stunting, ensuring a fertility transition, and reaching the underserved remain major obstacles to achieving Afghanistan's National Development Goals.

In recent years, insecurity in Afghanistan has intensified and this poses clear risks for health. Since 2010, there has been a clear uptick in instability and insecurity in Afghanistan and an increasing share of the population lives in areas that are affected by high levels of insecurity. This trend puts health at greater risk.

The direct and indirect impacts of insecurity and on health can be huge. Conflict and violence have an adverse effect on the health and well-being of populations, directly and indirectly. The collapse of health systems, deterioration of protective infrastructure, and displacement also lead to greater mortality and morbidity (Bhutta 2010 & 2016), in addition to threat of harm from weapons and brutal war practices resulting in death, injury, and disability. For every individual death caused by armed violence in a security zone, at least 3 to 15 other deaths occur due to malnutrition, infectious disease, or other side effect of insecurity (Save the Children 2014).

The impacts of insecurity on health are also long-term. Insecurity also has long-term consequences with prolonged effects in the months and years following its conclusion (Bhutta 2010). The breakdown of infrastructure and institutions (including community networks, education, health services, and social welfare systems impairs coping and healing mechanisms, such as mental health wellness) further exposes individuals to long-term social, physical, and mental consequences. In fact, maternal depression, poor stimulation, unsafe learning environments, exposure to violence and trauma significantly contribute to behavioral and cognitive impairment in long-term development (Bhutta 2010 & 2016).

Improving service delivery and responding to intensified health needs in a context is one of the biggest challenges facing Afghanistan's health system. Scaling up service delivery strategies that are security adaptive will be critical to maintaining and expanding coverage with high quality services.

The health services study focuses on four main questions to inform health policy in Afghanistan:

- a. Has the Afghan health system delivered good results in terms of Reproductive Maternal Neonatal and Child Health (RMNCH) service coverage and health systems performance?

- b. How has escalating insecurity influenced these trends?
- c. Has the CO or CI model delivered better results on service coverage and health systems performance?
- d. How can service delivery in Afghanistan be improved and made resilient to insecurity?

The study also examines whether there is a relationship between type of NGO contracted, whether national Afghan, international, or consortium (a partnership between national and international NGO), and service coverage and health systems performance results achieved. Results on this are presented in the appendices.

PART I

STUDY METHODS

SCOPE AND METHODOLOGY

1.1 STUDY DESIGN

This study relies mainly on quantitative data analyses. These analyses focus on the 2003–2016 time period, focusing specifically on the critical transitional windows of 2003/2004 to 2010/11 and 2010/11 to 2015/16. These time windows were selected for two main reasons: firstly, 2003/04 to 2010/11 marked the initial development phase of Afghanistan, including a strong focus from three donors (i.e., World Bank, European Union, USAID) in rapidly scaling up the BPHS (2003) and EPHS (2005) health services throughout the nation. This period also marked a comparatively “stable” security context than during the pre-2001 situation. In 2010, donor financing for health merged through the Afghanistan Reconstruction Trust Fund (ARTF) and the BPHS was revised to reflect gaps and emerging health priorities. Additionally, the security context of the nation gradually deteriorated post-2010. Secondly, robust, comparable, and reliable datasets on health systems and household service coverage outcomes were available at these two-time points, as well.

Interviews and focus group discussions were conducted with key stakeholders to supplement the quantitative data analyses and draw insights on how service delivery could be improved. Insights from this are integrated into this report.

1.2 QUANTITATIVE ANALYSIS METHODS

Data Sources

The report evaluates a range of national demographic, asset, health, and nutrition surveys conducted in Afghanistan post-2001. It focuses on the key datasets that were collected at critical time points to inform analyses and appraised to have adequate population coverage with comparable methods. This includes: Multiple Indicator Cluster Surveys (MICS) (2003, 2010/11) and the Afghanistan Health Surveys (AHS) (2012, 2015). Sensitivity analyses were also conducted with the 2015 Demographic and Health Survey (DHS) (appendix), however, for comparability and consistency across survey estimates, inferences are derived largely from the AHS 2015.

Analyses also included the Afghanistan Balanced Scorecards (BSC) datasets which provide comprehensive and rich information on health facilities assessment nationally and provincially from 2004 to 2016. BSC indicators changed definitions frequently across sequential surveys. Generally, the 2004–2010 BSC survey definitions are comparable and 2011–2016 are alike (table 1). Analyses are presented separately for these periods. The original data was obtained and analyzed for all surveys.

Indicators

Reproductive, maternal, newborn and child health services coverage across the continuum of care was analyzed using the following key indicators from household surveys:

Indicator	Definition
Current use of contraceptives (any method) (CPU)	Prevalence of current contraceptive use among married women 15–49 years old, any method.
Current use of contraceptives (any modern method) (CPUM)	Prevalence of current contraceptive use among married women 15–49 years old, any modern method.
At least one antenatal care (ANC) checkup from a skilled provider	Percentage of women attended at least once during pregnancy by skilled health personnel.
2 doses of tetanus toxoid in pregnancy (TT)	Percent of women who received at least two doses of tetanus-toxoid vaccine in their last pregnancy.
Skilled birth attendance (SBA) at last delivery	Percentage of live births attended by skilled health personnel.
Facility births	Percentage of births delivered in a health facility.
BCG vaccination (BCG)	The percentage of children aged 12–23 months who have received at least one dose of Bacillus Calmette-Guérin vaccine.
DPT3/Penta vaccination (DPT3)	The percentage of one-year-olds who have received three doses of the combined diphtheria, tetanus toxoid, and pertussis (DTP3) vaccine in a given year.
Measles vaccination (MSL)	The percentage of children aged 12–23 months who have received at least one dose of measles-containing vaccine in a given year.
Full immunization	Percentage of children aged 12–23 months who have received at least 3 doses of DPT3, 3 doses of Polio, measles, and BCG.
Care seeking for Acute Respiratory Infection (ARI)	Percentage of children under age five with symptoms of acute respiratory illness (ARI) during the two-week period before the survey and, among children with symptoms of ARI, the percentage who were taken to an appropriate health provider.
Oral Rehydration Therapy (ORT) use for diarrhea	Percentage of children under age five ill with diarrhea during the two-week period before the survey and, among children ill with diarrhea, the percentage who received Oral Rehydration Solution (ORS) (ORS packet or pre-packaged ORS fluid).
Composite Coverage Index (CCI)	The CCI is a weighted average of 8 core indicators: demand for family planning satisfied, ANC 1+ visit, skilled birth attendance, BCG vaccine, 3 doses of DPT vaccine, measles vaccination, oral rehydration with continued feeding for diarrhea treatment, and care seeking for acute respiratory infection.

TABLE I. Afghanistan Health Systems Performance Domains and Indicators, 2004–2010 and 2011–2016

AFGHANISTAN HEALTH SECTOR			
BPHS Balanced Scorecard 2004–2016		2004–2010	2011–2016
Domain A: Client and Community			
	Overall Patient Satisfaction	xx	
1	Patient Perception of Quality Index	xx	
	Overall Client Satisfaction and Perceived Quality of Care Index		xx
2	Written Shura-e-sehie activities in community	xx	
	Community Involvement and Decision-Making Index		xx
3	Health Post Status Index (New)		xx
Domain B: Human Resources			
4	Health Worker Satisfaction Index	xx	
	Revised Health Worker Satisfaction Index		xx
5	Health Worker Motivation Index		xx
6	Salary Payment Current	xx	xx
7	Staffing Index: Meeting minimum staff guidelines	xx	
	Revised Staffing Index: Meeting minimum staff guidelines		xx
	Provider Knowledge Score	xx	
8	Revised Provider Knowledge Score	xx	
	Revised Provider Knowledge Score	xx	
	New Provider Knowledge Score		xx
9	Staff received training in last year	xx	
	Revised Staff Received Training (in last year)		xx
Domain C: Physical Capacity			
10	Equipment Functionality Index	xx	
	Revised Equipment Functionality Index		xx
11	Drug Availability Index	xx	
	Pharmaceuticals and Vaccines Availability Index		xx
12	Laboratory Functionality Index (Hospitals & CHCs)	xx	
	Laboratory Functionality Index (CHCs only)		xx
13	Clinical Guidelines Index	xx	
	Revised Clinical Guidelines Index		xx
14	Infrastructure Index	xx	
	Revised Infrastructure Index		xx
Domain D: Quality of Service Provision			
15	Patient History and Physical Exam Index	xx	
	Client Background and Physical Assessment Index		xx
16	Patient Counseling Index	xx	
	Client Counselling Index		xx

(continues on next page)

TABLE 1. Afghanistan Health Systems Performance Domains and Indicators, 2004–2010 and 2011–2016 (*continued*)

17	Proper sharps disposal	xx	
	Universal Precautions		xx
18	Time Spent with Client	xx	xx
Domain E: Management Systems			
19	HMIS Use Index	xx	
	Revised HMIS Use Index		xx
20	Financial Systems		xx
21	Health Facility Management Functionality Index		xx
Domain F: Overall Mission			
22	Outpatient visit concentration index	xx	
	New Outpatient visit concentration index	xx	xx
23	Patient satisfaction concentration index	xx	
	New Patient satisfaction concentration index	xx	xx

Note: XX indicates availability of indicator in the respective time period; indicators highlighted in yellow are the same for both periods.

The Composite Coverage Index (CCI) is a composite of overall health coverage and includes both curative and preventative child and maternal health interventions (Boerma and others 2008). This measure is calculated as a weighted coverage mean of eight essential interventions that represent broad categories of the continuum of care. The four categories are as follows: family planning, maternal and newborn care, immunization, and case management of sick children. Each continuum stage is given equal weight and the CCI is then calculated, as below. Note that FPS indicates family planning needs satisfied (related to contraceptive use) and CPNM refers to care seeking for ARI.

$$CCI = \frac{1}{4} \left(FPS + \frac{SBA + ANCS}{2} + \frac{2DPT3 + MSL + BCG}{4} + \frac{ORT + CPNM}{2} \right)$$

For health systems performance assessment, the report presents analyses of the standard composite domains as derived in the BSC methodology and detailed in table 1. Additionally, key component indicators were selected for detailed analyses. All domains and component indicators are scaled from 0 to 100, where higher values indicate better performance.

- ◆ Client and community
- ◆ Human resource
- ◆ Physical capacity
- ◆ Quality of service provision
- ◆ Management systems
- ◆ Ethics (after 2011)
- ◆ Overall/composite scores

Descriptive Analyses and Stratifications

National and provincial-level panel estimates were constructed for reproductive, maternal, neonatal, and child health (RMNCH) coverage and health facility assessment indicators to examine changes over time. Performance ranking of provinces on RMNCH coverage was done based on composite coverage index improvement (percentage point increase) for two time periods between the years 2003–2010 and 2010–2015. Health systems performance ranking of provinces was based on the composite BSC score (percentage point increase) between 2004–2010 and 2011–2016. The best, moderate, and low-performing provinces were identified for each category based on the percentile distribution and allocated in each category as follows:

- ◆ Low performing provinces: Provinces falling below 30th percentile.
- ◆ Moderate performing provinces: Provinces falling between 30th and 70th percentile
- ◆ High performing provinces: Provinces falling above 70th percentile

Information was collected from MoPH on the contracts handed out to various NGOs (name of NGOs, contract dates, provinces). A number of NGOs have delivered health services in Afghanistan since 2003 and varying in size, operational capacity, and management. Analyses focused on two features of service delivery: contracting-in (CI) and contracting-out (CO), and among CO provinces on type of NGO/s contracted. The type of NGOs contracted were classified as national (Afghan NGO), international, or consortium (Afghan and international NGO jointly awarded a contract).

A third stratification of interest was analysis by security/insecurity in the country. To do this, war-related casualty data (i.e., battle-related deaths) were analyzed with information from the Uppsala Conflict Data Programme (UCDP). The UCDP has recorded ongoing armed security data since 1970 and is the most commonly cited data source on global armed conflicts. UCDP definitions are commonly becoming a standard on how conflicts are studied and analyzed. The United Nations Department of Safety and Security (UNDSS) databases were additionally searched for province-level security ranking in Afghanistan; however, no robust and reliable time series security estimates were identified. We thus utilized available conflict data from Uppsala. Encounter-level count data on battle related deaths (BRDs) (defined as the use of armed force between warring parties in a conflict dyad, be it state-based or non-state, resulting in deaths) were obtained and totals generated for 34 provinces in Afghanistan from 2004 to 2015. Provinces were grouped into low-, moderate-, and high-intensity security zones by using the following classification for two time periods, 2003–2009 and 2010–2015:

- ◆ High-Intensity Insecurity Province (1,000 total BRD in any 3 consecutive years)
- ◆ Moderate-Intensity Insecurity Province (300–1,000 total BRD in any 3 consecutive years)
- ◆ Low-Intensity Insecurity Province (less than 300 total BRD in any 3 consecutive years)

For sensitivity, the analyses also explored the BRD rates (per provincial population) as a measure of security/insecurity. War-related death rates were computed for 3- and 5-year periods and security groupings based on these were contrasted with the above based on BRD counts. Though

we noted some variation in provinces' security category, overall, these did not impact effect estimates and inferences.

For stratified descriptive analyses by contracting mechanism, NGO type and insecurity, descriptive statistics were calculated including means/standard deviations, and frequencies/proportions as appropriate. Means and mean differences were compared across subgroups using the student's T-tests and one-way analysis of variance methods. Post-hoc comparisons were conducted with the Tukey's multiple comparison methods, constraining Type 1 error rate at 0.05.

Multivariable Analysis Methods

The analyses examined the potential impact of contracting type, insecurity, and NGO types on changes in selected RMNCH indicators for 2003–2010 and 2010–2015 periods, and health facility performance systems indicators for 2004–2010 and 2011–2016 through panel data, linear and logistic regression methods. Outcomes for the coverage analysis were selected to represent various entry points on the continuum of care including contraceptive use, ante-natal care, skilled birth attendance, measles vaccination, BCG vaccination, DPT3/Penta vaccination, oral rehydration therapy, and care-seeking for ARI. For the health systems performance models, outcomes from multiple domains were selected as deemed important to the study context: these included equipment functionality, pharmaceutical and vaccine availability, functional infrastructure, client background and physical assessment, client counseling, availability of female health workers, and provider knowledge. The coverage models were adjusted for female illiteracy, % rural population and battle related deaths (BRD/10,000 population). Health systems outcome models were adjusted for patient volume, facility type, and distance from provincial center or region. It must be noted that though a range of potential confounders were identified from the literature and expert opinion, the above factors were included for parsimony and to avoid over-fitting models. Additionally, model fit stats revealed that these covariates adequately represented the outcome and any important confounding by other variables of the main exposure-outcome effect. In addition, the main exposures, contract mechanism, and security level were also treated as covariates in the models where these factors were not included as the primary exposure.

Generalized linear models and generalized estimating equations were used and population-averaged estimates were obtained through 'xtreg' and 'xtgee' routines in STATA for linear and logistic models, respectively. All provinces that were evaluated for at least two time points between 2003–2010 and 2010–2015 were included the analyses. Bivariate analysis was conducted to evaluate the independent effect of primary exposures on outcomes. The adjusted models were developed with time and primary exposure interaction with and without covariates to assess the impact of these exposures over time on the outcome. The results are reported as regression co-efficients with 95% confidence intervals. p-value less than 0.10 were considered statistically significant.

I.3 STRUCTURE AND OUTLINE

This report is organized as follows: first, a brief overview is presented of the evolution of health major reforms and innovations post-2001 in Afghanistan. The next section describes trends in the coverage of key RMNCH interventions and health facility performance both at the national and

the provincial level for the years 2003–2015, and an overall ranking of provinces according to performance is subsequently suggested. As a major contextual concern in Afghanistan, the effect-modifying role of security on service coverage and health systems performance is highlighted next. The report then proceeds to review the impact of the two contracting approaches (CO vs CI). Finally, we summarize inferences of key findings, lessons learned and implications for the future health system of Afghanistan. Analyses on the relationship between NGO type contracted (national, consortium, or international) and service coverage and health systems performance are presented in the appendices to this report.

PART II

KEY FINDINGS

HEALTH OUTCOMES, SERVICE COVERAGE AND HEALTH SYSTEMS PERFORMANCE

2.1 TRENDS IN HEALTH OUTCOMES IN AFGHANISTAN

Afghanistan has made notable progress towards achieving the Millennium Development Goal (MDG) targets for improving maternal (MDG5) and child health (MDG4). According to UN estimates, maternal mortality rates (MMR) declined from 1100 to 396 deaths per 100,000 live births from 2000 to 2015 (Alkema and others 2016), and under 5 mortality rates (U5MR) reduced 34% (from 137 to 91 deaths per 1,000 live births), while newborn mortality rates (NMR) dropped 32% (from 53 to 36 deaths per 1,000 live births) (You and others 2016). The most recent Afghanistan Demographic and Health survey gives estimates of 55 and 22 per 1,000 live births for U5MR and NMR respectively (Afghanistan DHS 2017). Also notable is the lack of negative female gender bias in survival of newborns and children.

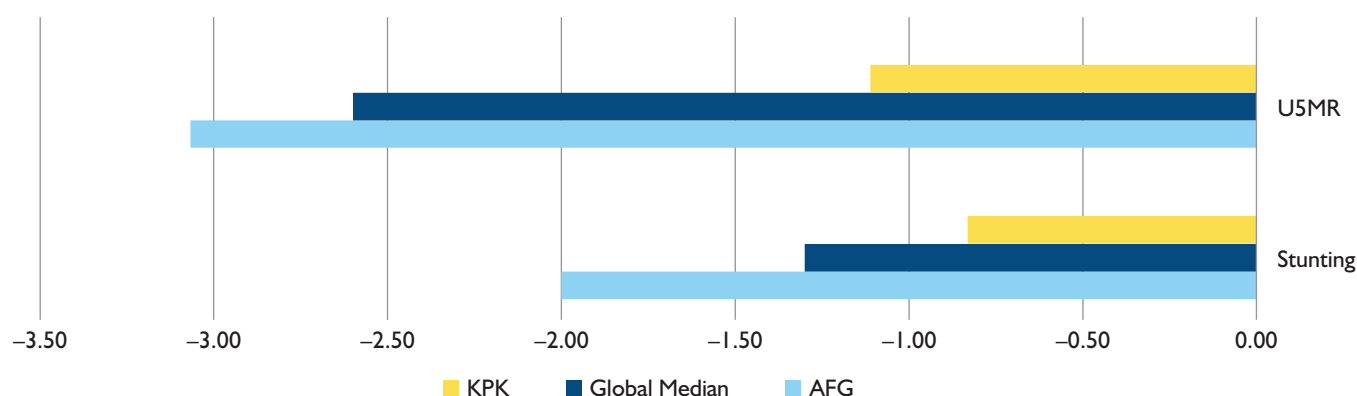
Improvements achieved in health outcomes compare very favorably with improvements achieved in comparators. As figure 1 indicates, Afghanistan has achieved greater improvements in key maternal and child health outcomes than regional comparators. Improvements over time have also exceeded the global median for countries that started off at the same baseline levels as Afghanistan in 2003–04 (Akseer and others 2016; Arur and others 2011). **Nevertheless, in absolute terms there is considerable room for progress.**

2.2 HEALTH SERVICE COVERAGE

National Trends in Key Maternal and Child Health Interventions

Afghanistan has also made good progress on the coverage of all key maternal and child health interventions since 2003. Coverage of contraceptives increased until 2010 and declined between 2010 and 2015 (table 2, figures 3A–C). All other maternal and child health (MCH) service coverage indicators examined showed improvements across the 2010–2015 period, barring TT coverage, which declined in 2003–2010 and increased thereafter. Once again there is no significant gender differences in coverage of these critical life saving interventions.

FIGURE 1. Rate of change in key health outcomes, percentage point change per year



Note: U5MR = Under 5 Mortality Rate; AFG = Afghanistan; KPK = Khyber Pakhtunkhwa Province. These comparators are presented due to geographic proximity and other contextual similarities, including security constraints.

Interestingly, service coverage increased at a faster pace in the 2010–2015 period for most indicators. ANC and measles immunization coverage increased at a faster pace in 2003–2010 relative to 2010–2015. TT coverage, facility deliveries, SBA, BCG, and DPT3/Penta3 coverage, as well as the Composite Coverage Index increased at a faster pace during 2010–2015. These analyses examined annual percent point changes during each of the two time periods (table 2).

The pace at which service coverage improved in Afghanistan compares very favorably to comparators. As figure 3 illustrates, the annual percent point change in maternal and child health service coverage outcomes exceeds that of regional comparators. The only exception is DPT3 coverage wherein progress in Afghanistan lagged behind the global median for the subset of countries that started at the same baseline level as Afghanistan during 2003–04.

TABLE 2. Annualized Rates of Change in Coverage Indicators, % Point Differences, 2003–2015

	2003–2010 % Point Annual Rate of Change	2010–2015 % point Annual Rate of Change
Contraceptives (Any method)	1.4	–0.6
Contraceptives (Any modern method)	1.4	–0.5
ANC by skilled provider	4.0	2.2
TT two or more shots	–1.1	1.6
Facility deliveries	2.6	3.8
SBA	3.0	3.3
BCG	0.5	3.2
DPT3/Penta3	1.3	5.3
Measles	3.9	2.5
Fully immunized	—	4.8
Care seeking for ARI	1.8	0.3
ORT	3.0	2.8
Composite coverage index	1.9	2.1

2003 values for full immunization were not available for calculation of annual rates of change.

FIGURE 2. Rates of change in service outcomes, percentage points per year

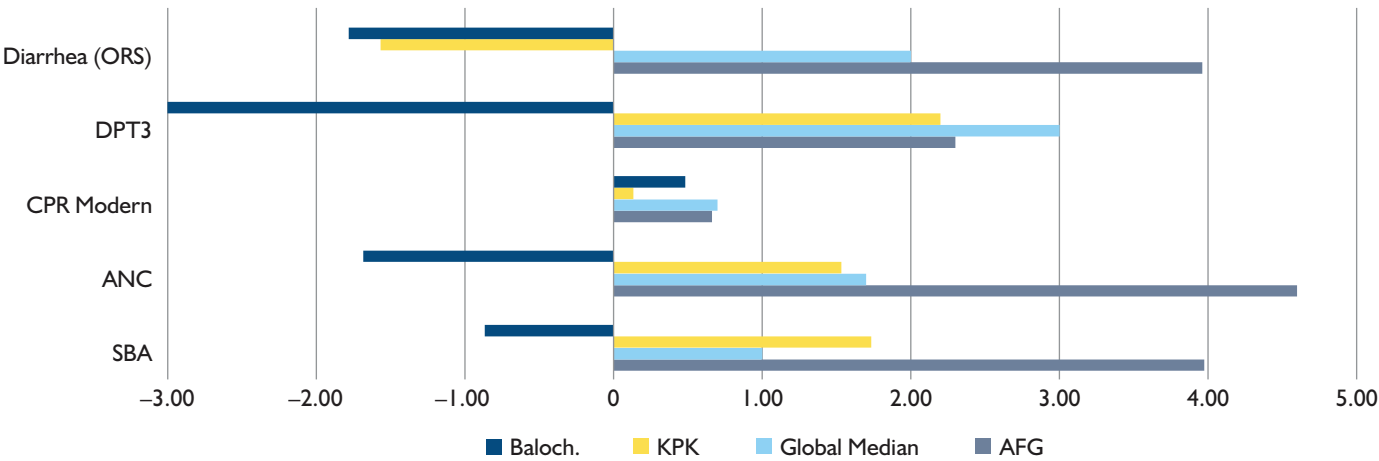


FIGURE 3A. National trends in reproductive and maternal interventions, 2003–2015

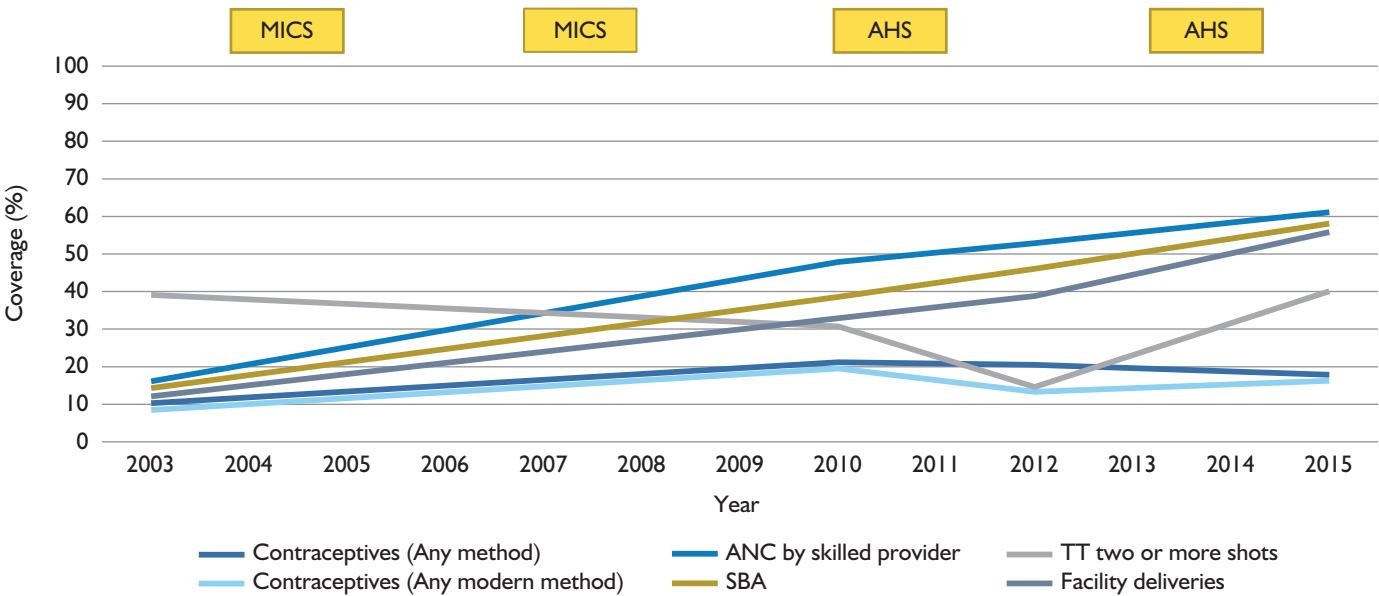


FIGURE 3B. National trends in reproductive and maternal interventions, 2003–2015

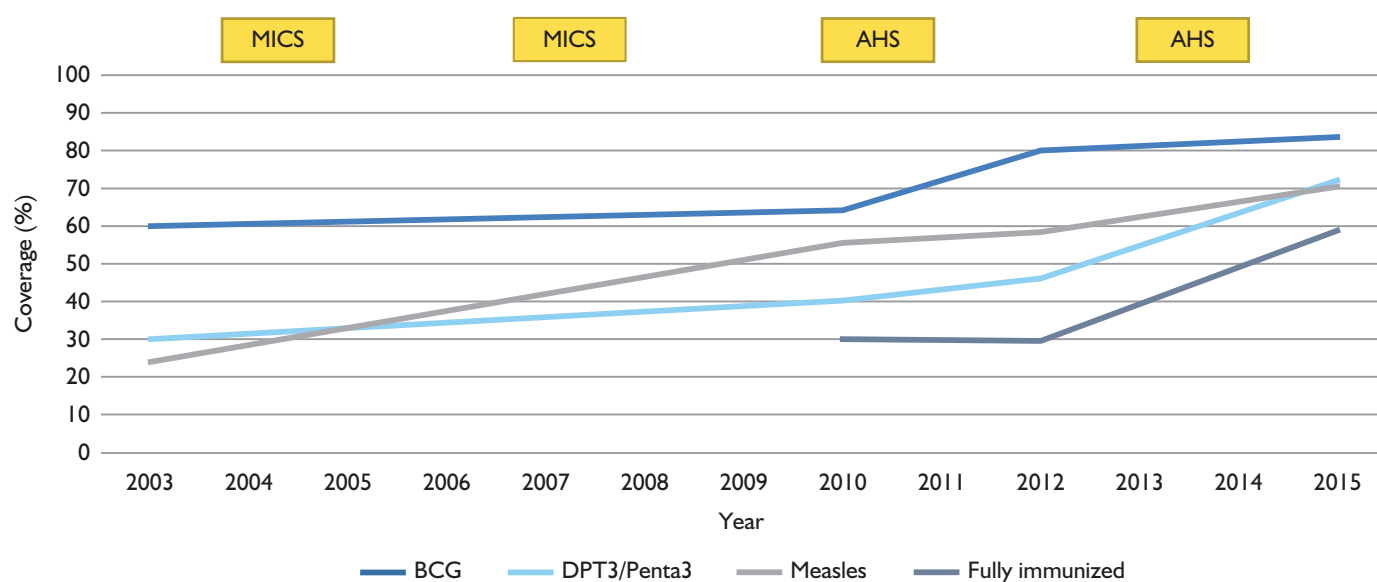
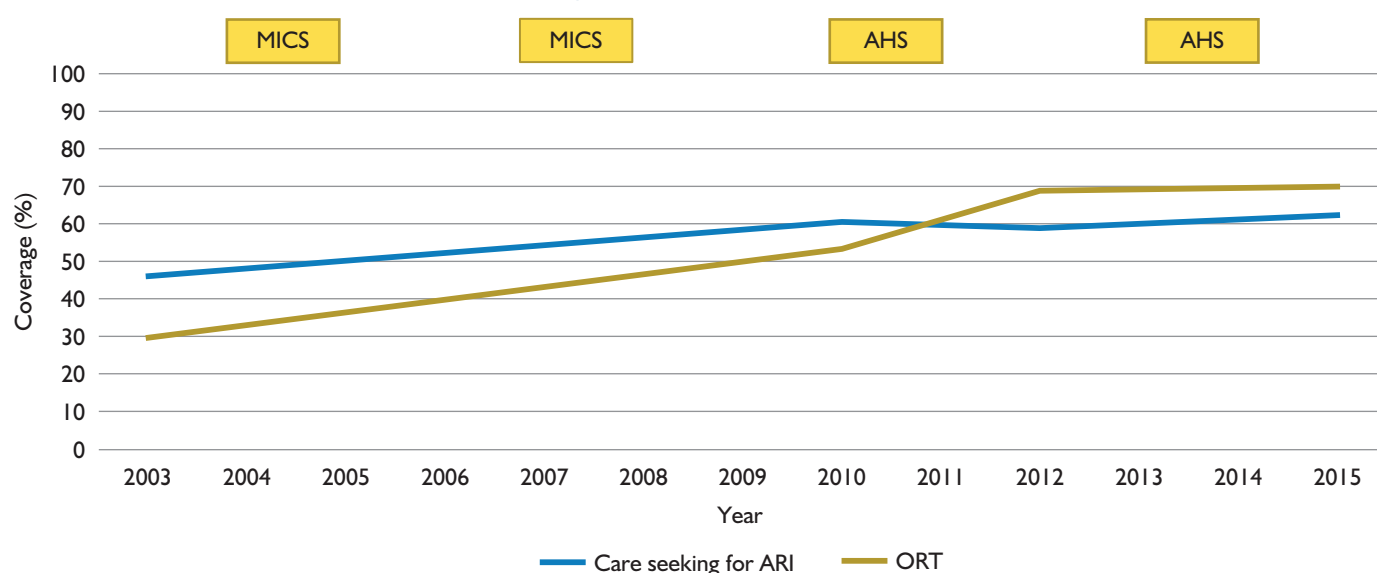


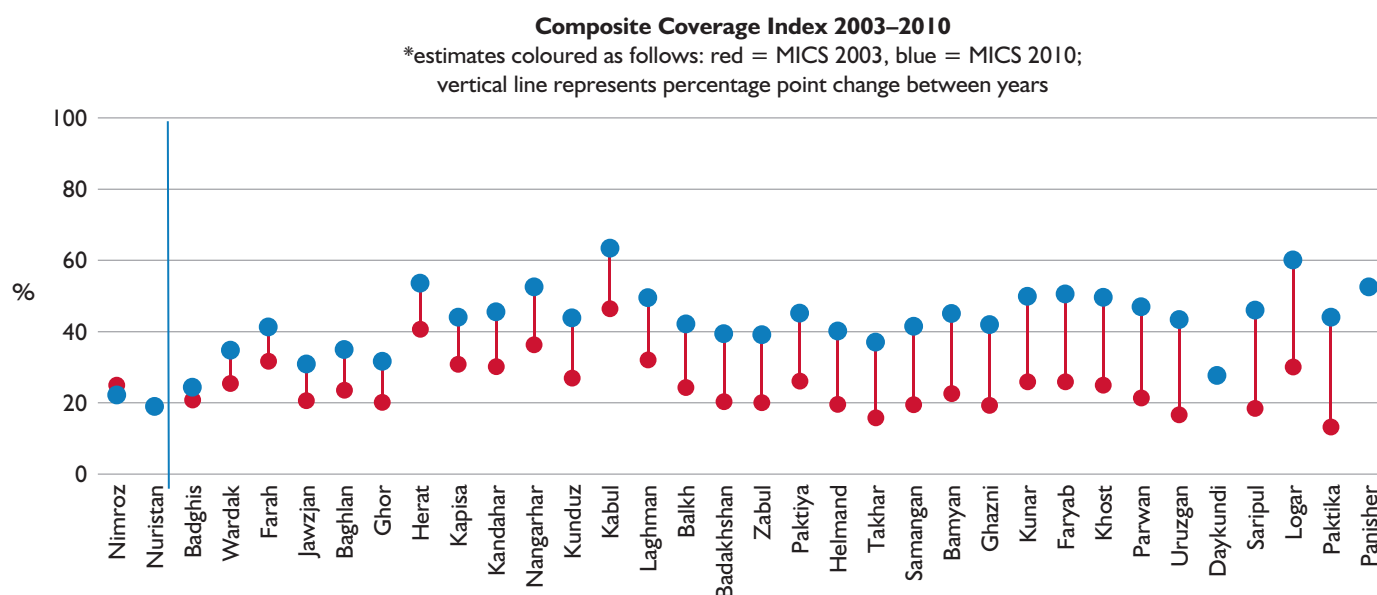
FIGURE 3C. National trends in childhood care-seeking interventions, 2003–2015



Provincial Trends in Key Maternal and Child Health Intervention

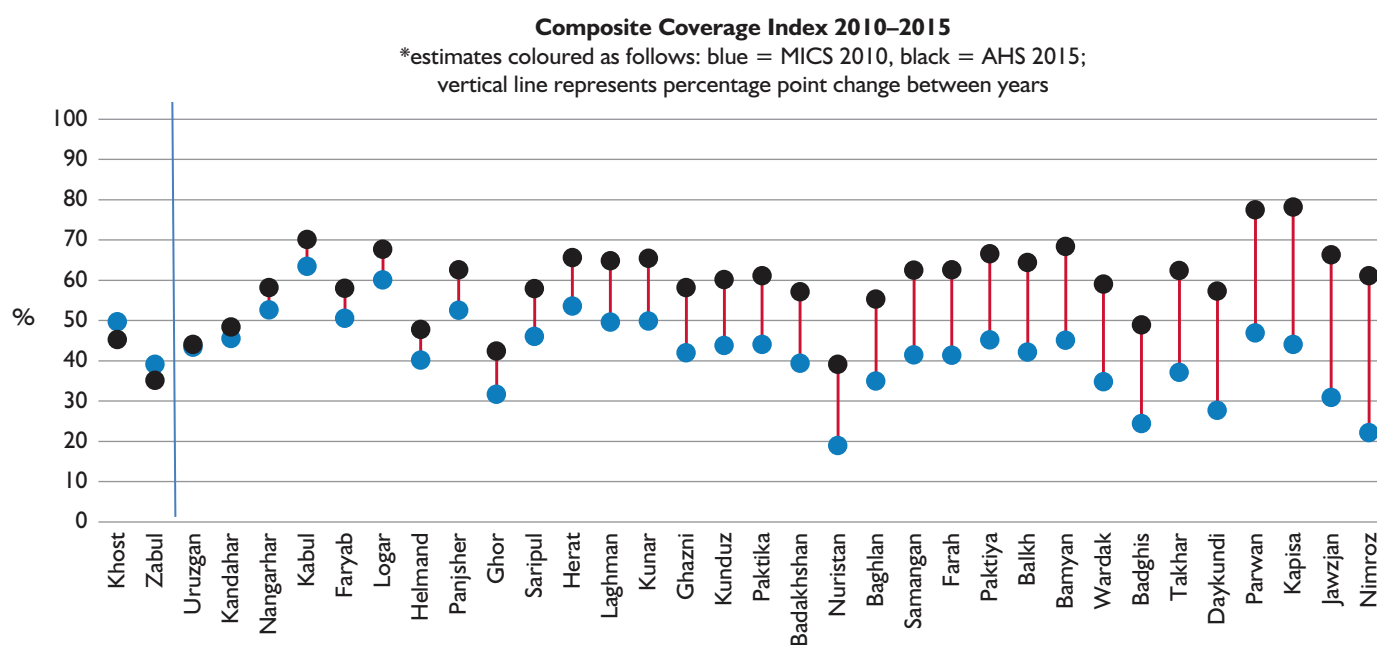
There are differences in improvements in coverage over time among provinces, but almost all provinces made improvements in the composite coverage index in both time periods. We evaluated changes in coverage at the provincial level using the composite coverage index (figures 4A–4B, Appendix A). Overall, almost all provinces made improvements during 2003–2010 and 2010–2015. The picture differs slightly when individual coverage indicators are examined separately, although it remains a largely positive one. More results are presented in appendix A.

FIGURE 4A. Composite coverage index levels and change by province, 2003–2010



Note: A single point is presented for provinces with an estimate for only that year.

FIGURE 4B. Composite coverage index levels and change by province, 2010–2015



Note: A single point is presented for provinces with an estimate for only that year.

Ranking of Provinces

Despite improvements, the share of the Afghan population living in provinces with slowest pace of improvements has increased over time from 23% to 39%. The CCI trends for the provinces show varying patterns for provinces with an improvement in performance for almost all provinces from 2003–2015 (figures 5A–5B). The exceptions are Nimroz and Nuristan during the years 2003–2010 and Khost and Zabul in 2010–2015. Figures 5A–5B show the provinces which were identified as high, moderate, or minimal performing based on the relative ranking. For the period 2003–2010, the high-performing provinces were Faryab, Ghazni, Khost, Kunar, Logar, Paktika, Panjsher, Parwan, Saripul, and Uruzgan; while for 2010–2015, the high-performing provinces based on CCI were Badghis, Bamyan, Daykundi, Jawzjan, Kapisa, Nimroz, Paktiya, Parwan, Takhar, and Wardak. Parwan was the only high-performing province during the two time periods. Population distribution in the three health service coverage performance categories during 2003–2010 were 23% (minimal), 53% (moderate), and 23% (high), and over 2010–2015 were 39% (minimal), 42% (moderate), and 20% (high).

2.3 HEALTH SYSTEMS PERFORMANCE AND QUALITY OF CARE

National Trends

Figures 6 and 7 present health facilities performance domains in Afghanistan from 2004 to 2016. Domain definitions and component variables were modified post-2010 to make the balanced score card tougher in view of improvements in facility performance. Therefore, trends are contrasted separately for the 2004–2010 and 2011–2016 time periods in these analyses.

Over 2004–2010, most health systems performance domains showed considerable improvements. Overall, health systems broad domains have changed variably in Afghanistan from 2004 to 2010 (figure 6). The nation seems to be consistently performing best in the client and community area with scores as high as 80/100. Steep improvements were noted for physical capacity, which moved from a low score of 44 to 74 from 2004 to 2010. Scores for management systems and human resources were improving and well above 70/100 before 2010, while overall mission and quality of service provision were relatively unchanged.¹

2011–2016 onwards, health systems performance continued to improve, although at a slower pace, with the exception of large improvements in physical capacity to deliver high quality care. As figure 7 shows, while health systems performance continued to improve over 2011–2016, the pace of improvements is slower. The main exception is physical capacity to deliver quality care which continued to improve at a fast pace. Another important development throughout this period has been the steady increase in female health workers, increasing from fewer than 600 in 2002 to around 2,500 in 2014 and almost 90% of health facilities with at least one female health worker.

¹Please refer to table 1 for more details on each health systems domain.

FIGURE 5A. Overall province performance on CCI, 2003–2010

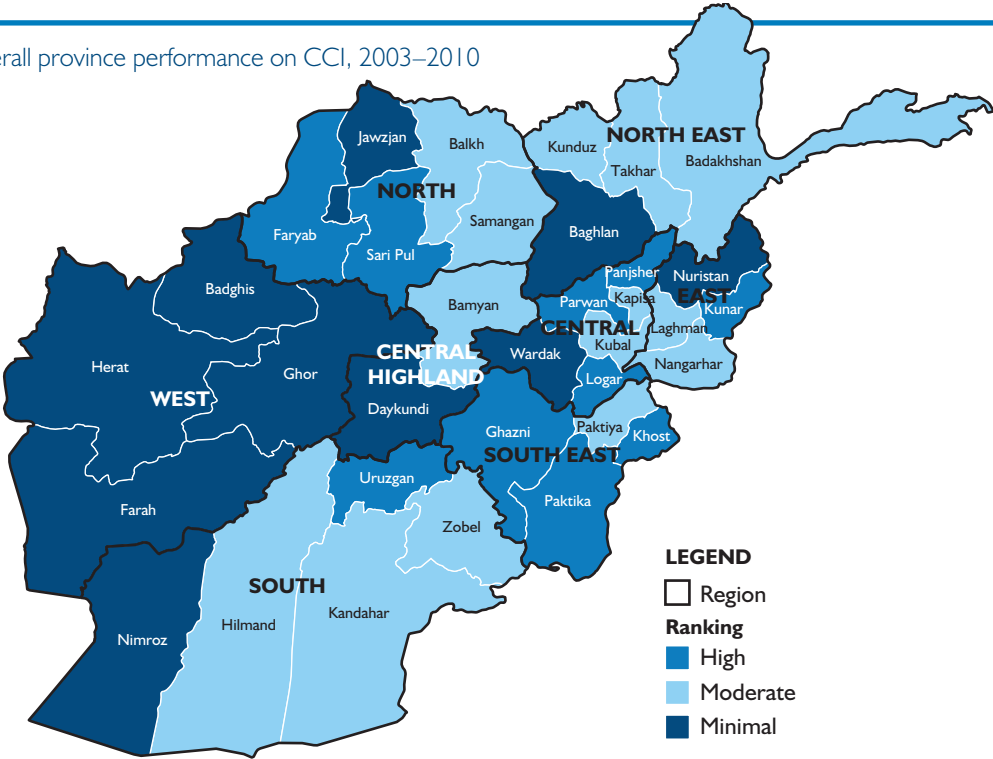


FIGURE 5B. Overall province performance on CCI, 2010–2015

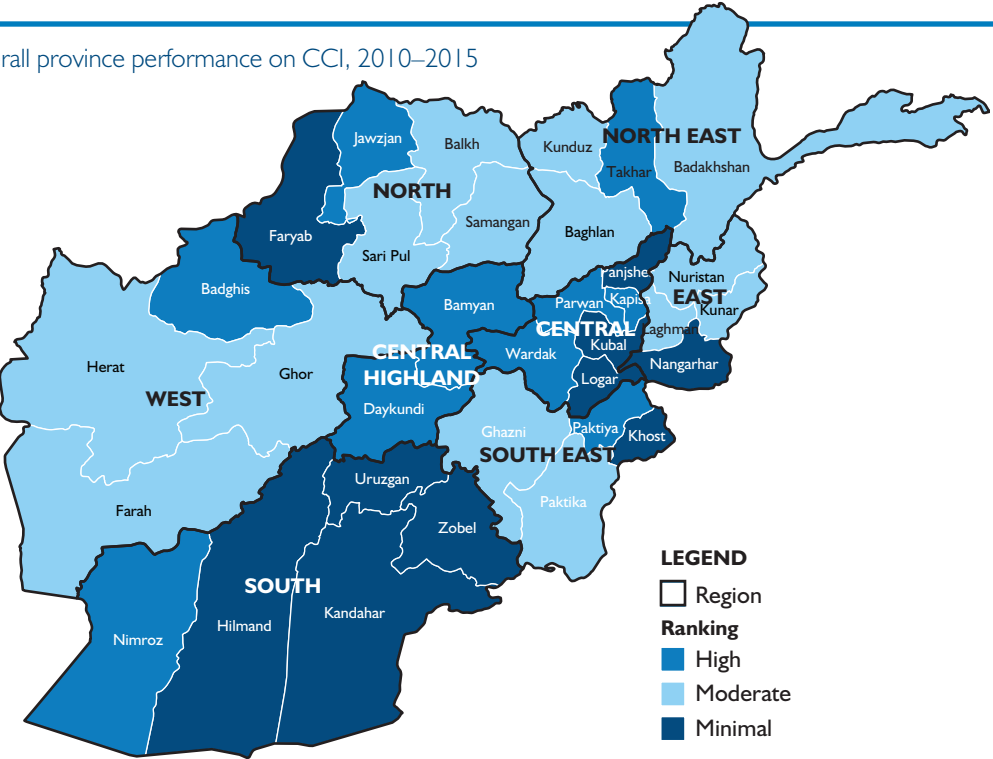
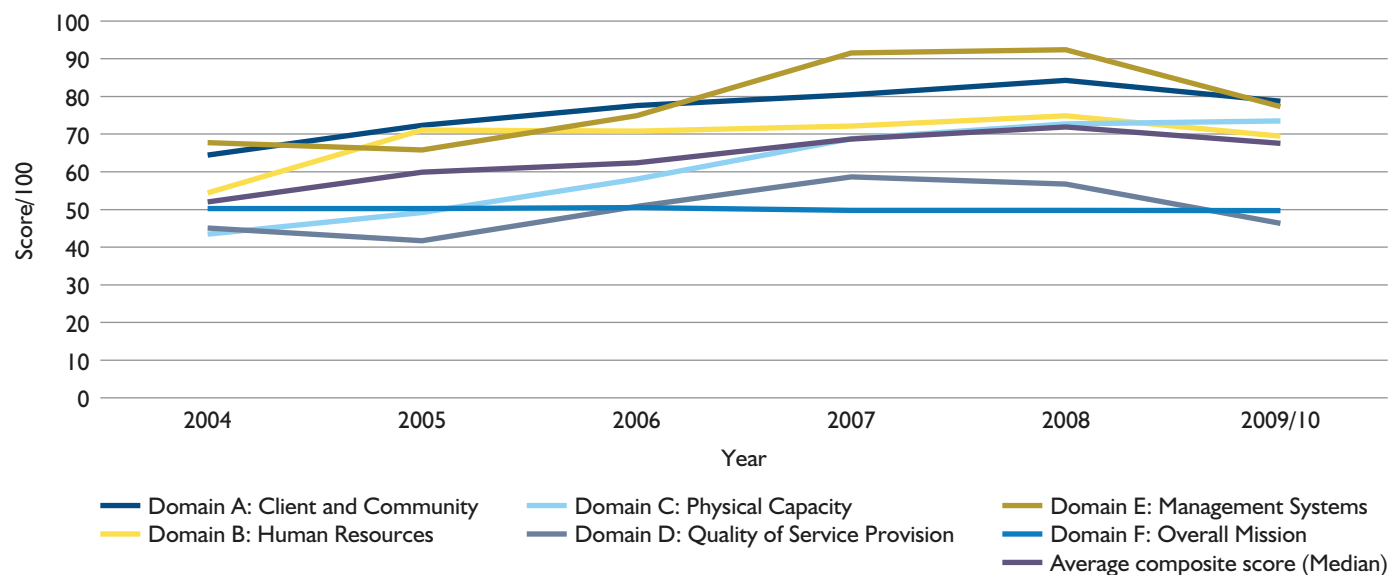
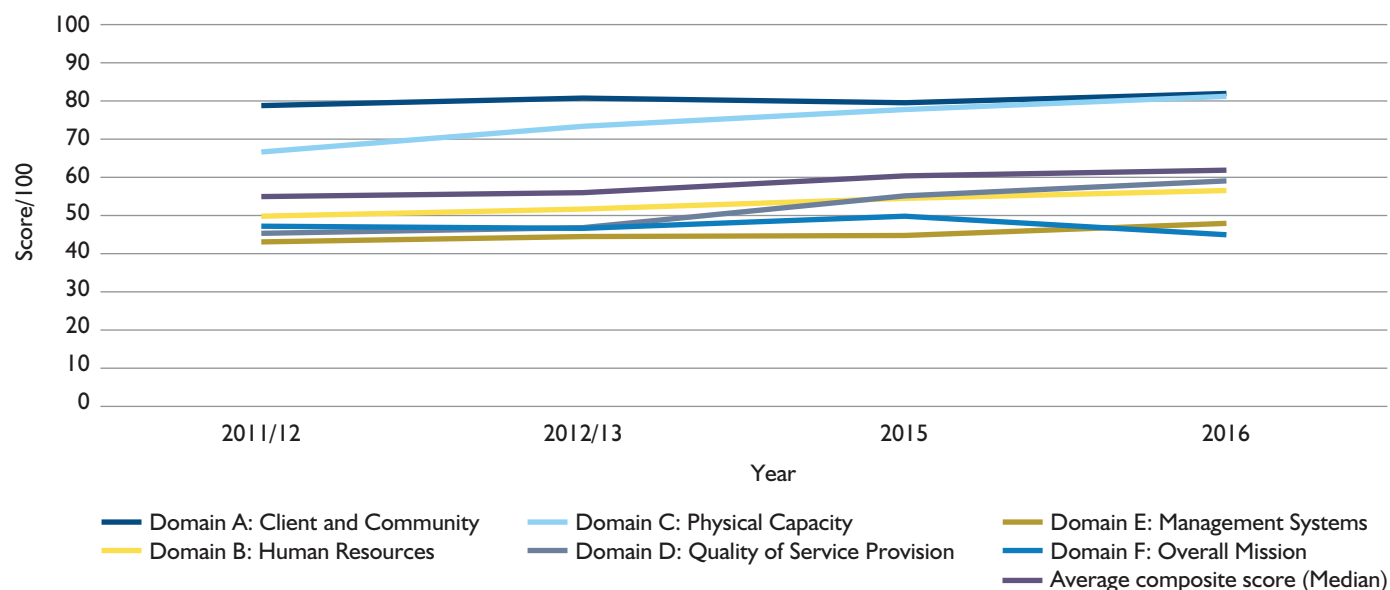


FIGURE 6. National trends in health systems domains from 2004–2010



Note: Trends are interpreted separately for 2004–2010 and 2011–2016 time periods due to a change in domain definitions after 2010.

FIGURE 7. National trends in health systems domains from 2011–2016



Note: Trends are interpreted separately for 2004–2010 and 2011–2016 time periods due to a change in domain definitions after 2010.

Provincial Trends

All provinces, except Zabul, made improvements in health systems domains during 2004–2010, while all provinces, except Kapisa, Kunar and Badghis, made health systems improvements during 2011–2016. During 2004–10, most provinces showed improvement in all the six domains evaluated (see supplementary figures in appendix). Client and community showed improvement in the range of 3.8% to 44.2% across provinces, physical capacity from 3.8% to 44.2%, human resource from –12.5% to 40.9%, quality of service provision from –24.6% to 25.1%, management systems from –18.9% to 54%. During 2011–2016, client and community showed improvement in the range of –10.3% to 17.9% between provinces, physical capacity from 5.4% to 52.2%, human resource from –12.7% to 19.1%, quality of service provision from –17.9% to 29.2%, management systems from –21.1% to 27.5%. Figures 8A and 8B show the overall improvement during the two time periods. With the exception of Zabul, all provinces showed improvements ranging from 1.3% to 25.5% in 2004–2010. In 2011–2016, all except three (Kapisa, Kunar, Badghis) showed improvement which ranged from 0.1% to 48.3% across provinces. Overall, the improvements were greater over the 2004–2010 period than during the 2011–2016 period, as indicated by steeper slopes and greater absolute score gains within the earlier period. It should be noted that there are some provinces that saw worsening performance in some specific areas/components, but these disappear in the aggregate.

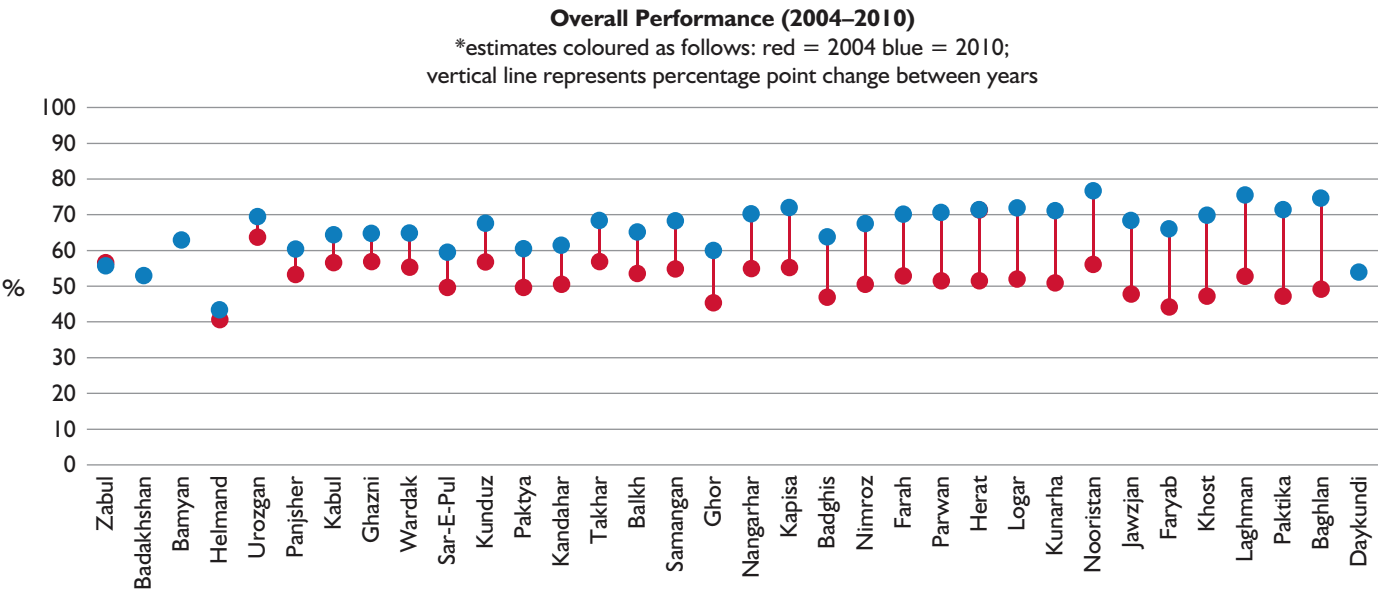
Ranking of Provinces

The best performing provinces in terms of health systems performance varied slightly from the CCI service utilization ranking: the share of the Afghan population living in minimal improvement provinces increased from 37% to 45% between 2004–2010 and 2011–2016. Composite health systems scores were used to further rank provinces based on overall performance (figures 9A–9B). Health facilities are functioning best in Baghlan, Faryab, Herat, Jawzjan, Khost, Kunar, Laghman, Logar, Nuristan, and Paktika in 2003–2010; while for the period 2011–2016, the high performing provinces are Badakhshan, Balkh, Daykundi, Farah, Faryab, Helmand, Nangarhar, Paktiya, Saripul, and Zabul. Faryab was the only high-performing province during the two time periods. Population distribution in the three health systems performance categories over 2004–2010 were 37% (minimal), 38% (moderate) and 25% (high); and over 2011–2016 were 45% (minimal), 26% (moderate) and 30% (high).

2.4 IS HEALTH FACILITY PERFORMANCE RELATED TO SERVICE UTILIZATION?

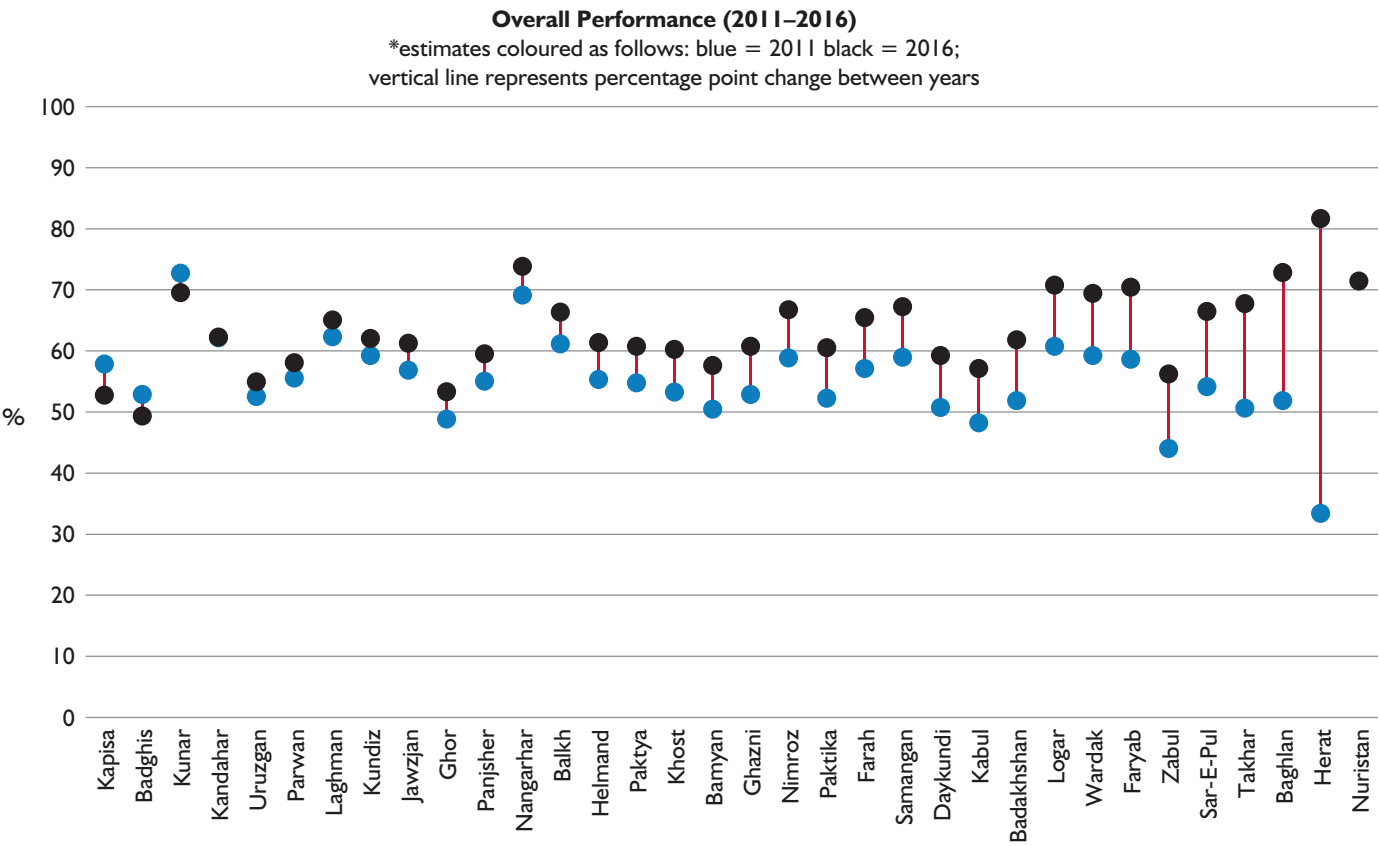
Service utilization is not consistently correlated with health facility performance with the exception of care-seeking for ARI. In evaluating the performance of the provinces for both the service coverage and facility performance, during the 2003–2010 period, five provinces (Faryab, Khost, Kunar, Logar) were rated as best performing in both areas, while two provinces (Daykundi and Paktiya) were rated as best performing in both areas during 2010–2015. We examined correlations between coverage

FIGURE 8A. Health system overall mission scores and change by province, 2004 to 2010



Note: A single point is presented for provinces with an estimate for only that year.

FIGURE 8B. Health system overall mission scores and change by province, 2011 to 2016



Note: A single point is presented for provinces with an estimate for only that year.

FIGURE 9A. Provinces overall ranking in health systems performance, 2004–2010

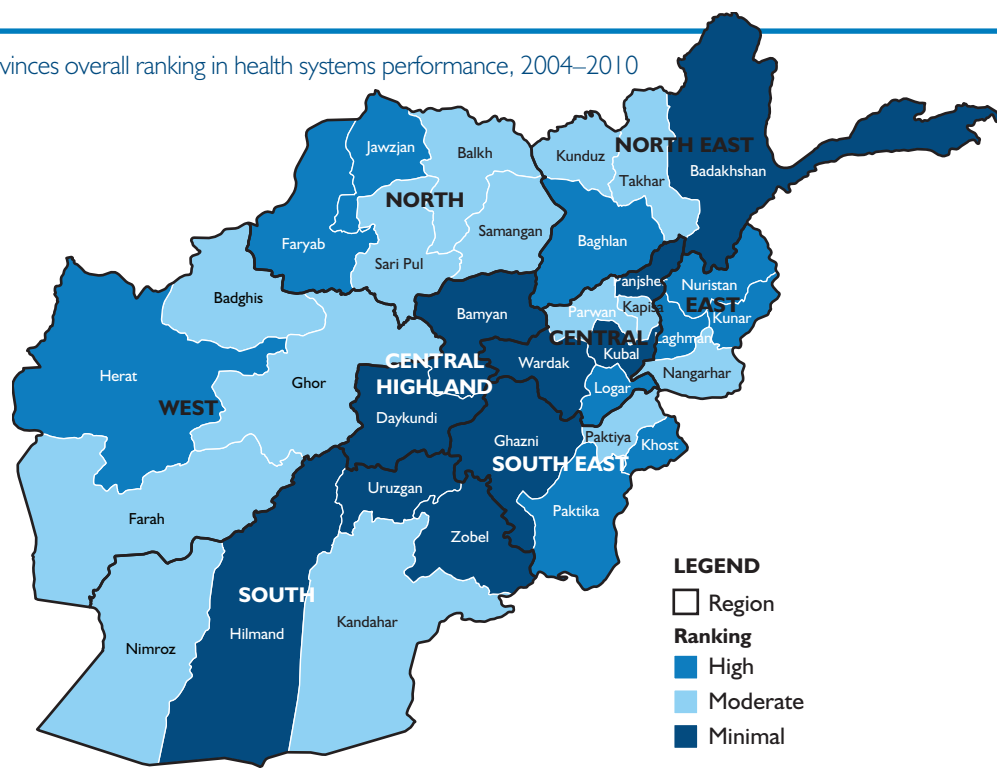
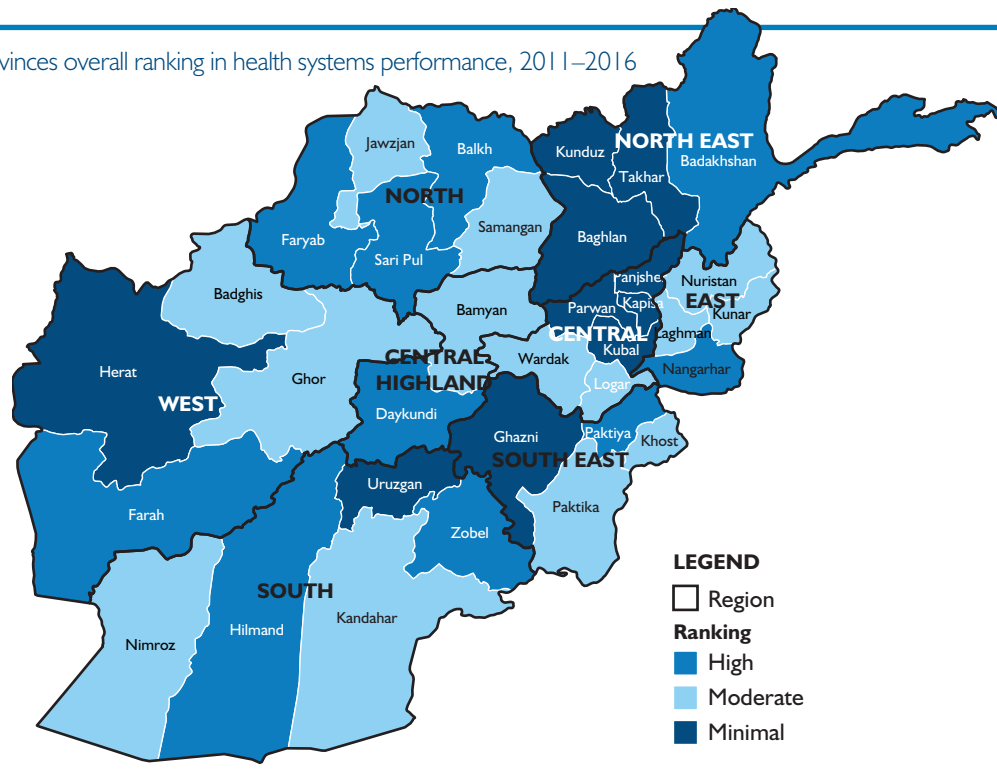


FIGURE 9B. Provinces overall ranking in health systems performance, 2011–2016



of SBA, measles, care seeking for ARI and CCI and health facility indicators in 2004, 2011, and 2016 (appendix B). In 2004, there was no significant correlation between coverage and health facility performance indicators. In 2011, increased care seeking for ARI among children was moderately correlated to the female health worker index (Pearson $r = 0.387$, $p = 0.031$). In 2015/16, increased ARI care seeking was positively correlated with female health worker index ($r = 0.38$, $p = 0.031$), provider knowledge score ($r = 0.457$, $p = 0.01$), and borderline significantly with equipment functionality ($r = 0.332$, $p = 0.068$) and functional infrastructure ($r = 0.333$, $p = 0.067$). The CCI was also positively associated with pharmaceuticals and vaccines availability ($r = 0.372$, $p = 0.043$), while higher SBA was linked to higher functional infrastructure ($r = 0.387$, $p = 0.034$).

IMPLICATIONS OF INSECURITY FOR HEALTH SERVICE COVERAGE AND HEALTH SYSTEMS PERFORMANCE

In this section, we explore the extent to which escalating insecurity explains observed trends. Data sources, security indicators/classifications, and methods are detailed in the methodology section, above.

3.1 SECURITY CLASSIFICATION AND PROVINCE RANKING

To assess the relationship of security with key indicators, we relied on battle-related death data from Uppsala databases, as described in the methodology. Annual battle-related deaths for each province are shown in appendix C. We divided the provinces as low-, moderate-, and high-intensity security zones based on the criteria previously specified (figures 10A-10B).

There has been an escalation in insecurity in Afghanistan and the share of the population living in severely insecure areas has increased substantially over time. Population distribution across three insecure zones during 2003–2010 were as follows: 50% (minimal), 33% (moderate) and 17% (severe); and during 2010–2015, 16% (minimal), 44% (moderate) and 40% (severe). Many provinces moved from low to moderate and from moderate to severe insecurity during the time periods 2003–2010 to 2010–2015. According to our classification, Zabul was the only province to show improvement, as it moved from the high- to moderate-intensity group.

No province under the CI approach was classified as severely insecure for the two time periods (identified with asterisks on the maps), given their proximity to Kabul. Parwan and Panjsher were classified as regions with minimal insecurity during the two time periods, while Kapisa moved from minimal intensity in 2003–2010 to moderate intensity over 2010–2015.

3.2 DIFFERENTIALS IN HEALTH OUTCOMES AND SERVICE COVERAGE BY INSECURITY

An analysis of the RMNCH indicators to evaluate whether there is a relationship between insecurity with coverage of essential interventions is presented in tables 3A and 3B, respectively, for the 2003–2010 and 2010–2015 time periods. Results suggest that service delivery has been resilient to insecurity.

FIGURE 10A. Provinces by insecurity, 2003–2010

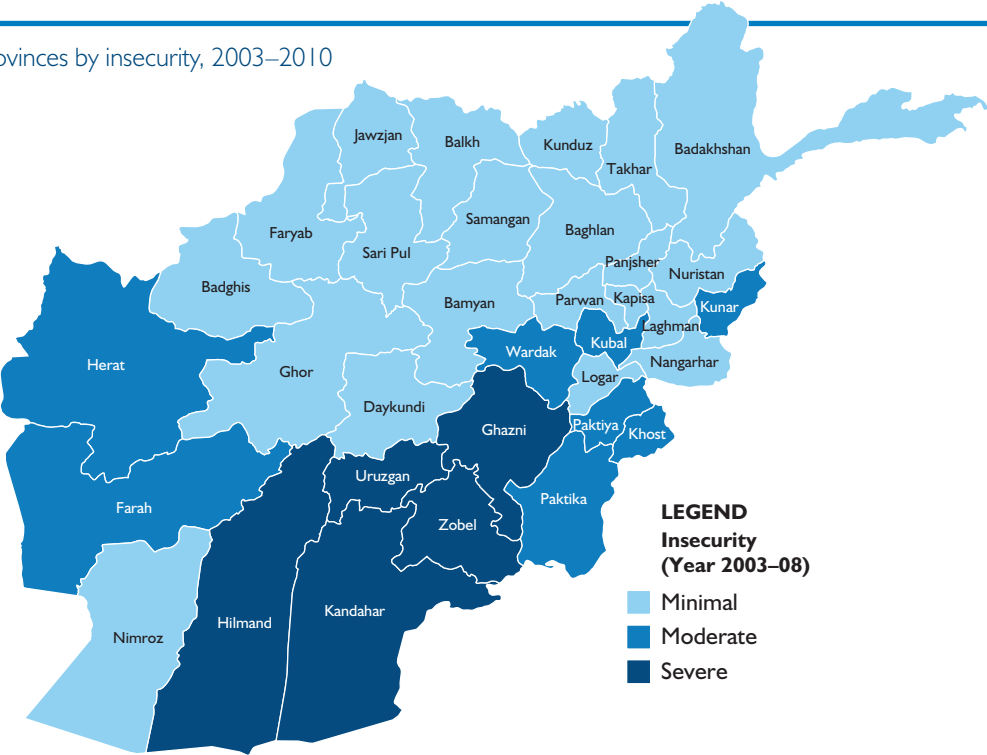


FIGURE 10B. Provinces by insecurity, 2010–2015

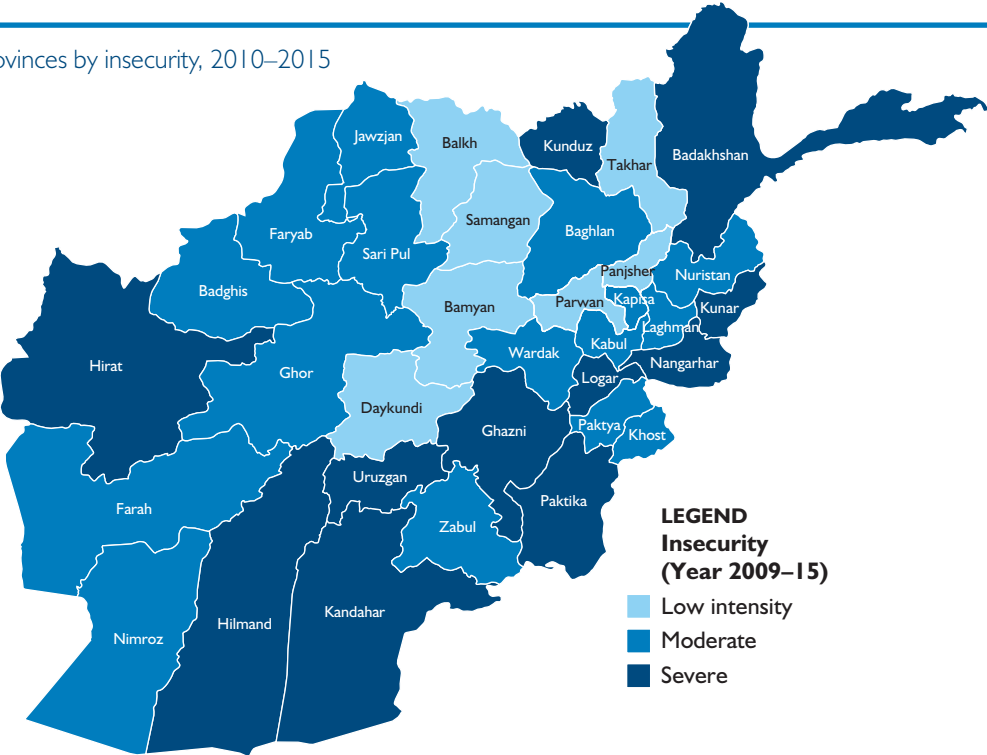


FIGURE I I A. Unadjusted change in service coverage by severity of insecurity, 2003–2010

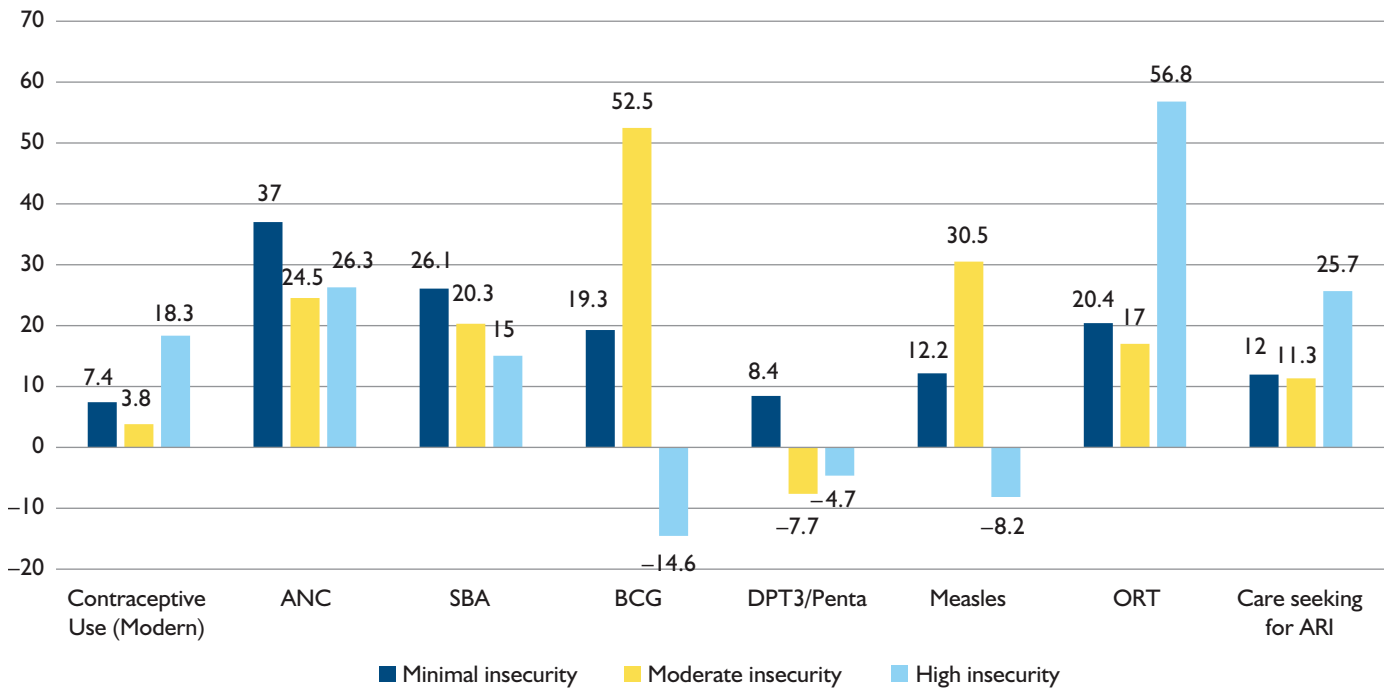
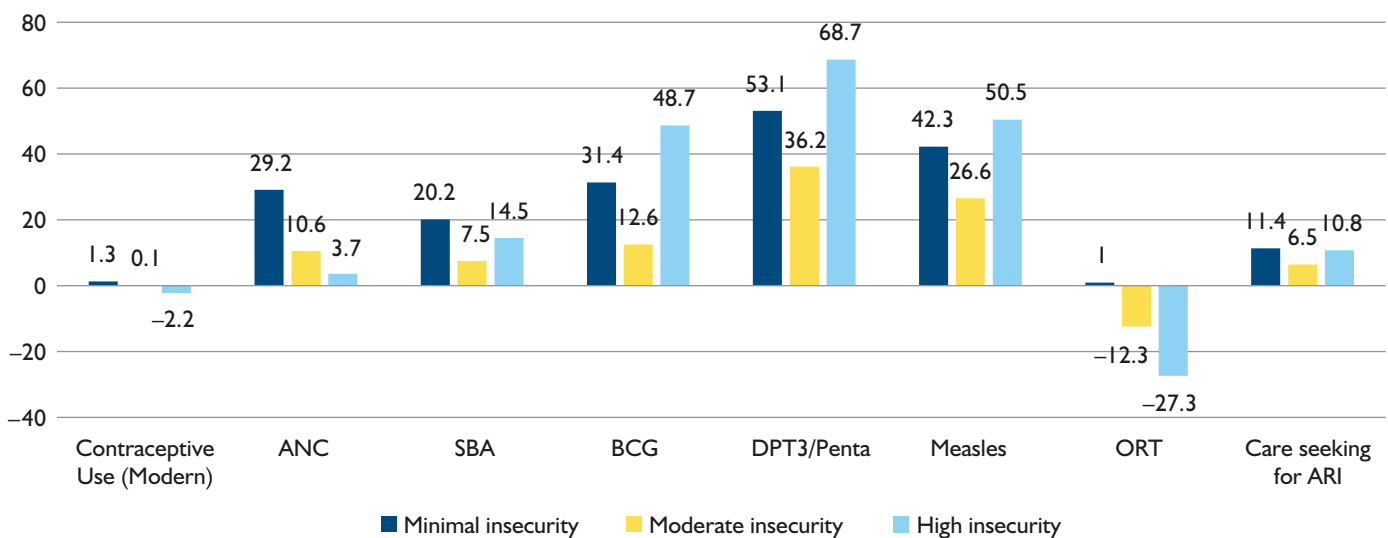


FIGURE I I B. Unadjusted change in service coverage by severity of insecurity, 2010–2015



Higher insecurity provinces achieved improvements in service coverage in during the time periods 2003–2010 and 2010–2015. Severe and moderate insecurity provinces achieved increases in service coverage on most indicators, with the exception of immunization coverage which declined over 2003–2010. During 2010–2015, ORT coverage declined substantially in severe and moderate insecurity provinces as did contraceptive use, with the latter declining only in severe insecurity provinces.

The pace of improvements varied over time and by indicator. During 2003–2010, severe insecurity provinces achieved statistically significantly greater improvements in contraceptive coverage ($p < 0.01$) and ORT use ($p < 0.01$) than did minimal insecurity provinces. Moderate insecurity provinces achieved statistically significantly greater improvements in BCG ($p < 0.01$) and measles coverage ($p < 0.01$) relative to minimal insecurity provinces. On the remaining indicators, provinces with minimal insecurity achieved similar ($p > 0.10$) or greater increases than did provinces with moderate or severe insecurity.

Over 2010–2015, severe insecurity provinces achieved statistically significantly greater improvements in DPT3 coverage ($p < 0.01$) compared to minimal insecurity provinces. On all other coverage indicators presented here, provinces with severe and moderate insecurity achieved fewer or statistically similar improvements ($p > 0.10$) in coverage compared to provinces with minimal insecurity (see tables 3A and 3B).

TABLE 3A. RMNCH Interventions Coverage by Insecurity Status, 2003–2010

Indicator	Survey	N	Minimal Insecurity	N	Moderate Insecurity	N	Severe Insecurity	Minimal vs. Moderate p-value	Minimal vs. Severe p-value
Contraceptives (Any method)	Mean% 2003	12,048	5.2	5,654	20.3	3,260	6.6	0.000	0.013
	Mean% 2010	10,042	12.7	5,801	22.8	2,231	25.1	0.000	0.000
	Mean Difference		7.5		2.5		18.5	0.000	0.000
Contraceptives (Any modern method)	Mean% 2003	12,033	4.4	5,647	16.2	3,255	6.3	0.000	0.001
	Mean% 2010	10,042	11.8	5,801	20.1	2,231	24.6	0.000	0.000
	Mean Difference		7.4		3.8		18.3	0.000	0.000
ANC by skilled provider	Mean% 2003	6,295	8.7	2,890	31.8	1,702	10.5	0.000	0.330
	Mean% 2010	2,714	45.7	1,808	56.3	352	36.8	0.007	0.068
	Mean Difference		37.0		24.5		26.3	0.000	0.031

TABLE 3A. RMNCH Interventions Coverage by Insecurity Status, 2003–2010 (*continued*)

Indicator	Survey	N	Minimal Insecurity	N	Moderate Insecurity	N	Severe Insecurity	Minimal vs. Moderate p-value	Minimal vs. Severe p-value
Facility deliveries	Mean% 2003	6,370	5.4	2,919	28.3	1,719	7.7	0.000	0.011
	Mean% 2010	2,786	27.3	1,820	45.3	356	15.3	0.000	0.013
	Mean Difference		21.9		17.0		7.6	0.000	0.001
SBA	Mean% 2003	6,380	7.4	2,915	29.5	1,720	8.3	0.000	0.384
	Mean% 2010	2,786	33.4	1,820	49.9	356	23.3	0.000	0.037
	Mean Difference		26.1		20.3		15.0	0.000	0.021
BCG	Mean% 2003	2,505	41.6	1,283	19.2	857	49.3	0.000	0.010
	Mean% 2010	1,429	60.9	816	71.8	247	34.8	0.026	0.000
	Mean Difference		19.3		52.5		-14.6	0.000	0.000
DPT3/Penta3	Mean% 2003	2,504	23.3	1,283	45.5	857	11.7	0.000	0.000
	Mean% 2010	1,400	31.8	793	37.8	240	7.0	0.168	0.000
	Mean Difference		8.4		-7.7		-4.7	0.001	0.007
Measles	Mean% 2003	2,516	27.7	1,285	17.2	851	28.6	0.001	0.733
	Mean% 2010	1,413	39.9	817	47.7	244	20.4	0.076	0.003
	Mean Difference		12.2		30.5		-8.2	0.000	0.006
Care seeking for ARI	Mean% 2003	3,110	45.0	1,121	54.4	487	36.2	0.004	0.025
	Mean% 2010	1,696	57.0	1,041	65.7	212	61.8	0.020	0.546
	Mean Difference		12.0		11.3		25.7	0.967	0.126
ORT	Mean% 2003	4,800	25.9	2,071	41.6	865	17.2	0.000	0.007
	Mean% 2010	2,059	46.3	1,044	58.6	337	74.0	0.034	0.000
	Mean Difference		20.4		17.0		56.8	0.400	0.000

TABLE 3B. RMNCH Interventions Coverage by Insecurity Status, 2010–2015

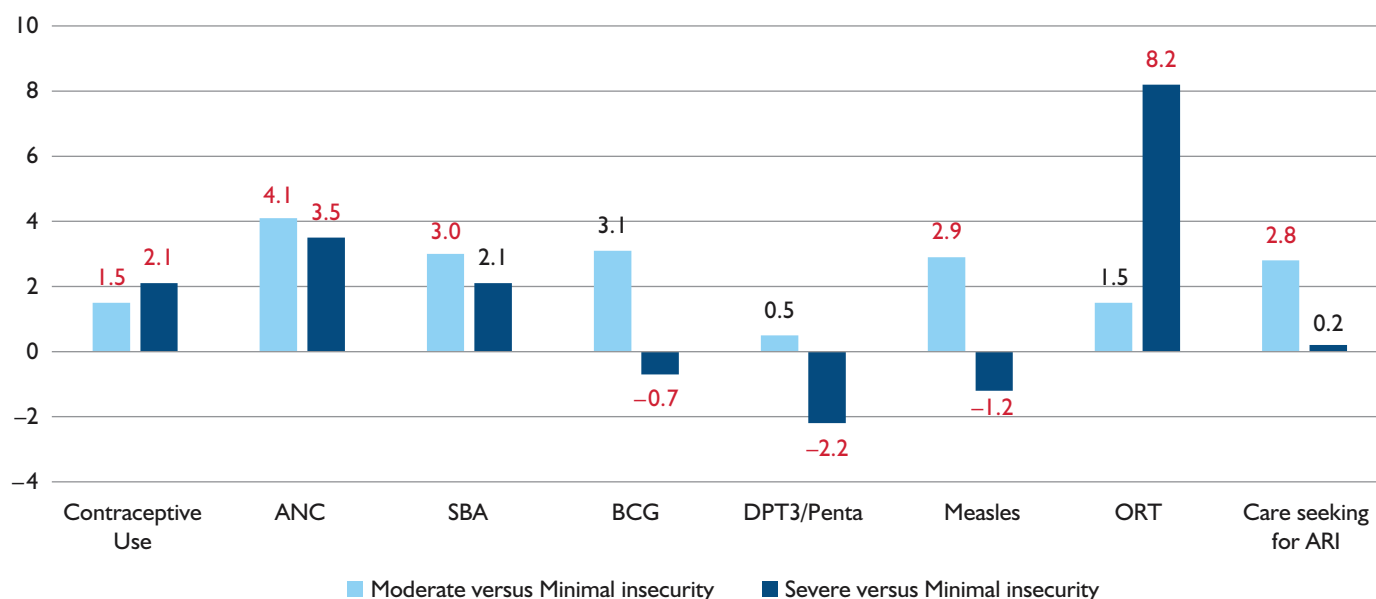
Indicator	Survey	N	Minimal Insecurity	N	Moderate Insecurity	N	Severe Insecurity	Minimal vs. Moderate p-value	Minimal vs. Severe p-value
Contraceptives (Any method)	Mean% 2010	4,426	14.1	7,329	16.4	6,319	20.7	0.099	0.000
	Mean% 2015	4,880	15.2	12,013	16.9	7,828	20.0	0.213	0.002
	Mean Difference		1.1		0.5		–0.7	0.737	0.349
Contraceptives (Any modern method)	Mean% 2010	4,426	12.7	7,329	14.4	6,319	19.8	0.212	0.000
	Mean% 2015	4,880	14.0	12,013	14.5	7,828	17.6	0.685	0.008
	Mean Difference		1.3		0.1		–2.2	0.520	0.082
ANC by skilled provider	Mean% 2010	1,223	50.2	1,954	49.9	1,697	46.7	0.933	0.350
	Mean% 2015	1,636	79.5	3,915	60.5	2,400	50.4	0.000	0.000
	Mean Difference		29.2		10.6		3.7	0.000	0.000
Facility deliveries	Mean% 2010	1,228	32.3	1,974	37.6	1,760	27.3	0.195	0.195
	Mean% 2015	1,740	59.6	4,185	55.4	2,495	50.2	0.990	0.025
	Mean Differences		27.3		17.8		22.9	0.081	0.536
SBA	Mean% 2010	1,228	36.1	1,974	44.7	1,760	32.6	0.042	0.395
	Mean% 2015	1,770	56.3	4,305	52.2	2,606	47.1	0.957	0.017
	Mean Differences		20.2		7.5		14.5	0.018	0.344
BCG	Mean% 2010	1,429	60.9	816	71.8	247	34.8	0.026	0.000
	Mean% 2015	818	92.3	2,002	84.3	1,166	83.5	0.001	0.000
	Mean Differences		31.4		12.6		48.7	0.000	0.566
DPT3/Penta3	Mean% 2010	1,400	31.8	793	37.8	240	7.0	0.168	0.000
	Mean% 2015	818	84.9	2,002	74.0	1,166	75.7	0.000	0.002
	Mean Differences		53.1		36.2		68.7	0.000	0.002

TABLE 3B. RMNCH Interventions Coverage by Insecurity Status, 2010–2015 (*continued*)

Indicator	Survey	N	Minimal Insecurity	N	Moderate Insecurity	N	Severe Insecurity	Minimal vs. Moderate p-value	Minimal vs. Severe p-value
Measles	Mean% 2010	1,413	39.9	817	47.7	244	20.4	0.076	0.003
	Mean% 2015	818	82.2	2,002	74.2	1,166	70.9	0.008	0.000
	Mean Difference		42.3		26.6		50.5	0.002	0.388
Care seeking for ARI	Mean% 2010	1,696	57.0	1,041	65.7	212	61.8	0.020	0.546
	Mean% 2015	520	68.4	1,388	72.2	542	72.6	0.318	0.378
	Mean Difference		11.4		6.5		10.8	0.449	0.992
ORT	Mean% 2010	2,059	46.3	1,044	58.6	337	74.0	0.034	0.000
	Mean% 2015	891	47.4	1,813	46.2	863	46.7	0.766	0.875
	Mean Difference		1.0		-12.3		-27.3	0.052	0.000

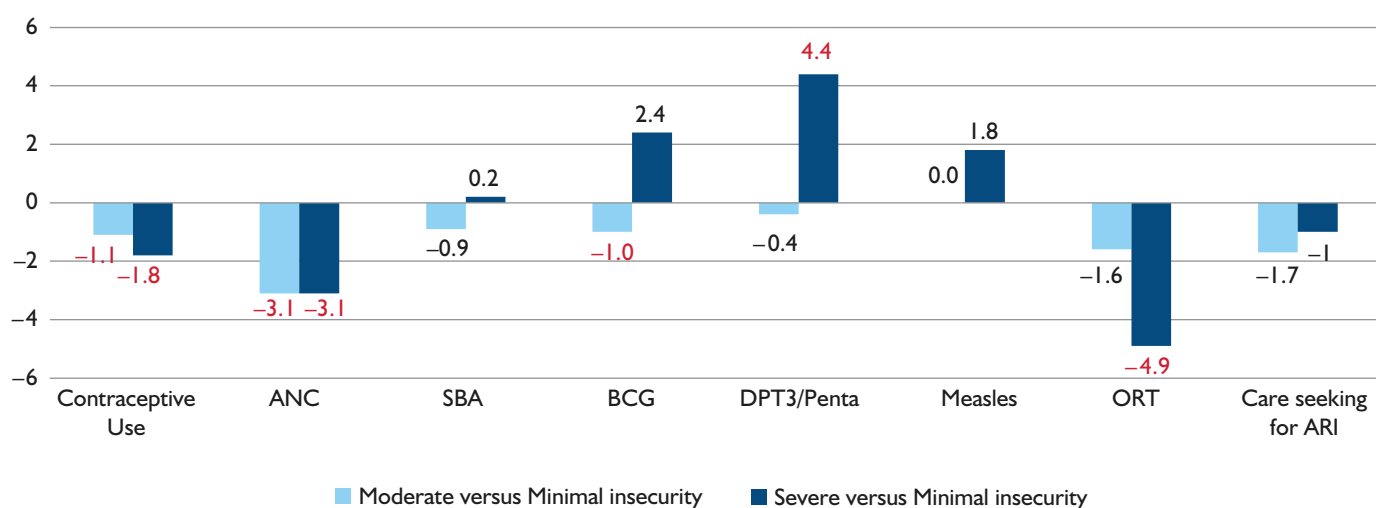
After controlling for confounders (maternal literacy, contracting type and rural residence), this finding of insecurity resilience persists and differences in improvement between higher and minimal insecurity provinces are small. Higher insecurity provinces show striking resilience to insecurity in 2003–2010 and make statistically significantly ($p < 0.10$) greater gains relative to low insecurity provinces in improving coverage of contraceptive use, Ante Natal Care (ANC), Skilled Birth Attendance (SBA), care seeking for ARI (Acute Respiratory Infections) and ORT (Oral Rehydration Therapy) use during this period after adjusting for maternal literacy, contracting type and rural residence. However, relative progress in scaling up childhood vaccines coverage was lacking in the high insecurity provinces (figure 12A; table 4A, 4B). During 2010–2015, gains in contraceptive coverage, ANC, Bacillus Calmette-Guerin (BCG), and ORT were statistically significantly smaller in more insecurity prone provinces compared to minimal insecurity provinces after controlling for confounders (figure 12B; tables 4A, 4C). However, higher insecurity areas achieved similar relative improvements in SBA, DPT3, and measles coverage and care seeking for ARI as compared to minimal insecurity provinces. ORT coverage was most affected by insecurity as improvements in coverage for this indicator were 4.9 percent points lower in severe insecurity provinces compared to minimal insecurity provinces over a period of 5 years or about 1 percent point per year (see figures 12 A-B, tables 4A-C). Crude box-plots, complete regression models, and covariate-adjusted prevalence plots for each indicator over time are included in appendix D.

FIGURE 12A. Annual percentage point difference in service coverage by severity of insecurity, 2003–2010
(Reference: Minimal insecurity)*



Note: *Red values indicate statistical significance at $p = 0.10$ or less. Model adjusted for the main effects of insecurity, time, and covariates including maternal illiteracy, contracting type, and rural residence. Positive numbers mean that provinces with severe or moderate insecurity achieved greater improvements than did provinces with minimal insecurity.

FIGURE 12B. Annual percentage point difference in service coverage between by severity of insecurity, 2010–2015
(Reference: Minimal insecurity)*



Note: Red values indicate statistical significance at $p = 0.10$ or less. Model adjusted for the main effects of insecurity, time, and covariates, including maternal illiteracy, contracting type, and rural residence. Positive numbers mean that provinces with severe or moderate insecurity achieved greater improvements than did provinces with minimal insecurity.

TABLE 4A. Multivariable Adjusted Impact of Insecurity on Change in Key RMNCH Interventions

Insecurity* time Interaction [Reference = Minimal]	MICS 2003–MICS 2010			MICS 2010–AHS 2015		
	Coef.	95% CI	p-value	Coef.	95% CI	p-value
Contraceptive Use: Moderate insecurity* time	1.03	(0.73, 1.32)	0.000	–0.48	(–0.73, –0.22)	0.000
Contraceptive Use: Severe insecurity* time	1.22	(0.74, 1.69)	0.000	–0.67	(–0.99, –0.34)	0.000
ANC: Moderate insecurity* time	0.43	(0.06, 0.8)	0.024	–0.87	(–1.22, –0.51)	0.000
ANC: Severe insecurity* time	0.66	(–0.05, 1.37)	0.070	–0.86	(–1.34, –0.37)	0.001
SBA: Moderate insecurity* time	0.53	(0.2, 0.86)	0.002	–0.25	(–0.59, 0.09)	0.149
SBA: Severe insecurity* time	0.43	(–0.38, 1.24)	0.294	0.08	(–0.52, 0.68)	0.796
BCG: Moderate insecurity* time	0.05	(–0.45, 0.55)	0.851	–0.46	(–1, 0.08)	0.096
BCG: Severe insecurity* time	–1.33	(–2.17, –0.49)	0.002	0.46	(–0.35, 1.28)	0.261
DPT3/Penta: Moderate insecurity* time	–0.07	(–0.51, 0.38)	0.769	–0.22	(–0.74, 0.31)	0.415
DPT3/Penta: Severe insecurity* time	–2.11	(–3.05, –1.17)	0.000	1.79	(0.94, 2.64)	0.000
Measles: Moderate insecurity* time	0.47	(0.01, 0.94)	0.044	–0.07	(–0.58, 0.43)	0.779
Measles: Severe insecurity* time	–1.15	(–2.03, –0.27)	0.010	0.41	(–0.43, 1.24)	0.342
ORT: Moderate insecurity* time	–0.43	(–0.97, 0.1)	0.111	–0.39	(–0.86, 0.08)	0.101
ORT: Severe insecurity* time	2.78	(2.06, 3.5)	0.000	–1.27	(–1.9, –0.64)	0.000
Care seeking ARI: Moderate insecurity* time	0.59	(0.16, 1.02)	0.008	–0.36	(–0.8, 0.09)	0.118
Care seeking ARI: Severe insecurity* time	–0.30	(–1.29, 0.69)	0.555	–0.23	(–1.22, 0.76)	0.651

*Models adjusted for the main effects of insecurity and time, and covariates including maternal illiteracy, contracting type and rural residence; complete results in the appendix.

3.3 DIFFERENTIALS IN HEALTH FACILITY PERFORMANCE INDICATORS BY INSECURITY SEVERITY

Health systems performance improvements have been achieved across the insecurity spectrum; while facilities in higher insecurity provinces achieve improvements over time in health systems performance in unadjusted comparisons of changes over time. During 2003–2010, with the exception of quality of service provision (process quality) in severe insecurity provinces, severe, and moderate insecurity provinces achieved improvements on all health systems performance domains examined (table 5A). During 2011–2016, with the exception of the overall mission domain (equity) in moderate insecurity provinces, severe and moderate insecurity provinces achieved improvements in all other health systems performance domains (table 5B). Crude box-plots, complete regression models, and covariate-adjusted mean plots for each indicator over time are included in appendix E.

Although facilities in severe insecurity provinces achieved improvements in 2003–2010, the rate of (unadjusted) improvement is smaller than in minimal insecurity provinces on some health systems performance indicators. Severe insecurity provinces made smaller improvements than minimal insecurity provinces on client and community ($p < 0.10$) and physical capacity ($p < 0.01$). The average facility in a severe insecurity area has a statistically significantly lower quality score than in a minimal insecurity facility (9 percentage points lower over 2003–2010, $p = 0.012$). Facilities in moderate insecurity provinces achieved similar levels of improvement ($p > 0.10$) over time as did minimal insecurity facilities in the same time period.

TABLE 4B. Multivariable Adjusted % Point Change in Key RMNCH Interventions by Insecurity Status, 2003–2010

	Minimal		Moderate			Severe				Minimal vs. Moderate p-value	Minimal vs. Severe p-value
	MICS 2003	MICS 2010	2003– 2010	MICS 2003	MICS 2010	2003– 2010	MICS 2003	MICS 2010	2003– 2010		
	Adjusted %	Adjusted %	Average % Point Change	Adjusted %	Adjusted %	Average % Point Change	Adjusted %	Adjusted %	Average % Point Change		
Contraceptive Use	11.02	12.8	0.1	7.12	19.77	1.6	8.41	26.07	2.2	0.000	0.000
ANC	17.96	46.84	0.3	14.46	49.32	4.4	8.47	38.94	3.8	0.024	0.070
SBA	16.12	35.91	0.3	12.54	39.29	3.3	8.25	27.36	2.4	0.002	0.294
BCG	33.93	59.97	0.2	42.73	69.17	3.3	38.16	34.12	–0.5	0.851	0.002
DPT3/Penta	29.41	37.47	0.2	23.87	29.81	0.7	21.75	5.44	–2.0	0.769	0.000
Measles	25.49	40.32	0.2	21.05	45.48	3.1	28.85	20.7	–1.0	0.044	0.010
ORT	27.24	49.29	0.2	40.25	53.91	1.7	7.52	74.87	8.4	0.111	0.000
Care seeking for ARI	47.49	56.84	0.1	40.45	63.98	2.9	54.1	56.1	0.3	0.008	0.555

TABLE 4C. Multivariable Adjusted % Point Change in Key RMNCH Interventions By Insecurity Status, 2010–2015

	Minimal		Moderate			Severe				Minimal vs. Moderate p-value	Minimal vs. Severe p-value
	MICS 2010	AHS 2015	2010– 2015	MICS 2010	AHS 2015	2010– 2015	MICS 2010	AHS 2015	2010– 2015		
	Adjusted %	Adjusted %	Average % Point Change	Adjusted %	Adjusted %	Average % Point Change	Adjusted %	Adjusted %	Average % Point Change		
Contraceptive Use	12.46	14.75	0.4	20.73	16.55	–0.7	27.69	19.42	–1.4	0.000	0.000
ANC	50.47	72.61	3.7	53.55	57.19	0.6	45.74	49.59	0.6	0.000	0.001
SBA	41.33	50.17	1.5	43.84	47.26	0.6	35.76	45.91	1.7	0.149	0.796
BCG	68.28	89.02	3.5	70.75	85.46	2.5	48.26	83.77	5.9	0.096	0.261
DPT3/Penta	39.55	81.11	6.9	35.55	74.4	6.5	9.09	76.94	11.3	0.415	0.000
Measles	52.35	79.91	4.6	46.4	74.27	4.6	33.37	71.63	6.4	0.779	0.342
ORT	40.15	44.41	0.7	53.17	47.94	–0.9	71.86	46.5	–4.2	0.101	0.000
Care seeking for ARI	40.46	64.31	4.0	62.3	75.94	2.3	51.19	69.22	3.0	0.118	0.651

TABLE 5A. Health Systems Composite Indicators by Insecurity Status, 2004–2010

Indicator	Survey	N	Minimal Insecurity Group	N	Moderate Insecurity Group	N	Severe Insecurity Group	Minimal vs. Moderate p-value	Minimal vs. Severe p-value
Domain A Client and Community	Mean% 2004	21	60.71(18.01)	8	65.98(6.86)	5	64.68(11.07)	0.690	0.862
	Mean% 2010	21	79.37(7.22)	8	79.48(6.59)	5	67.54(14.38)	0.999	0.021
	Mean Difference (SD)		18.66(15.36)		13.5(10.66)		2.86(8.34)	0.693	0.067
Domain B Human Resources	Mean% 2004	20	51.17(7.35)	8	52.86(8.3)	5	56.12(6.81)	0.853	0.397
	Mean% 2010	20	68.77(8.57)	8	73.73(7.08)	5	63.64(16.54)	0.354	0.698
	Mean Difference (SD)		17.6(9.99)		20.86(11.46)		7.52(15.29)	0.766	0.186
Domain C Physical Capacity	Mean% 2004	20	46.99(7.87)	8	48.1(6.28)	5	54.82(11.94)	0.944	0.154
	Mean% 2010	20	75.57(8.46)	8	74.18(4.98)	5	67.76(7.98)	0.902	0.123
	Mean Difference (SD)		29.33(9.89)		26.08(8.67)		12.94(6.18)	0.678	0.003
Domain D Quality of Service Provision	Mean% 2004	20	48.6(8.24)	8	38.76(8.4)	5	43.56(15.4)	0.050	0.549
	Mean% 2010	20	48.92(10.90)	8	49.69(8.84)	5	38(12.9)	0.966	0.136
	Mean Difference (SD)		0.32(13.41)		10.93(7.17)		-5.56(12.15)	0.107	0.598
Domain E Management Systems	Mean% 2004	20	64.97(13.1)	8	70.56(13.47)	5	49.6(29.21)	0.692	0.160
	Mean% 2010	20	78.98(12.97)	8	79.1(12.93)	5	65.16(22.71)	0.999	0.154
	Mean Difference (SD)		14.86(20.11)		8.54(24.19)		15.56(17.19)	0.749	0.998
Domain F Overall Mission	Mean% 2004	20	50.48(1.81)	8	49.63(2.15)	5	49.98(0.39)	0.494	0.842
	Mean% 2010	20	50.31(2.68)	8	50.69(3.52)	5	50.58(2.49)	0.948	0.981
	Mean Difference (SD)		-0.18(3.78)		1.06(3.69)		0.6(2.75)	0.698	0.905

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TABLE 5A. Health Systems Composite Indicators by Insecurity Status, 2004–2010 (*continued*)

Indicator	Survey	N	Minimal Insecurity Group	N	Moderate Insecurity Group	N	Severe Insecurity Group	Minimal vs. Moderate p-value	Minimal vs. Severe p-value
Overall Means (Provincial)	Mean% 2004	20	52.15(4.19)	8	51.38(3.42)	5	53.62(8.65)	0.925	0.819
	Mean% 2010	20	66.41(6.50)	8	67.89(4.15)	5	58.88(10.05)	0.856	0.074
	Mean Difference (SD)		14.9(6.54)		16.51(6.29)		5.26(4.57)	0.812	0.012

TABLE 5B. Health Systems Composite Indicators by Insecurity Status, 2011–2016

Indicator	Survey	N	Minimal Insecurity Group	N	Moderate Insecurity Group	N	Severe Insecurity Group	Minimal vs. Moderate p-value	Minimal vs. Severe p-value
Domain A Client and Community	Mean% 2011	7	78.96(4.55)	15	75.68(8.48)	11	76.29(13.71)	0.757	0.847
	Mean% 2016	7	79.16(6.35)	15	81.25(5.3)	11	79.58(9.45)	0.792	0.992
	Mean Difference (SD)		0.2(8.05)		5.23(7.83)		3.29(6.98)	0.331	0.681
Domain B Human Resources	Mean% 2011	7	50.47(6.8)	15	46.51(5.38)	11	52.54(6.28)	0.332	0.758
	Mean% 2016	7	57.97(4.64)	15	54.15(8.85)	11	56.85(6.22)	0.498	0.948
	Mean Difference (SD)		7.5(5.23)		7.06(9.41)		4.32(6.81)	0.992	0.685
Domain C Physical Capacity	Mean% 2011	7	33.59(2.75)	15	36.2(8.23)	11	41.35(9.12)	0.747	0.116
	Mean% 2016	7	76.56(4.93)	15	77.95(9.15)	11	77.61(8.58)	0.927	0.963
	Mean Difference (SD)		42.97(3.75)		41.37(11.83)		36.26(14.42)	0.952	0.472
Domain D Quality of Service Provision	Mean% 2011	7	46.33(7.69)	15	50.68(8.55)	11	51.2(8.12)	0.489	0.449
	Mean% 2016	7	58.99(9.21)	15	60.54(12.65)	11	60.17(9.09)	0.947	0.973
	Mean Difference (SD)		12.66(11.89)		9.46(14.17)		8.97(8)	0.830	0.801

TABLE 5B. Health Systems Composite Indicators by Insecurity Status, 2011–2016 (*continued*)

Indicator	Survey	N	Minimal Insecurity Group	N	Moderate Insecurity Group	N	Severe Insecurity Group	Minimal vs. Moderate p-value	Minimal vs. Severe p-value
Domain E Management Systems	Mean% 2011	7	42.33(3.9)	15	43.23(8.24)	11	53.95(18.23)	0.985	0.132
	Mean% 2016	7	51.13(14.53)	15	50.35(14.7)	11	54.68(13.35)	0.992	0.865
	Mean Difference (SD)		8.8(12.95)		5.53(8.12)		0.74(8.74)	0.733	0.200
Domain F Overall Mission	Mean% 2011	7	46.41(2.47)	15	48.15(3.53)	11	47.48(4.28)	0.553	0.816
	Mean% 2016	7	41.47(7.41)	15	42.6(11.3)	11	50.39(11.06)	0.969	0.200
	Mean Difference (SD)		−4.94(6.23)		−5.95(11.15)		2.91(11.27)	0.975	0.277
Overall Means (Provincial)	Mean% 2011	7	54.6(4.29)	15	54.55(4.9)	11	56.53(10.41)	0.999	0.843
	Mean% 2016	7	62.21(4.6)	15	62.38(7.19)	11	65.36(7.65)	0.998	0.620
	Mean Difference (SD)		7.61(4.71)		7.24(6.43)		8.84(13.7)	0.996	0.960

During 2011–2016, facilities in severe and moderate insecurity provinces achieved similar (unadjusted) improvements in health systems performance as did facilities in minimal insecurity provinces. Remarkably, improvements in health systems performance at severe and moderate facilities are statistically non-distinguishable ($p > 0.10$) from those at minimal insecurity facilities in the 2011–2016 period.

During 2004–2010, differences in health systems performance between higher and low insecurity provinces are minimal after adjusting for confounders. During 2004–2010, moderate and severe insecurity facilities made statistically significantly smaller improvements in functioning equipment ($p < 0.01$) after adjusting for key confounders (table 6; figure 13A). Moderate insecurity facilities also achieved smaller improvements ($p < 0.10$) in infrastructure relative to minimal insecurity facilities. However, the differences in improvement as compared to minimal insecurity facilities are very small (less than 3.3 percent points over 2004–2010). The main exception is pace of improvements in functioning equipment at severe insecurity facilities, which was 12.3 percentage points lower in severe insecurity facilities relative to minimal insecurity facilities ($p = 0.01$).

In 2011–2016 as well, differences in health systems performance between higher and lower insecurity provinces remain minimal after adjusting for confounders. Adjustments for confounders found that insecurity negatively impacted improvements in infrastructure, client assessment, and provider knowledge in severe and/or moderate insecurity facilities as compared to minimal insecurity

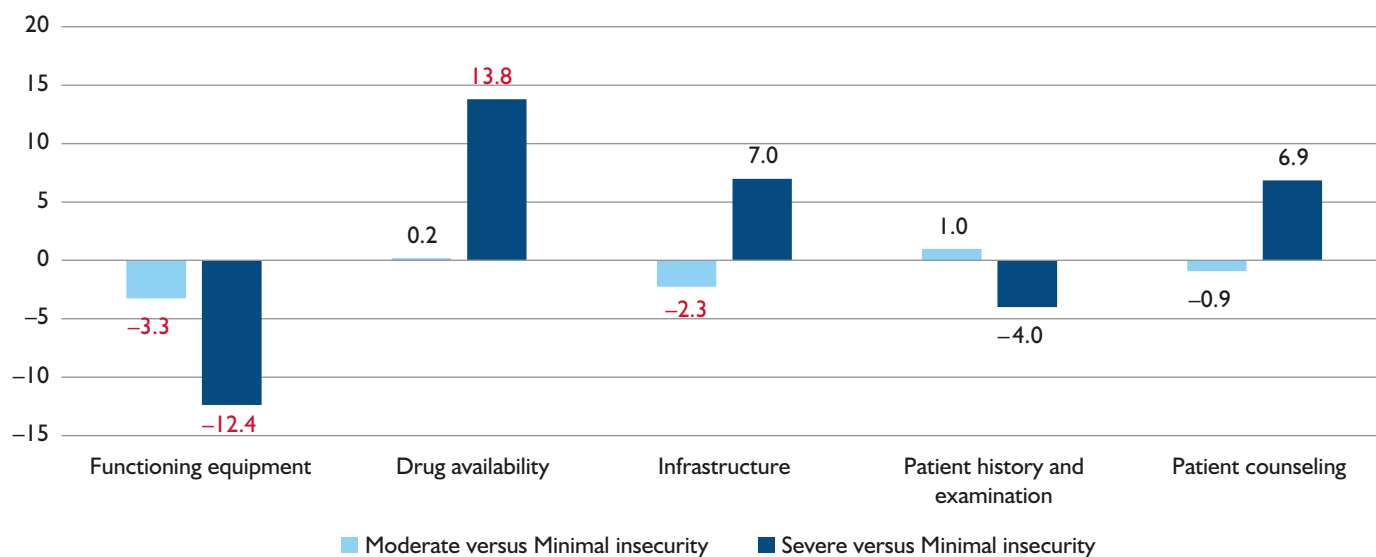
TABLE 6. Multivariable Adjusted Impact of Conflict on Change in Key Health Systems Indicators

Insecurity* time Interaction [Reference = Minimal]	2004–2010			2011–2016		
	Coef.	95% CI	p-value	Coef.	95% CI	p-value
Equipment functionality index: Moderate insecurity* time	–3.26	–5.07–1.45	<0.0001	1.7	0.61–2.7	0.002
Equipment functionality index: Severe insecurity* time	–12.37	–21.38–3.36	0.01	0.24	–1.22–1.6	0.750
Drug availability index: Moderate insecurity* time	0.18	–2.77–3.14	0.903	—	—	—
Drug availability index: Severe insecurity* time	13.81	–0.95–28.57	0.067	—	—	—
Pharmaceuticals and vaccines availability index: Moderate insecurity* time	—	—	—	3.12	1.96–4.2	<0.0001
Pharmaceuticals and vaccines availability index: Severe insecurity* time	—	—	—	0.6	–0.95–2.1	0.448
Infrastructure index: Moderate insecurity* time	–2.26	–4.75–0.24	0.077	—	—	—
Infrastructure index: Severe insecurity* time	6.99	–5.38–19.36	0.268	—	—	—
Functional infrastructure index: Moderate insecurity* time	—	—	—	–1.85	–3.64–0.07	0.042
Functional infrastructure index: Severe insecurity* time	—	—	—	–2.84	–5.21–0.46	0.019
Patient history and physical examination index: Moderate insecurity* time	0.98	–0.77–2.74	0.271	—	—	—
Patient history and physical examination index: Severe insecurity* time	–4.00	–12.79–4.79	0.372	—	—	—
Client background and physical assessment index: Moderate insecurity* time	—	—	—	–0.16	–1.27–0.95	0.779
Client background and physical assessment index: Severe insecurity* time	—	—	—	–2.75	–4.24–1.2	<0.0001
Patient counseling index: Moderate insecurity* time	–0.92	–3.44–1.60	0.474	—	—	—
Patient counseling index: Severe insecurity* time	6.85	–5.77–19.46	0.288	—	—	—
Client counseling index: Moderate insecurity* time	—	—	—	0.73	–1.04–2.4	0.420
Client counseling index: Severe insecurity* time	—	—	—	–1.28	–3.66–1.09	0.290
Female health worker index: Moderate insecurity* time	—	—	—	–0.19	–1.73–1.3	0.813
Female health worker index: Severe insecurity* time	—	—	—	1.6	–0.46–3.6	0.128
Provider knowledge score: Moderate insecurity* time	—	—	—	0.80	–0.23–1.81	0.127
Provider knowledge score: Severe insecurity* time	—	—	—	–1.84	–3.21–0.46	0.009

Note: *Models adjusted for the main effects of insecurity and time, and covariates including patient volume, facility type, geographic region, and contracting type; complete results in the appendix; (–) indicates unavailable indicators.

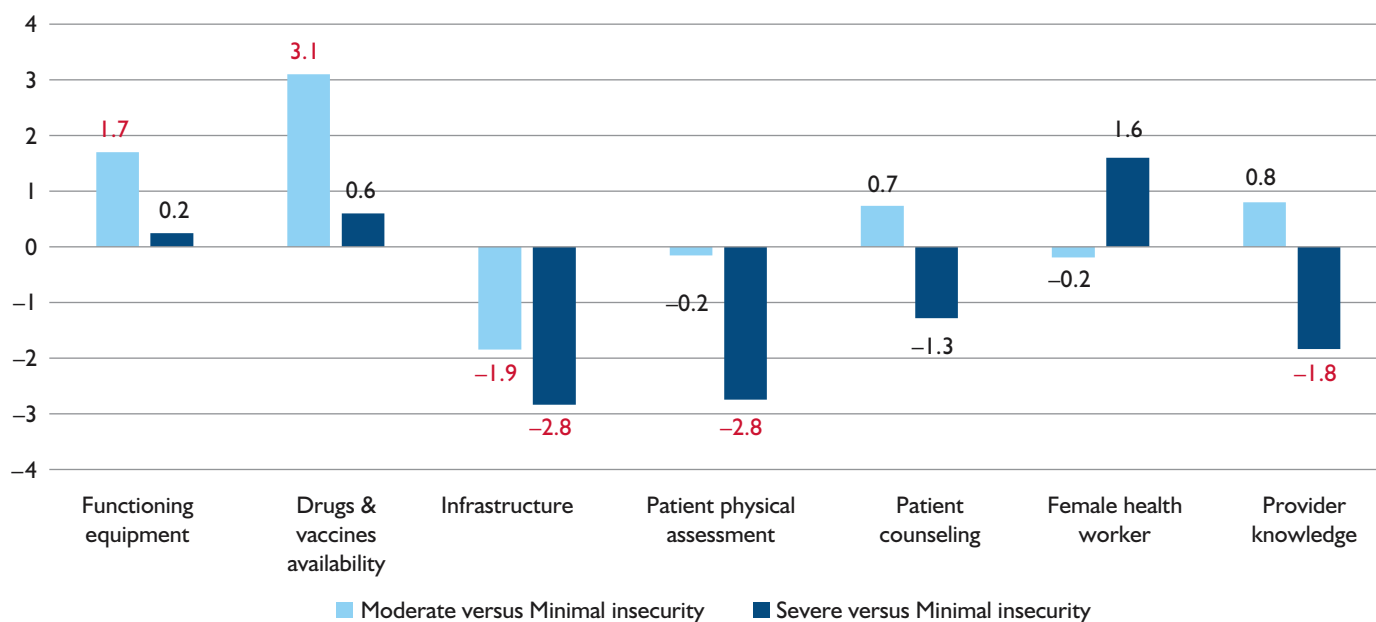
facilities during 2011–2016 (table 6; figure 13B). However, the pace of improvements in health systems performance was only slightly smaller in severe insecurity areas compared to minimal insecurity areas (between 1.8 and 2.8 percent points lower over 5 years). Severe insecurity facilities achieved statistically significantly greater improvements in functioning equipment ($p < 0.01$) and availability of drugs ($p < 0.01$) relative to minimal insecurity facilities, although the difference in improvements is relatively small. There were no statistically significant differences in improvements between severe, moderate, and minimal insecurity facilities on other health systems performance domains examined over 2011–2016. Crude boxplots, adjusted means, and complete regression models are included in appendix E.

FIGURE 13A. Annual percentage point change in health systems performance by severity of insecurity, 2004–2010
(Reference: Minimal insecurity)*



Note: *Red values indicate statistical significance at $p = 0.10$ or less. Model adjusted for the main effects of insecurity and time, and covariates including patient volume, facility type, geographic region, and contracting type. Positive numbers mean that provinces with severe or moderate insecurity achieved greater improvements than did provinces with minimal insecurity.

FIGURE 13B. Annual percentage point change in health systems performance indicators by severity of insecurity, 2011–2016
(Reference: Minimal insecurity)*



Note: *Red values indicate statistical significance at $p = 0.10$ or less. Model adjusted for the main effects of insecurity and time, and covariates including patient volume, facility type, geographic region, and contracting type. Positive numbers mean that provinces with severe or moderate insecurity achieved greater improvements than did provinces with minimal insecurity.

3.4 KEY SECTION CONCLUSIONS AND CONSIDERATIONS

Overall, service delivery has been resilient to insecurity. Improvements in service coverage, as well as health systems performance, are evident across the insecurity spectrum in unadjusted comparisons. After adjusting for key factors that might influence this finding, it is apparent that even in those instances where improvements over time have been smaller in higher insecurity facilities, the difference in pace of improvements is relatively small. Indicative findings from interviews and focus group discussions with key stakeholders indicate that insecurity resilience may be driven by specific NGO strategies that result in stronger links with local communities.

Implementers and policymakers in Afghanistan highlight the challenges posed by insecurity to delivering services effectively. Interviews and discussions with stakeholders conducted as a part of this study suggest that security has been a challenge, resulting in increased difficulty with identifying and retaining suitable human resource, supply management, coordination, and supervising and monitoring of health facilities. Evidence from other settings also underscores the devastating impact that insecurity has on service delivery. **In this context, relatively small differences in performance between higher and minimal insecurity facilities are an important achievement.**

This finding of insecurity resilience merits further investigation with health management information systems data. These conclusions are based on survey data. Survey teams may have been unable to access facilities in the most insecure areas. This could mean that the facilities eventually surveyed were better-performing relative to others in high insecurity areas, and thus could result in an underestimation of the impact of insecurity on health facility performance. Future survey strategies should clearly describe the sampling frames and geospatial distribution within provinces. **Exploring variations in performance between facilities using health management information system data could yield more granular insights into good practices with insecurity adaptation.**

IMPLICATIONS OF CONTRACTING TYPE FOR SERVICE COVERAGE AND HEALTH SYSTEMS PERFORMANCE

4.1 DIFFERENCES IN SERVICE COVERAGE

Differences in RMNCH interventions coverage by contracting mechanism are presented in tables 7A-7B, appendix F). At baseline (2003) before these contracting models were implemented, CO provinces had significantly higher coverage of ANC ($p = 0.002$), facility births ($p = 0.000$), SBA ($p = 0.001$) and DPT3 coverage ($p = 0.012$). In 2010, CI provinces had higher levels of ANC ($p = 0.002$) and lower coverage of ORT ($p = 0.029$). In 2015, CI provinces had significantly higher coverage in all interventions ($p < 0.05$) relative to CO provinces.

Unadjusted comparisons of changes in service coverage between 2003–2010 and 2010–2015 clearly indicate that CI provinces achieved greater absolute gains in coverage (i.e., mean differences between time points) for some RMNCH indicators ($p < 0.10$) than did CO provinces. During 2003–2010, CI provinces achieved greater increases in coverage than CO provinces on facility delivery and SBA ($p < 0.01$), and care seeking for ARI ($p < 0.10$). CO provinces accomplished greater increases than CI provinces on ANC coverage ($p < 0.01$). However, in 2010–2015, CI provinces achieved statistically significantly greater increases ($p < 0.10$) on most indicators than CO provinces (see table 7A–B).

This report explored the impact of contracting approach through multivariable analysis on change in contraceptive use, ANC, SBA, BCG, DPT3/Penta, measles vaccinations, care-seeking for ARI and ORT use for the 2003–2010 and 2010–2015 time periods. Model results, covariate-adjusted prevalence, and slopes over time are displayed in tables 8A–C and figures 14A–B and 15.

During 2003–2010, CO provinces made smaller improvement in ANC, SBA, and care seeking for ARI, but greater improvement in ORT coverage as compared to CI provinces after adjusting for confounders. However, the difference in improvements is small. Over 2003–2010, covariate-adjusted improvements in ANC, SBA, and care seeking for ARI were slower among CO provinces relative to CI (tables 8A and 8B): on average, coverage of these interventions in CO provinces increased only about 3.8%, 2.8%, and 1.6% points per year, while average gains in CI provinces were 5.9%, 4.4%, and 3.5% points per year, $p = 0.003, 0.007, 0.052$, respectively. ORT coverage, however, improved more rapidly in CO provinces during the same time period (3.0% vs 1.3% points, $p = 0.064$) (see tables 8A and 8B). However, the difference in the pace of improvements is small, with a maximum difference of 2.1 percentage points over 2003–2010.

TABLE 7A. RMNCH Interventions Coverage by Contracting Mechanism, 2003–2010

Indicator	Survey	N	Contracting IN	N	Contracting Out	Contracting In vs. Contracting Out p-value
Contraceptive any method	Mean% MICS 2003	1,064	7.7	19,898	10.4	0.158
	Mean% MICS 2010	1,175	18.2	16,899	17.5	0.752
	Mean Difference		10.5		7.1	0.159
Contraceptive any modern method	Mean% MICS 2003	1,061	6.0	19,874	8.6	0.111
	Mean% MICS 2010	1,175	16.5	16,899	16.1	0.840
	Mean Difference		10.5		7.4	0.130
ANC by skilled provider	Mean% MICS 2003	577	7.9	10,310	16.6	0.002
	Mean% MICS 2010	228	60.2	4,646	48.2	0.005
	Mean Difference		52.3		31.6	0.000
Facility delivery	Mean% MICS 2003	590	3.4	10,418	13.4	0.000
	Mean% MICS 2010	230	38.8	4,732	32.4	0.213
	Mean Difference		35.4		19.0	0.000
Skilled birth attendance	Mean% MICS 2003	587	5.4	10,428	14.9	0.001
	Mean% MICS 2010	230	44.3	4,732	38.2	0.197
	Mean Difference		38.8		23.3	0.000
BCG	Mean% MICS 2003	242	46.6	4,403	35.6	0.060
	Mean% MICS 2010	137	60.9	2,355	61.6	0.920
	Mean Difference		14.3		26.0	0.183
DPT3/PENTA3	Mean% MICS 2003	241	15.2	4,403	28.5	0.012
	Mean% MICS 2010	137	23.8	2,296	31.4	0.111
	Mean Difference		8.6		2.9	0.276
Measles	Mean% MICS 2003	243	27.7	4,409	24.3	0.571
	Mean% MICS 2010	136	42.2	2,338	40.2	0.786
	Mean Difference		14.5		15.9	0.832
Care seeking for ARI	Mean% MICS 2003	317	36.1	4,401	47.0	0.089
	Mean% MICS 2010	175	63.2	2,774	60.3	0.470
	Mean Difference		27.1		13.3	0.061
ORT	Mean% MICS 2003	509	27.3	7,227	29.8	0.567
	Mean% MICS 2010	217	41.0	3,223	54.1	0.029
	Mean Difference		13.7		24.3	0.202

TABLE 7B. RMNCH Interventions Coverage by Contracting Mechanism, 2010–2015

Indicator	Survey	N	Contracting IN	N	Contracting Out	Contracting IN vs. Contracting Out p-value
Contraceptive any method	Mean% MICS 2010	1,175	18.2	16,899	17.5	0.752
	Mean% AHS 2015	1,939	26.5	22,782	17.6	0.000
	Mean Difference		8.3		0.1	0.012
Contraceptive any modern method	Mean% MICS 2010	1,175	16.5	16,899	16.1	0.840
	Mean% AHS 2015	1,939	23.6	22,782	15.4	0.000
	Mean Difference		7.0		-0.7	0.011
ANC by skilled provider	Mean% MICS 2010	228	60.2	4,646	48.2	0.005
	Mean% AHS 2015	588	80.4	7,363	59.3	0.000
	Mean Difference		20.2		11.1	0.013
Facility delivery	Mean% MICS 2010	230	38.8	4,732	32.4	0.213
	Mean% AHS 2015	623	71.6	7,797	53.6	0.000
	Mean Difference		32.8		21.2	0.078
Skilled birth attendance	Mean% MICS 2010	230	44.3	4,732	38.2	0.197
	Mean% AHS 2015	640	69.4	8,041	50.3	0.000
	Mean Difference		25.2		12.2	0.025
BCG	Mean% MICS 2010	137	60.9	2,355	61.6	0.920
	Mean% AHS 2015	308	98.3	3,678	84.9	0.000
	Mean Difference		37.4		23.3	0.000
DPT3/PENTA3	Mean% MICS 2010	137	23.8	2,296	31.4	0.111
	Mean% AHS 2015	308	94.3	3,678	75.9	0.000
	Mean Difference		70.5		44.5	0.000
Fully immunized	Mean% MICS 2010	138	8.9	2,361	16.1	0.065
	Mean% AHS 2015	308	76.9	3,678	67.4	0.019
	Mean Difference		67.9		51.4	0.006
Measles	Mean% MICS 2010	136	42.2	2,338	40.2	0.786
	Mean% AHS 2015	308	82.1	3,678	74.1	0.028
	Mean Difference		39.9		33.9	0.301
Care seeking for ARI	Mean% MICS 2010	175	63.2	2,774	60.3	0.470
	Mean% AHS 2015	149	95.3	2,301	70.8	0.000
	Mean Difference		32.1		10.5	0.000
ORT	Mean% MICS 2010	217	41.0	3,223	54.1	0.029
	Mean% AHS 2015	217	74.8	3,350	45.9	0.000
	Mean Difference		33.8		-8.3	0.000

TABLE 8A. Multivariable Adjusted Impact of Contracting Mechanism on Change in Key RMNCH Interventions

Contracting type* time Interaction [Reference = contracting in]	MICS 2003- MICS 2010			MICS 2010- AHS 2015		
	Coef.	95% CI	p-value	Coef.	95% CI	p-value
Contraceptive Use	-0.32	(-0.87 0.23)	0.253	-0.52	(-0.9 -0.14)	0.008
ANC	-0.94	(-1.56 -0.33)	0.003	-0.43	(-0.85 -0.01)	0.045
SBA	-0.96	(-1.66 -0.27)	0.007	-0.46	(-0.95 0.02)	0.058
BCG	0.39	(-0.4 1.18)	0.334	-2.18	(-3.21 -1.14)	0.000
DPT3/Penta	-0.17	(-0.95 0.61)	0.664	-1.86	(-2.66 -1.05)	0.000
Measles	0.13	(-0.76 1.02)	0.777	-0.11	(-0.86 0.64)	0.776
ORT	0.61	(-0.04 1.26)	0.064	-1.74	(-2.37 -1.12)	0.000
Care seeking for ARI	-0.61	(-1.22 0.01)	0.052	-1.93	(-2.85 -1.01)	0.000

Note: *Models adjusted for the main effects of contracting type and time, and covariates including maternal illiteracy, insecurity, and rurality of residence; complete results in the appendix.

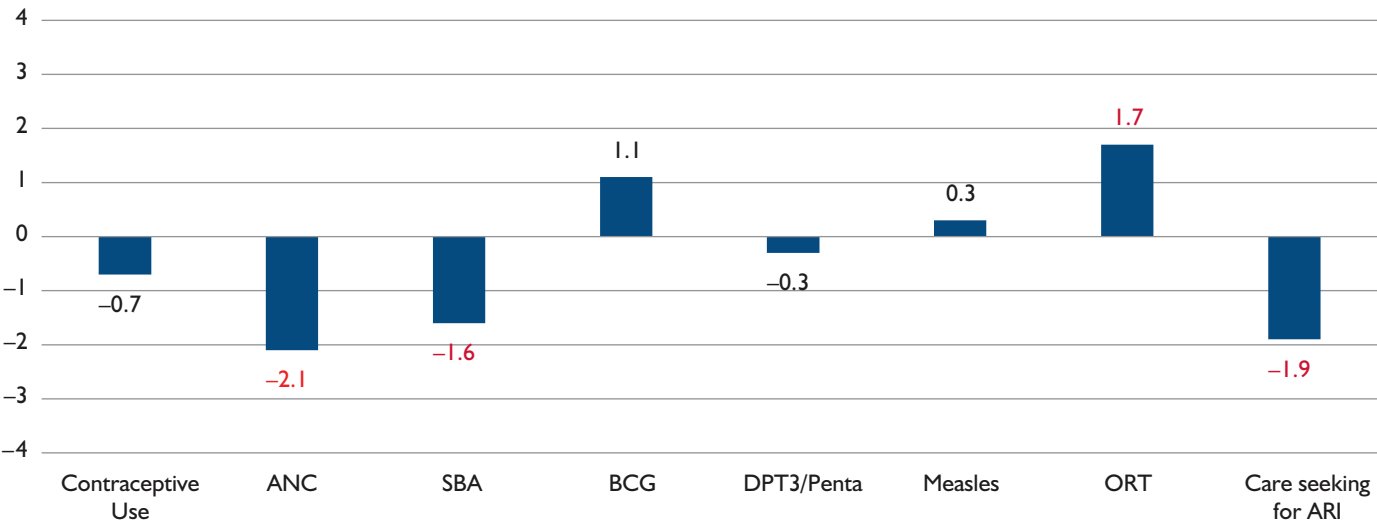
TABLE 8B. Multivariable Adjusted % Point Change in Key RMNCH Interventions by Contracting Group, 2003–2010

	Contracting IN			Contracting OUT			p-value for interaction term
	MICS 2003	MICS 2010	2003–2010	MICS 2003	MICS 2010	2003–2010	
	Adjusted %	Adjusted %	Average % Point Change	Adjusted %	Adjusted %	Average % Point Change	
Contraceptive Use	10.81	22.41	1.5	10.47	17.04	0.8	0.253
ANC	13.56	60.95	5.9	16.93	47.28	3.8	0.003
SBA	9.89	44.94	4.4	15.14	37.35	2.8	0.007
BCG	45.09	60.79	2.0	35.64	60.11	3.1	0.334
DPT3/Penta	19.88	25.99	0.8	28.28	32.32	0.5	0.664
Measles	24.6	40.33	2.0	24.49	43.18	2.3	0.777
ORT	32.63	43.23	1.3	28.87	53.19	3.0	0.064
Care seeking for ARI	36.75	64.37	3.5	47.16	60.19	1.6	0.052

TABLE 8C. Multivariable Adjusted % Point Change in Key RMNCH Interventions by Contracting Group, 2010–2015

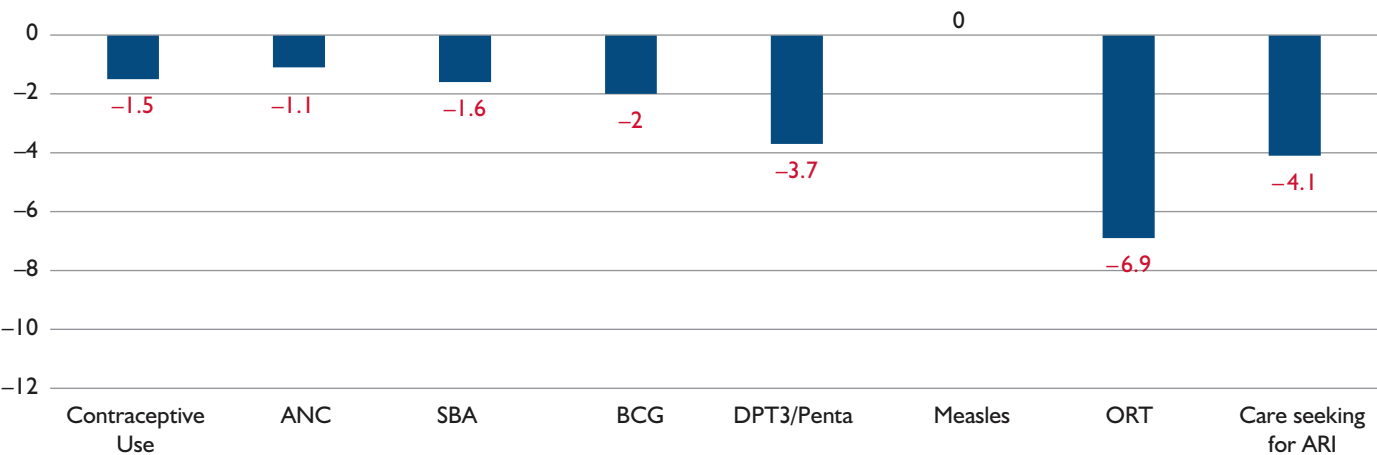
	Contracting IN			Contracting OUT			P-value for interaction term
	MICS 2010	AHS 2015	2010–2015	MICS 2010	AHS 2015	2010–2015	
	Adjusted %	Adjusted %	Average % Point Change	Adjusted %	Adjusted %	Average % Point Change	
Contraceptive Use	24.33	30.89	1.1	18.58	16.03	-0.4	0.008
ANC	64.85	79.14	2.4	49.93	57.5	1.3	0.045
SBA	55.38	70.26	2.5	41.4	46.61	0.9	0.058
BCG	67.66	98.09	5.1	66.15	84.96	3.1	0.000
DPT3/Penta	31.18	94.17	10.5	34.93	75.88	6.8	0.000
Measles	52.06	81.21	4.9	44.74	74.12	4.9	0.776
ORT	35.46	71.67	6.0	51.07	45.95	-0.9	0.000
Care seeking for ARI	53.23	93.67	6.7	55.61	70.99	2.6	0.000

FIGURE 14A. Annual percentage point difference in service coverage by type of contracting, 2003–2010 (Reference: Contracting-In)*



Note: *Red values indicate statistical significance at $p = 0.10$ or less. Model adjusted for the main effects of contracting type and time, and covariates including maternal illiteracy, insecurity, and rurality of residence. Positive numbers mean the CO provinces achieved greater improvements than did CI provinces.

FIGURE 14B. Annual percentage point difference in service coverage by type of contracting, 2010–2015 (Reference: Contracting-In)*



Note: *Red values indicate statistical significance at $p = 0.10$ or less. Model adjusted for the main effects of contracting type and time, and covariates including maternal illiteracy, insecurity, and rurality of residence. Positive numbers mean the CO provinces achieved greater improvements than did CI provinces.

FIGURE 15. Multivariable adjusted means of key RMNCH interventions by contracting type

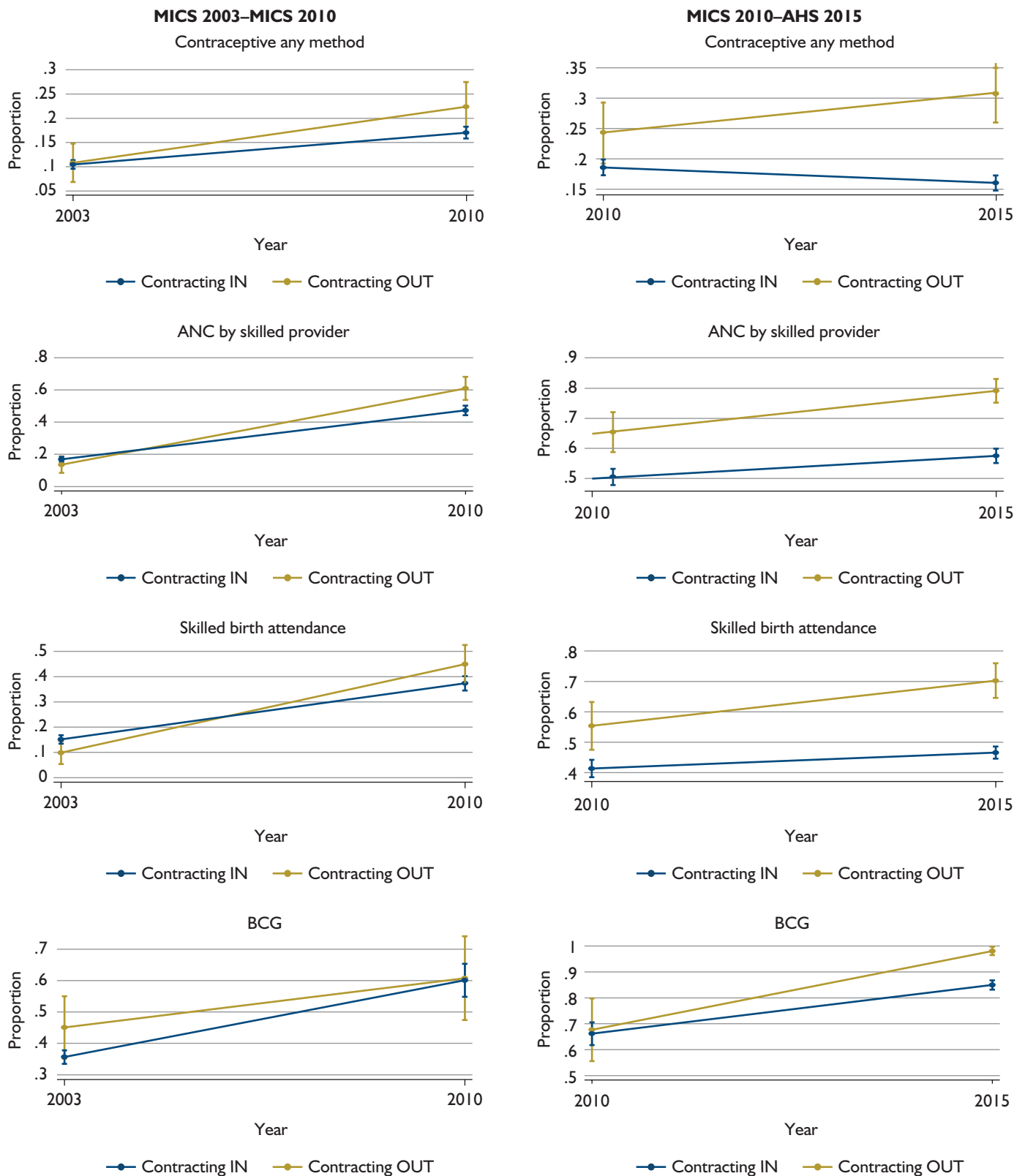
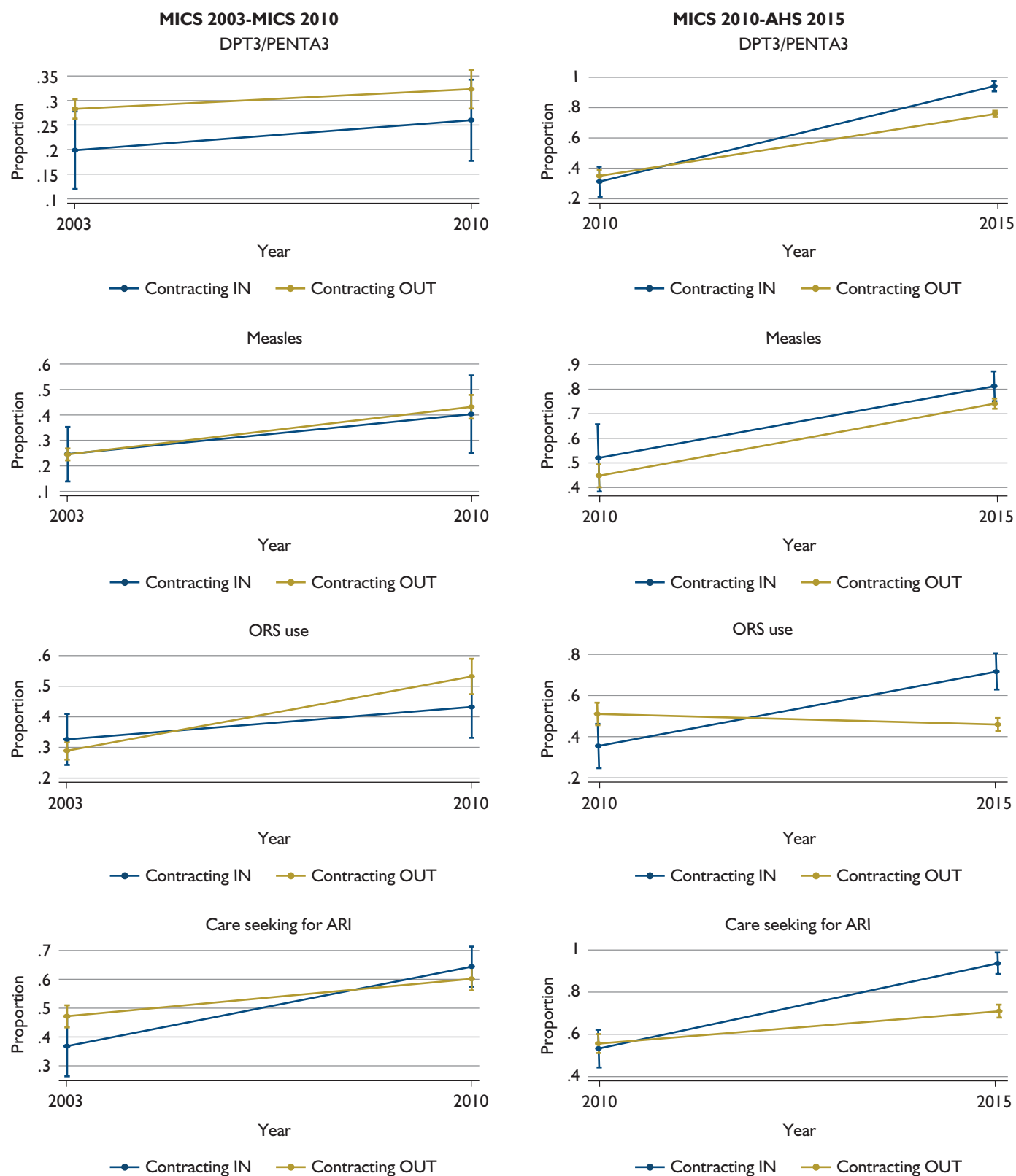


FIGURE 15. Multivariable adjusted means of key RMNCH interventions by contracting type (*continued*)



CO provinces made smaller improvements than did CI provinces on many service coverage indicators between 2010 and 2015 after adjusting for confounders; however, the difference in improvements is small with the exception of ORT. From 2010 to 2015, coverage gains were significantly higher in CI provinces for almost all indicators assessed ($p < 0.05$) (see figure 14B, tables 8A and 8C). Respectively for CI versus CO provinces, greatest improvements were observed for BCG (average increase 5.1% vs 3.1% points, $p = 0.000$), DPT3/Penta (10.5% vs 6.8% points, $p = 0.000$), ORT (6.0% vs -0.9% points, $p = 0.000$) and care seeking for ARI (6.7% vs 2.6% points, $p = 0.000$) (see table 9C). However, the difference in improvements is small. There is one exception: annual increases in ORT use were 6.9 percent points lower in CO provinces than in CI provinces over 2010–2015. Crude boxplots and complete regression models are included in appendix F.

4.2 DIFFERENCES IN HEALTH FACILITY PERFORMANCE INDICATORS

Unadjusted comparisons indicate that CI and CO facilities find no significant differences in health facility performance over the 2004–2010 period. Health systems performance broad domains were comparable between CO and CI provinces, 2004–2010 (table 9A, $p > 0.10$).

By contrast, unadjusted comparisons between 2011–2016 find that CO facilities achieved greater improvements relative to CI facilities on the client and community domain. In fact, CI regressed in this period, while CO made improvements in this domain (table 9B). The pace of improvements in client and community performance was about 9.2 percent points higher in CO facilities than in CI facilities over 2011–2016 ($p < 0.05$).

Adjusted comparisons of improvements over time in health systems domains in the CO and CI models find greater improvements in CI facilities relative to CO facilities in 2004–2010. Table 10 and figure 16A present the impact of contracting type on health systems performance indicators for 2004–2010. After adjusting for covariates, CO facilities achieved greater improvements from 2004–2010 in the patient counseling index ($\beta = 3.1$, $p = 0.001$) relative to CI facilities, but smaller improvements in drug availability ($\beta = -2.47$, $p = 0.024$). **However, the difference in pace of improvements between CO and CI facilities is relatively small, with a maximum difference of 3 percentage points over 2004–2010.**

Over 2011–2016, however, CO facilities achieved greater improvements over time relative to CI comparators in adjusted comparisons. From 2011 to 2016, however, CO facilities achieved greater improvements than CI facilities on several indicators, including equipment functionality ($p = 0.009$), the availability of pharmaceuticals and vaccines ($p < 0.0001$), appropriate client background and physical assessment ($p = 0.07$), and client counseling ($p = 0.03$). Table 10 and figure 16B have more details. Covariate-adjusted mean plots for each indicator over time are included in appendix G. **However, the difference in rate of improvement over time is relatively small with the exception of improvements in drug availability, which were 8.4 percentage points higher per year in CO facilities than in CI facilities.**

Crude boxplots and complete regression models are included in appendix G.

TABLE 9A. Composite Health Systems Indicators by Contracting Type, 2004–2010

Indicator	Survey	N	Contracting In Group	N	Contracting Out Group	Contracting In vs. Contracting Out p-value
Domain A Client and Community	Mean% 2004	3	66.92(21.19)	30	62.11 (14.76)	0.605
	Mean% 2010	3	81.99(9.52)	31	77.23 (9.19)	0.399
	Mean Difference (SD)		15.07(16.33)		15.12 (14.49)	0.995
Domain B Human Resources	Mean% 2004	3	50.14(7.12)	30	52.55(7.6)	0.602
	Mean% 2010	3	69.59(8.04)	31	68.47(10.75)	0.863
	Mean Difference (SD)		19.45(1.04)		16.6(12.17)	0.691
Domain C Physical Capacity	Mean% 2004	3	43.57(8.34)	30	48.94(8.42)	0.300
	Mean% 2010	3	73.05(4.91)	31	74.2(8.27)	0.816
	Mean Difference (SD)		29.48(13.21)		25.71(10.55)	0.568
Domain D Quality of Service Provision	Mean% 2004	3	55.29(12.81)	30	44.45(9.57)	0.078
	Mean% 2010	3	53.43(8.35)	31	46.67(11.32)	0.323
	Mean Difference (SD)		−1.86(19.77)		2.39(12.48)	0.568
Domain E Management Systems	Mean% 2004	3	70.87(21.96)	30	63.31(16.84)	0.474
	Mean% 2010	3	82.73(16.77)	31	76.42(15)	0.495
	Mean Difference (SD)		11.87(30.32)		13.59(19.8)	0.891
Domain F Overall Mission	Mean% 2004	3	51.1(1.01)	30	50.08(1.81)	0.346
	Mean% 2010	3	48.17(1.96)	31	50.63(2.78)	0.145
	Mean Difference (SD)		−2.93(1.26)		0.56(3.56)	0.103
Overall Means (Provincial)	Mean% 2004	3	53.3(1.85)	30	52.07(4.98)	0.678
	Mean% 2010	3	67.6(6.36)	31	65.47(7.21)	0.626
	Mean Difference (SD)		14.3(6.35)		13.78(7.29)	0.907

4.3 KEY SECTION CONCLUSIONS AND CONSIDERATIONS

Policy conclusions on the relative performance of CO and CI must take on board the fact that CI provinces are much closer to the capital city and smaller than are most CO provinces. This makes CI facilities easier to staff, supply, and manage on average than CO facilities, and therefore easier to improve coverage in these provinces, as well. **The analysis methods cannot control for these systematic advantages which are likely to bias findings in favor of CI provinces.**

Despite this, it is clear that CO and CI approach have delivered similar results with the exception of the availability of drugs and vaccines. Although there are some differences in which contracting type delivers greater improvements in service coverage and health systems performance, these differences are relatively small for almost all health systems performance domains.

Substantially greater improvements in pharmaceutical and vaccine availability in CO facilities points to the importance of continuing decentralized procurement and supply chains. This

TABLE 9B: Composite Health Systems Indicators by Contracting Type, 2011–2016

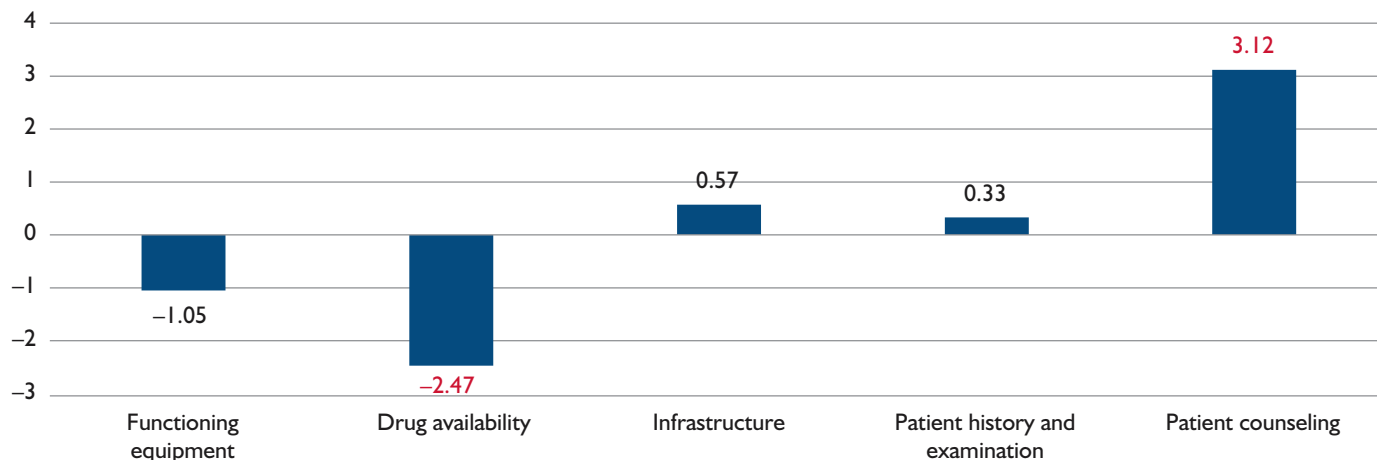
Indicator	Survey	N	Contracting In Group		Contracting Out Group	Contracting In vs. Contracting Out p-value
Domain A Client and Community	Mean% 2011	3	79.67(2.09)	30	76.25(10.21)	0.572
	Mean% 2016	3	74.83(3.68)	31	80.81(6.99)	0.158
	Mean Difference (SD)		–4.83(2.08)		4.37(7.47)	0.044
Domain B Human Resources	Mean% 2011	3	53.69(1.94)	30	48.91(6.57)	0.225
	Mean% 2016	3	53.33(6.27)	31	56.04(7.49)	0.550
	Mean Difference (SD)		–0.36(4.33)		6.91(7.77)	0.124
Domain C Physical Capacity	Mean% 2011	3	32.83(2.42)	30	37.79(8.4)	0.322
	Mean% 2016	3	71.18(2.41)	31	78.18(8.17)	0.154
	Mean Difference (SD)		38.35(2.92)		40.2(12.24)	0.799
Domain D Quality of Service Provision	Mean% 2011	3	50.55(11.03)	30	49.85(8.11)	0.890
	Mean% 2016	3	53.1(13.73)	31	60.78(10.34)	0.239
	Mean Difference (SD)		2.55(24.16)		10.73(10.19)	0.253
Domain E Management Systems	Mean% 2011	3	42.24(3.55)	30	47.05(13.35)	0.544
	Mean% 2016	3	40.08(7.46)	31	53.06(13.98)	0.126
	Mean Difference (SD)		–2.17(5.77)		5.3(9.79)	0.207
Domain F Overall Mission	Mean% 2011	3	47.65(0.05)	30	47.52(3.76)	0.954
	Mean% 2016	3	36.1(8.23)	31	45.72(10.83)	0.146
	Mean Difference (SD)		–11.55(8.28)		–1.9(10.81)	0.145
Overall Means (Provincial)	Mean% 2011	3	56.1(1.49)	30	55.13(7.31)	0.822
	Mean% 2016	3	56.73(3.57)	31	63.95(6.81)	0.082
	Mean Difference (SD)		0.63(5.06)		8.58(9.08)	0.149

TABLE 10: Multivariable Adjusted Impact of Contracting Mechanism on Change in Key Health Systems Indicators

Contracting Type* Time Interaction [Reference = Contracting In]	2004–2010			2011–2016		
	Coef.	95% CI	p-value	Coef.	95% CI	p-value
Equipment functionality index	–1.05	–2.36–0.25	0.114	2.15	0.53–3.77	0.009
Drug availability index	–2.47	–4.62–0.32	0.024	—	—	—
Pharmaceuticals and vaccines availability index	—	—	—	8.39	6.68–10.10	<0.0001
Infrastructure index	0.57	–1.20–2.35	0.526	—	—	—
Functional infrastructure index	—	—	—	0.82	–1.79–3.42	0.538
Patient history and physical examination index	0.33	–0.98–1.65	0.622	—	—	—
Client background and physical assessment index	—	—	—	1.55	–0.13–3.24	0.071
Patient counseling index	3.12	1.25–4.99	0.001	—	—	—
Client counseling index	—	—	—	2.97	0.27–5.66	0.031
Female health worker index	—	—	—	–0.16	–2.43–2.12	0.894
Provider knowledge score	—	—	—	–0.53	–2.09–1.03	0.504

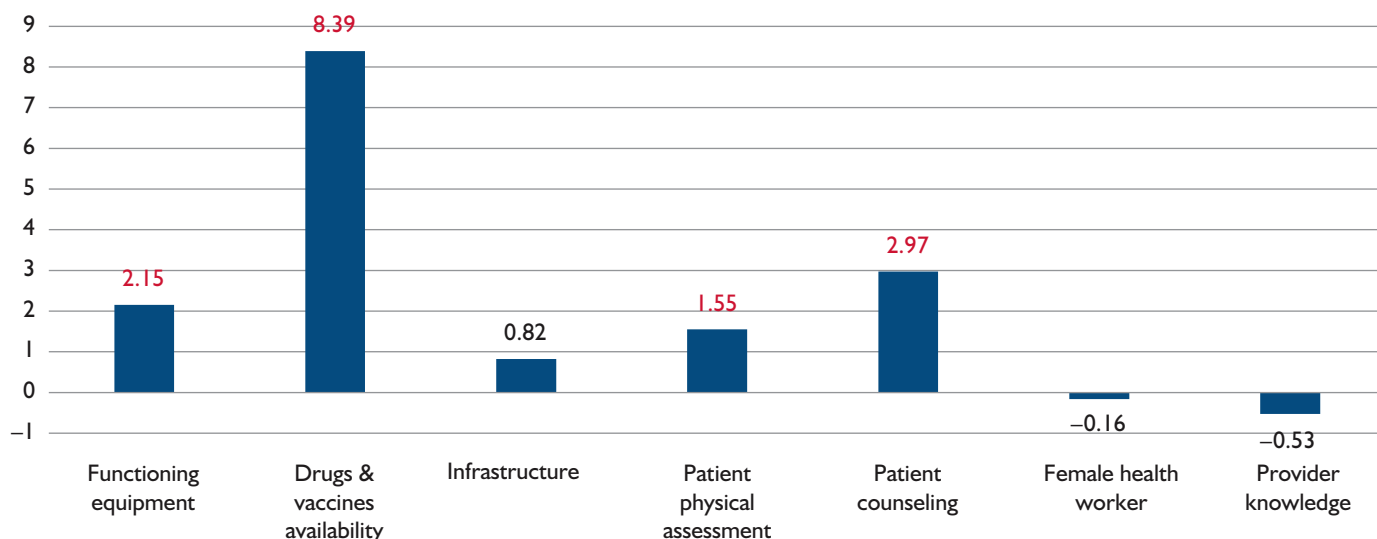
Note: *Models adjusted for the main effects of contracting type and time, and covariates including patient volume, facility type, distance of facility from province centre, geographic region, and insecurity; complete results in the appendix. (–) indicates unavailable indicators.

FIGURE 16A: Annual percentage point difference in health systems performance by type of contracting, 2004–2010
(Reference: Contracting-In) *



Note: *Red values indicate statistical significance at $p = 0.10$ or less. Model adjusted for the main effects of contracting type and time, and covariates including patient volume, facility type, distance of facility from province center, geographic region, and insecurity. Positive numbers mean the CO facilities achieved greater improvements than did CI facilities.

FIGURE 16B. Average percentage point difference in health systems performance by type of contracting, 2011–2016
(Reference: Contracting-In) *



Note: *Red values indicate statistical significance at $p = 0.10$ or less. Model adjusted for the main effects of contracting type and time, and covariates including patient volume, facility type, distance of facility from province center, geographic region, and insecurity. Positive numbers mean the CO facilities achieved greater improvements than CI facilities.

is particularly striking since CO provinces are more remote and greater than the CI provinces, implying that it may be more difficult to keep them adequately supplied. The current system of decentralized procurement and supply chains appears to be functioning better, and these findings therefore suggest that it should be continued. Future supply chain and commodities assessments should also include information on batch numbers and expiration dates to assess utilization. At the same time, there is a need to oversee drug quality through drug quality surveys and other approaches that independently assess whether drugs actually available at service delivery points meet quality standards.

PART III

DISCUSSION AND
CONCLUSIONS

Afghanistan has made noteworthy gains towards improving maternal and child health and the country has made considerable progress towards achieving the Millennium Development Goals for maternal and child health (MDGs 4 and 5). Service coverage of key reproductive maternal neonatal and child health interventions increased between 2003 and 2015 across the country, with no indications of a slowdown in the 2010–2015 period, despite the increase in insecurity.

Health systems performance continued to improve considerably at the national level during 2004–2016. From 2011–2016 improvements largely continued, but at a slower pace and with the exception of physical capacity to deliver high quality care, which has continued to register substantial improvements.

These trends are mirrored at the provincial level. While some differences are evident by individual indicators, there were overall increases in service coverage as assessed by the composite coverage index² in nearly all provinces over 2003–2015, except for Nimroz and Nuristan during the years 2003–2010 and Khost and Zabul over 2010–2015. Similarly, all provinces (except Zabul) made progress on health systems domains over 2004–2010, while all provinces (except Kapisa, Kunar, and Badghis) achieved health systems improvements over 2011–2016.

Improvements achieved in health outcomes and service coverage compare very favorably with improvements achieved by comparators. Afghanistan has achieved greater improvements in key maternal and child health outcomes and service coverage than regional comparators. Improvements over time have also exceeded the global median for countries that started off at the same baseline levels as Afghanistan during 2003–04 (Akseer and others 2016; Arur and others 2011). **Nevertheless, in absolute terms, there is considerable room for progress which will be needed to achieve the SDG health targets.**

Escalating insecurity is one of the main challenges to improving health outcomes in Afghanistan. Insecurity has large direct and indirect adverse impacts on health and well-being. Escalations

²This overall assessment of coverage was based on improvements in the composite coverage index which is a widely used measure calculated as the weighted mean of eight essential interventions spanning the continuum of care, including both preventive and curative care.

in armed conflict increase health needs, while also weakening health systems and service delivery. Analyses of battle-related deaths using data from the Uppsala Conflict Data Program, a gold standard in international analyses of insecurity, finds a substantial increase in insecurity after 2010, particularly in the South, East, and North Eastern regions.

Service delivery has been generally resilient to insecurity. The report finds that health service delivery has been resilient to insecurity with a few exceptions. Service coverage increases over time have been smaller in severe or moderate insecurity provinces than in minimal insecurity provinces. However, improvements in coverage are apparent across the insecurity spectrum. Furthermore, after adjusting for confounders that could influence the relationship between insecurity and RMNCH service coverage, we find that the difference in the pace of improvements between higher and minimal insecurity provinces is relatively small. Similarly, health systems performance improvements are also evident across the insecurity spectrum, and differences in the pace of health systems performance improvement between high and low security provinces were minimal, as well.

Stronger links between service providers and NGOs with local communities may have been a key contributor to insecurity resilience. CO provinces experienced higher levels of insecurity than did CI provinces with two of three CI provinces falling in the minimal intensity insecurity category during both time periods; and the third province moving from minimal to moderate intensity insecurity during the 2010–2015. Interviews and discussions with stakeholders as a part of this study point to specific NGO strategies, notably links with local communities, as a potential drivers of insecurity resilience, as links with local communities and stakeholders were identified as key potential drivers of insecurity resilience in service delivery in the health services study, where NGOs recruit staff from local communities and build relationships with local powerbrokers. Such strategies enable NGOs to maintain service delivery in difficult contexts where there might be few alternative sources of medical services. Going forward, there may be benefits to embedding services closer to communities by strengthening ties with and accountability to local communities.

Recent studies have also highlighted other potential explanatory factors for the resilience of service delivery in insecure settings. In particular two recent World Bank studies are relevant in this regard. The study, “Critical Administrative Constraints to Service Delivery: Improving Public Services in Afghanistan’s Transformational Decade” (2014), suggests that the contracting approach has enabled the health sector to bypass some of the administrative and political economy bottlenecks that have stymied other sectors (though the study also points out that this may be at the cost of political buy-in). The more recent study, “Social Service Delivery in Violent Contexts: Achieving Results against the Odds” (2017), argues that it is crucially the nature of the elite bargaining at sub-national level that facilitates sustained service delivery.

This finding of insecurity resilience merits further exploration with health management information systems data. Health service coverage and health systems performance data in this report are sourced from household and health facility surveys. Every type of data source has its own drawbacks and, in this case, a key concern could be that survey teams may not have been able to access the worst affected facilities. Health management information system data in Afghanistan are considered to be relatively complete and of good quality. It may therefore be worth exploiting these data further to explore these relationships prospectively, not only to confirm findings of resilience, but also to gain more granular insights into good practices to adapt to levels of insecurity. Yet, absolute levels of coverage are low for

many health services, and there is a need to continue to build on the improvements that have so far been achieved.

The location and size of CI provinces gives them systematic advantages over CO provinces for which the analysis cannot control. Findings from the contracting model comparisons must take on board an important caveat. CI provinces are much closer to Kabul and smaller than most CO provinces. This makes CI facilities easier to staff, supply and manage on average than CO facilities and therefore to improve coverage in these provinces as well. The analysis methods cannot control for these systematic advantages which are likely to bias findings in favor of CI provinces.

CO and CI provinces achieve similar improvements in service coverage, with some exceptions. Both CO and CI provinces achieved improvement in maternal and child health coverage in 2003–2010, as well as over 2010–2015 and with a few exceptions. Unadjusted comparisons of *relative* improvements in maternal and child health coverage over time find that CI provinces made greater gains in coverage in both 2003–2010 and 2010–2015 compared to CO provinces. After adjusting for confounders, CI provinces still achieved statistically significantly greater improvements on most service coverage indicators relative to CO provinces in both 2003–2010 and 2010–2015. However, the absolute difference in the pace of improvements achieved by the two approaches is not very large. Improvements in ORT use is a noteworthy exception to this: the rate of increase in ORT use were 6.9 percent points lower in CO provinces over 2010–2015 than in CI provinces.

The two contracting approaches also deliver similar results in terms of improvements in health systems performance, except in the case of drug availability where CO facilities showed much greater improvements in 2011–2016. Adjusted comparisons of improvements over time show that CO facilities achieved similar or greater improvements in health systems performance in 2004–2010 with the exception of drug availability. By contrast, in 2011–2016, CO facilities achieved greater improvements over time relative to CI comparators on several indicators including functioning equipment, availability of drugs and vaccines, client physical assessment and client counseling. The availability of drugs increased to a far greater extent in CO facilities than in CI facilities over this period. Even after controlling for confounders, the pace of improvements in drug availability were 8.4 percent points higher in CO facilities than in CI facilities over 2010–2015.

The CO approach has clearly performed well in high and escalating conflict settings, and NGOs' ability to respond quickly and with flexibility may explain good CO model performance. Since CI provinces are largely more secure than CO provinces no evidence is currently available on the insecurity resilience of the CI model in high insecurity settings. The CO approach may have intrinsic benefits that explain these findings, notably via nimble recruitment, greater mobility, timely salary payments and flexibility with staff pay and flexible/ decentralized procurement. **In addition, NGOs may be better able to access and deliver services in more insecure areas.**

International reviews of CO on the use of health services also find that the CO approach is effective in low- and middle-income countries, particularly in under-served areas and post-insecurity settings. A recent systematic Cochrane (2009) review of the impact of CO in low- and middle-income countries (Lagarde and others 2009) finds that CO is an effective option particularly in settings where governments may have difficulties reaching populations. A literature review focused on contracting for primary care and nutrition services with broader inclusion criteria (Loevinsohn and others 2005) also concludes that contracting approaches whether contracting of service delivery

(or CO) or management contracting (or CI) have achieved impressive and rapid results in terms of scaling up service delivery.

Other studies in Afghanistan also point to the contribution of contracting approaches in improving coverage and equity. Arur and others (2010) found that both contracting-in and contracting-out approaches were associated with substantial increases in service use from 2004 to 2005 compared with non-contracted facilities, which was about 29% for outpatient visits ($p < 0.01$), and up to 41% ($p < 0.01$) for female patients, 68% for the poorest quintile ($p < 0.01$) and 27% for children aged under 5 years ($p < 0.05$). Contracting may also have the potential to reduce inequalities. Alonge and others (2015) studied levels of inequity in access between the poor and non-poor in Afghanistan. The adjusted odds of a poor client attending a health facility over time increased significantly for facilities that were contracted out, with odds ratio of 2.00 and 2.82 respectively (p-value 0.001).

Evidence points to the importance of a focus on provider autonomy and results, not inputs, in delivering better results, including improvements in equity. Similar to other research findings from Afghanistan (Arur 2008), the Loevinsohn and others (2005) review finds that successful approaches tend to maximize provider autonomy, and highlights that a focus on outputs and outcomes, rather than inputs tends to lead to better results. Both the Cochrane (2009) review and Loevinsohn review, discussed here, underscore the importance of robust evaluation and results monitoring.

In light of these findings, it is important to shift back to true lump sum budgets for contracted NGOs. The current contracts given to NGOs are lump-sum, but, in actual fact, NGOs say they have to seek permission from the MOPH to transfer funds between line items, which is a cumbersome and time-consuming process. This is troubling given the known benefits of provider autonomy in delivering good results, assuming that providers are held accountable for their performance, as is the case with current contracting models in Afghanistan.

Substantially greater improvements in pharmaceutical and vaccine availability in CO facilities point to the importance of continuing decentralized procurement and supply chains. At the same time, there is a need to oversee drug quality through drug quality surveys and other approaches that independently assess whether drugs actually available at service delivery points meet quality standards.

The Way Forward

The health sector has shown itself to be innovative and dynamic with the ability to make a major contribution to overall development objectives. The ministry has achieved success on a number of fronts:

- i. A regulatory framework has been established to engage the non-state sector in service delivery;
- ii. Regular data collection is implemented in over 2,000 facilities. The use of third party monitors for data collection can give life to the accountability function of the Citizens Charter;
- iii. Health campaigns, such as polio eradication and ending preventable maternal and newborn deaths, have been promoted and Community Development Centers (CDCs) that are empowered to play a leading role in improving development of their communities; and

- iv. Donor funding has been aligned to employ, train, and supervise more than 2,000 nutrition female counsellors predominantly in rural areas: this is also an example of the sector's potential to contribute to creating quality jobs for women in rural areas, whilst strengthening the health system.

While the track record of improvements in the health sector is heartening, there is a need to build on these improvements. Despite the improvements observed over time, absolute levels of coverage for maternal and child health services are low and health systems performance is no longer improving at the same pace. Given the pace of acceleration needed to reach the SDG targets for health, greater focus is needed on quality and scale of care to reach marginalized and remote populations.

Opportunities exist to improve the performance of both contracting-out and contracting-in models

Previous research in Afghanistan points to the importance of three key factors in delivering results: robust and independent results monitoring; provider autonomy; and performance incentives. Previous differences among contracting-out models implemented with World Bank, European Union, and United States Agency for International Development (USAID) funding in Afghanistan offer critical insights into the elements within contracting-out models that have driven results. Prior research into the impact of contracting-out on service utilization and quality using health facility survey data indicates that robust and independent monitoring, coupled with high degree of provider autonomy and credible links between payments to NGOs and performance, delivered the best results (Arur 2008). By contrast, additional resources without these elements failed to deliver greater improvements than in areas without any additional interventions.

Effective purchasing of health services is key: this involves a greater focus on outputs and outcomes. In general, effective purchasing of health services is more critical to delivering better health results and improving value from health spending than are concerns of public versus private ownership of health service providers. In fact, many high performing health systems have largely private service provision or a mix of public and private provision with public financing (see, for example, The Commonwealth Fund's 2015 report on international profiles of health care systems). The fundamental building block for this is the availability of good performance data and purchaser capacity to use these data to better oversee provider performance.

The Afghanistan health sector generates a wealth of data: these could be better used to drive performance improvements. The health sector in Afghanistan generates a wealth of data, including third party evaluation survey data and data generated by routine reporting systems. These could be used more extensively by the MOPH and Provincial Health Departments to actively drive improvements in performance in both CO and CI areas. There is also potential to expand the role of Provincial Health Departments to provide technical support for improved service delivery and decision-making, rather than their current more limited focus on coordination and monitoring. In addition, the involvement of MOPH technical departments in monitoring service delivery could be strengthened.

Strengthening citizen accountability and monitoring could improve both CO and CI performance. Findings on health systems performance improvement trends indicate that the Afghan health system has done very well on client and community engagement, and a key finding from this study is

that links to communities may explain insecurity resilience. Increasing citizen involvement in monitoring service delivery may be a promising approach both in building insecurity resilience in service delivery and as a part of a broader democratic state-building policy agenda. Rigorous research from other settings also points to the demonstrated value of community scorecard/citizen engagement approaches in improving service delivery (Nyqvist and others 2017).

Escalating insecurity makes robust and independent monitoring of contracted NGOs more difficult, and survey-based monitoring needs to be complemented with other monitoring strategies. Survey-based contract monitoring strategies are becoming increasingly difficult to implement in high insecurity areas, as survey teams may not be able to access some areas. This underscores the importance of complementing survey-based monitoring methods with other strategies, such as community-based monitoring strategies, as well as variants of survey methods, such as phone survey. Exploiting routinely generated data would also be valuable.

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