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Rewarding Provider Performance to Improve Quality and Coverage of Maternal and Child Health Outcomes

Zimbabwe Results-Based Financing Pilot Program

Evidence to Inform Policy and Management Decisions

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Abbreviations

ANC	Antenatal Care
CBO	Community-based Organization
DHE	District Health Executive
DHS	Demographic and Health Survey
EHT	Environmental Health Technician
EMOC	Emergency Obstetric Care
EPI	Expanded Program of Immunization
FP	Family Planning
HCC	Health Center Committee
HMIS	Health Management Information System
LMIC	Low- or middle-income country
MCH	Maternal and child health
MNCH	Maternal, Neonatal, and Child Health
MOHCC	Ministry of Health and Child Care
OOP	Out-of-pocket
OPD	Outpatient Department
PCN	Primary Care Nurse
PHE	Province Health Executive
PME	Process Monitoring and Evaluation
PNC	Postnatal Care
PPC	Postpartum Care
RBF	Results-based Financing
RGN	Registered General Nurse
RHC	Rural Health Center
WHO	World Health Organization

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Executive Summary

Low- and middle-income countries' interventions aim to improve health system functionality and priority health outcomes. Results-based financing (RBF) is one approach increasingly utilized. In an attempt to strengthen the health system and improve health-service delivery, Zimbabwe has been gradually introducing RBF approaches in rural and low-income urban areas to complement traditional input-based financing in some of its health programs.

This report reviews a comprehensive impact evaluation[1] of an RBF pilot program in Zimbabwe, officially known as the Health Sector Development Support Project. The main objective is to present and analyze the impact evaluation results of the RBF pilot program that supports the Ministry of Health and Child Care (MOHCC) in its efforts to increase the availability, accessibility, and utilization of quality health care to improve maternal, neonatal, and child health.

While this report touches on some of the broader policy implications of this work, a separate brief is being developed detailing the policy implications to inform strategy and operations in Zimbabwe and other countries with similar health sector challenges. A cost-effectiveness analysis study of the RBF pilot program is also being finalized. The Zimbabwe study is a contribution to the limited body of global evidence on the effectiveness of RBF programs through a rigorous evaluation using a quasi-experimental difference-in-difference estimator applied within matched pairs. As such, this study provides innovative insights on effectiveness in improving health systems and health outcomes.

Background and Program Design

The Government of Zimbabwe funds its health sector at a level lower than many other Sub-Saharan African countries.[2] As a result, a major financial burden of health care falls on households in the form of out-of-pocket payments, rendering the health system inequitable and inefficient. There is evidence that many poor households have to rely on substandard care or even forgo necessary health care due to their low capacity to pay. In response to this adverse health care scenario, and to operationalize the Results-Based Management Strategy, the Government has been implementing the RBF pilot program through the Health Sector Development Support Project since July 2011. The Government receives grant support from the Health Results Innovation Trust Fund for the RBF program. Cordaid, an international nongovernment organization, serves as a fundholder and provides technical support to the Government to execute RBF functions. The World Bank led the impact evaluation.

[1] The baseline for the impact evaluation was conducted from December 2011 to February 2012 and the midline was conducted from May to August 2014.

[2] Government spending on health is at 2.9 percent of GDP against a Sub-Saharan Africa average of 3.1 percent and an overage of 4 percent of GDP among low-income countries (World Bank 2015).

In July 2011, the RBF pilot program started in two districts, expanding to 397 health facilities in 16 additional pilot districts in March 2012. This represents a total catchment population of about 3.5 million people. In 2014, MOHCC, with the support of the Health Transition Fund administered by UNICEF, scaled up RBF to the remaining 44 rural districts in the country.

The RBF pilot program has three components: (i) results-based contracting; (ii) management and capacity building; and (iii) monitoring and documentation. Under the first component, a portion of financing received by health facilities depends on the quantity and quality of services, with a focus on maternal and child health. User fees were abolished in RBF pilot program districts, with the aim of improving access to care.

The impact evaluation was designed to inform several policy questions including the effects of the RBF pilot program on the utilization and quality of maternal and child health services as well as its effects on health system functioning.

The impact evaluation comprised quantitative and qualitative approaches. The evaluation investigated the impact of RBF over a broad range of targeted and non-incentivized services[3] related to maternal and child health services. Data were collected at household and facility levels at baseline and at midline from 32 districts serving as the total study sample for the impact evaluation, comprising 16 districts of the 18 districts implementing RBF and 16 control districts not conducting RBF. The 32 districts were purposively sampled from a universe of 64 districts in Zimbabwe and then pair-matched on predetermined, observable characteristics. The matched pairing sought to improve the power of inference and assure balance on observable district and facility characteristics. Additionally, administrative data were extracted to cover the entire study period. Qualitative process monitoring data (from health worker interviews and direct observations) were also collected.

Summary Results

The mixed methods process monitoring results revealed that the RBF pilot program is generally being implemented as planned. Many of the program's intended consequences have been achieved while, expectedly, some unintended changes and effects have also occurred. The pilot program has fostered many positive results through a complex web of factors, some inherent to the program and some a function of the context in which the facilities are operating.

Impact of RBF on Health Service Coverage

Results show improvements from baseline to midline in both the RBF and control districts for the RBF coverage indicators. For example, there was a 51-point and 49-point increase in coverage of postpartum from baseline to midline for both RBF and non-RBF (control) districts, respectively. Despite the general increases across Zimbabwe, key

[3] Non-incentivized services include conditions not directly related to the delivery of maternal and child health services, such as management of diabetes in the general population.

indicators such as delivery by skilled provider, in-facility delivery, and cesarean section deliveries improved faster in RBF districts than in control districts.

Impact of RBF on Health Service Quality (including client satisfaction)

Findings suggest a mixed but positive message on quality with some dimensions showing significant improvements under RBF, but not others. Within RBF districts, improvements were observed for selected measures of structural quality, such as higher incidence of biomedical waste disposal and increased availability of iron tablets, folic acid, and urine dipsticks. There was also increased availability of certain equipment such as electric autoclaves and refrigerators. Conversely, for both the RBF and control districts, the availability of the majority of medicines, supplies, and equipment remained largely unchanged, with minor fluctuations across products from baseline.

Impact of RBF on Health System Development and Governance (including health worker job satisfaction)

A key indicator of the system-level effects was the strong evidence suggesting no neglect of non-incentivized services. The findings suggested there is little if any justification for the typical concern over the risk of "task shifting" to incentivized (targeted) services at the expense of those that are not incentivized. None of the non-incentivized services investigated showed a decline in the number of cases treated, as would be expected if task shifting affected these services. For many of these services there appears to be a slight increase in volume, suggesting that service coverage actually increased for a broader set of services than those directly incentivized.

Key factors that emerged included improved autonomy and decentralized decision making, and strengthened facility-level management and governance. Facilities experienced more autonomy under RBF, and in particular, staff in RBF districts were more likely to be able to allocate their facility budget according to how it was needed. However, the nurses experience heavy workloads as they divide their attention between supervisory, administrative, and technical duties. The RBF-linked extra tasks in reporting, local procurement, and organizing logistics further aggravated the shortage and workload situation in health facilities.

Discussion

The RBF project is a health systems management tool designed to increase the efficiency of health system inputs in order to improve the coverage and quality of priority maternal, neonatal, and child health services. The impact evaluation and the process monitoring and evaluation (PME) investigated the project's impact on priority incentivized and non-incentivized services. In addition to these two evaluations, a trend analysis of non-incentivized services—including those unrelated to maternal and child health, such as the management of noncommunicable diseases in adults—was conducted to determine whether RBF biased health workers focus toward a narrow package of incentivized services. The PME also explored RBF's broader effects on various health systems dimensions through a mixed-methods approach.

The results of Zimbabwe's 2014 Multiple Indicator Cluster Survey reflect an increase in maternal and child health service coverage nationwide between 2010 and 2014, as shown by key indicators such as antenatal care (ANC) attendance (at least four visits) and institutional deliveries. However, not all coverage indicators demonstrate improvement under RBF. There were no significant differences for ANC services or family planning, perhaps because of the already high ANC and family planning coverage at baseline in the country.

For child health services, with the exception of the incidence of fever among children, the reported occurrence of disease among children and care-seeking practices did not change from baseline to midline. The trend analysis showed no significant difference in reported coverage in the eight quarters before the onset of the RBF pilot, while significant differences emerge by the fifth quarter after the start of the pilot.

It is also suggested that RBF has pro-poor or pro-marginalized group effects as reflected by two core dimensions of the PROGRESS framework: education and socioeconomic status. Relatively poorer households benefit disproportionately from RBF. Findings suggest accelerated gains or greater positive effects for the less-educated groups and the poor, particularly for those indicators in which differences between RBF and control districts were already significant.

Mixed results were observed on the process measures for quality of care, partly because it is multidimensional, difficult to precisely measure, and more complex to improve than service coverage. Health management information system data on various less-incentivized services, mostly related to treatment of adult cases of noncommunicable diseases, indicated a slight rise in the number of cases treated, suggesting the possibility that service coverage increased for a broader set of services than those directly incentivized.

Governance is one key area in which the quantitative impact evaluation found RBF to contribute to systems improvements. RBF facilities reported an increase in weekly operating hours for ANC and under-five clinics, though these differences were not significant. Health center committees are more active in RBF facilities, reporting significantly more meetings and greater participation of communities in decision making on prioritizing resources to improve health facilities.

On health worker motivation, the RBF program has had mixed effects. According to the qualitative findings, although staff were strongly motivated by incentives and their improved ability to serve the community, they also expressed their dissatisfaction with reduced unit prices of services from late 2013; the proportion of incentives relative to their tasks and those of their peers; inadequate living accommodations; limited capacity of supervisors; limited leadership ability among heads of facilities; and increased patient load, contributing to a higher workload and consequent burnout.

The qualitative work also highlights important channels of influence, which include regular and structured supervision yielding feedback to improve performance; enhanced community participation; and team-based incentives facilitating teamwork.

Insights/Lessons Learned

Key lessons learned include:

- Some of the coverage indicators that exhibited the lowest degree of change under RBF also exhibited the highest baseline coverage rates, suggesting that incentivizing these indicators may not present a highly efficient leverage of program funds. Careful thought should be given to selected indicators in future program design to maximize spending efficiency.

- Learning from implementation is critical for the successful implementation of an RBF program. Mid-course changes effected in the Zimbabwe program were largely informed by the PME studies jointly commissioned by the Government and the Bank. The PME also enabled evidenced-based policy planning and management decision making, particularly during the scale-up phase of the pilot.

- The study demonstrates the importance of continued innovations on ways to intelligently incentivize quality measures of care, which are more complex than coverage indicators. Related to this, given that quality of care is multidimensional, starting with structural quality indicators and then progressively introducing process measures of clinical care is critical to allow health providers to address less complex quality-of-care issues first, develop better understanding of RBF and quality of care, and then shift gradually toward more demanding measures of care under the RBF pilot.

- The quantitative results on human resources for health outcomes, such as health worker satisfaction and motivation, and evidence from the qualitative study, point to the following: (i) uncompensated price reductions of RBF services can induce negative effects among health workers, which can potentially affect priority indicators; (ii) it is important to start at a low and sustainable level in pricing structures of incentive schemes and introduce increases based on robust financial analysis; and (iii) team incentives play a positive role in health facilities beyond just monetary transfers. Qualitative evidence found significantly improved teamwork due to the team-based incentives under the RBF pilot program.

- The autonomy associated with RBF enables more responsiveness to health facility needs by health workers and the health center committee. This responsiveness not only benefits incentivized indicators but perhaps also enables health providers to address broader health systems challenges, such as stockouts for drugs, and non-incentivized conditions, such as noncommunicable diseases, as exhibited by increased reported services in these areas.

- RBF should not be isolated from broader health systems reforms and complementary interventions. Instead, it should be viewed as an entry point to tackling wider systemic issues that are brought to the fore when RBF is rolled out. A good example is seen in the human resources for health management and coordination challenges at health provider level reported in the follow-on qualitative study (fielded December 2014–June 2015): these could greatly benefit from parallel health sector reforms to strengthen health facility management and accountability.

1. Introduction

1. The Government of Zimbabwe rolled out a pilot of a results-based financing (RBF) program in the health care sector in July 2011, with grant support from the Health Results Innovation Trust Fund[4] and cofunding from the Ministry of Finance and Economic Development. The objective of the program is to support the Ministry of Health and Child Care (MOHCC) in its effort to increase the availability, accessibility, and utilization of quality health care to improve maternal, neonatal, and child health (MNCH). The project started in July 2011 in two districts and was expanded to 415 health facilities across 16 further districts in March 2012. In 2014, MOHCC scaled up RBF to 44 rural districts through the support of the Health Transition Fund.[5]

2. The program has three components: (i) results-based contracting; (ii) management and capacity building; and (iii) monitoring. Under the first component, a portion of financing received by health facilities depends on the quantity and quality of services, with a focus on maternal and child health. User fees have also been abolished on a package of services in districts, with the aim of improving access to care.

3. This overview report was developed at the request of the senior management of MOHCC to inform decisions and future directions of the RBF program. The report is based on dedicated data from impact and process evaluations commissioned by the World Bank and undertaken with technical input and support from a Technical Evaluation Working Group established by MOHCC in 2012 to provide technical and policy input of evaluations on RBF. The intent is to provide a synthesis of the quantitative and qualitative evidence on (i) the causal effect of the RBF program on priority health outcomes; and (ii) the effect of RBF as a financing reform on selected pillars of the health system in Zimbabwe.

2. Country Context

4. Zimbabwe's population is estimated at 13,061,231,[1] with a life expectancy at birth of 53.9 years. The total fertility rate is 4.1 children per woman. According to the World Health Organization (WHO) 2010 country burden of disease profile,[2] at least three-quarters of the annual deaths in the country can be attributed to communicable, maternal, perinatal, and nutritional illness. A major area of concern for Zimbabwe has been the high maternal mortality ratio, which reached 960 deaths per 100,000 live births in 2010-11. Estimates from the National Census of 2012 point to a decline of the maternal mortality ratio to 525 deaths per 100,000 live births. However, progress was not fast enough to achieve the Millennium Development Goal (MDG) target of 174

[4] This is a multidonor trust fund administered by the World Bank and funded by the Governments of Norway and United Kingdom to pilot innovative approaches to accelerating progress in maternal, neonatal and child health outcomes.

[5] This is a multidonor trust fund administered by UNICEF established to support the recovery of the health sector in Zimbabwe.

deaths per 100,000 live births. While both under-5 (84 per 1,000 in 2010/2011) and infant mortality rates (57 per 1,000 live births in 2010/2011)[3] are improving, Zimbabwe did not achieve its MDG targets by 2015 for those indicators either. Approximately one-third of children under 5 are stunted, and there has been little improvement in these figures over the last decade.

5. In terms of health expenditures as a proportion of gross domestic product (GDP), the government funds its health sector at a level lower than the average of low-income countries. As a result, a major financial burden of health care falls on households in the form of out-of-pocket (OOP) payments, rendering the health system inequitable and inefficient. There has been evidence that many poor households have to rely on substandard care or even forgo necessary health care due to their low capacity to pay.

6. As substantiated by several household and facility surveys, there are major challenges in the quality of health care services in Zimbabwe (Demographic and Health Survey [DHS] 2000, 2005, 2011; Multiple Indicator Monitoring Survey [MIMS] 2009; Maternal and Child Health Integrated Program study 2012). A 2012 study of the quality of maternal, newborn, and child health services demonstrated important quality gaps for both routine maternal newborn services and for the leading causes of maternal, newborn, and child mortality (i.e., postpartum hemorrhage, eclampsia, maternal and newborn sepsis, newborn asphyxia, newborn prematurity, child pneumonia, diarrhea and acute malnutrition).[4–6] In addition to being overstretched in understaffed facilities, providers often do not have the skills or the confidence to manage common life-threatening complications. Frequently district and regional administrative supervisors do not have up-to-date clinical knowledge and skills to permit them to assess and support provider competence in priority clinical areas, and there is no system of maintenance of clinical certification. Declines in government funding have also led to irregular supervision and oversight including core regulatory practices and systems, thus contributing to a low quality of services.

7. In response to this adverse maternal and child health (MCH) scenario, the Government has been implementing RBF through the Health Development Support Project since July 2011. The original Project Development Objective was to increase coverage of key MCH interventions in targeted rural and urban districts of Zimbabwe. The project also aims to improve the quality and quantity of health services provided by health facilities. Under the RBF project, a subsidy-for-service scheme was introduced in July 2011 for the delivery of a package of high impact maternal and child health services. Details about the project are provided under “Description of Intervention” below.

3. Results-based Financing: Summary of Evidence

8. RBF, in various forms, aims to improve the utilization and quality of essential health care services in both low- and high-income countries.[7] At its core, RBF is a mechanism in which financial incentives are provided to facilities and providers

conditional upon meeting certain performance targets.[8] RBF is an umbrella term that includes a wide range of performance-oriented payment systems such as performance-based financing, performance-based contracting, vouchers, and output-based aid.[7]

9. Several low- and middle-income countries (LMICs) in Asia and Africa have experimented with RBF over the last few decades. Systematic reviews show that RBF programs have predominantly catered to MCH conditions and are effective in improving service utilization in LMICs.[9,10] Experimental and quasi-experimental evaluations in Cambodia, the Democratic Republic of Congo, Burundi, Rwanda, and Haiti have shown that RBF can enhance service utilization as well as financial and management capacities, although not in all cases.[8, 11–16] In LMICs, the evidence of RBF on ultimate health outcomes is weak, as is the cost-effectiveness, as some studies had inappropriate designs to account for contextual factors and inadequate power to assess the effects of RBF on health outcomes.[10]

4. Objectives and Policy Questions

10. This report is designed to provide evidence to offer replies to the following policy questions:

a. What is the effect of RBF on utilization of maternal and child health services?

b. What is the effect of RBF on quality of maternal and child health services?

c. What is the effect of RBF on the provision and utilization of non-incentivized services?

d. What is the effect of RBF on health workers' motivation, job satisfaction, retention, and attrition?

e. What is the effect of RBF on patient/client satisfaction?

f. What is the effect of RBF on facility governance, health management information system (HMIS), supportive supervision, and other health system indicators?

g. Does RBF have implications for equity of maternal and child health and service utilization?

5. Description of Intervention

Design of Results-based Financing Contracting

11. RBF contracting consists of three components: payments for quantity of services, payment for the assessed quality of services, and, if applicable, a remoteness bonus. For rural health centers (RHCs), the quantity component consists of payment

on a unit-price basis for provision of 16 indicators identified as MCH priorities by MOHCC. District hospitals are remunerated based on five indicators, mostly relating to deliveries. The services incentivized in the RBF intervention, at both the rural health center and district hospital level, are in Tables 1 and 2. The unit prices were reduced during the mid-term review of the project in September 2013.

Table 1: Incentivized RBF services and subsidies in rural health centers ($)

Indicator number	Indicator	Current price (after Sept. 2013)	Price before Sept. 2013
1	OPD new consultations[1]	0.10/0.05	0.16
2	1st ANC Visit during first 16weeks[2]	3.00	3.00
3	ANC 4+ visits completed	3.00	3.00
4	HIV VCT in ANC	1.00	2.00
5	ARVs to HIV+ pregnant women (PMTCT)	2.50	2.00
6	Tetanus TT2+	0.45	0.45
7	Syphilis RPR test	0.45	0.45
8	IPT (x2 doses)	0.45	0.45
9	Normal deliveries	12.50	12.50
10	High risk perinatal referrals	3.00	3.00
11	PN visits 2 or more	4.50	3.00
12.a	Family planning, short-term methods	1.00	2.50
12.b	Family planning, long-term methods	5.00	50.00
13	Pri. course completed, immunization	3.50	3.50
14	Vit. A supplementation	0.18	0.18
15	Growth monitoring, children < 5yrs	0.18	0.18
16	Acute malnutrition cured & discharged children < 5 years[3]	Moved to hospital level	3.00

1 $0.05 for peri-urban/high volume; $0.10 for other facilities.
2 Indicator added after the RBF technical review.
3 Indicator added after the RBF technical review.

Table 2: RBF services and subsidies in district hospitals ($)

Indicator number	Indicator	Current price (after Sept. 2013)	Price before Sept. 2013
1	Normal deliveries[1]	12.50/25	25
2	Deliveries with complications	50	80
3	Cesarean sections	140	140
4	Family planning tubal ligations	30	30
5	High risk per-natal referrals	3	3
6	Acute malnutrition cured & discharged children < 5yrs[2]	3	N/A

1 Normal deliveries are not supposed to be done at a hospital except for refereed complicated deliveries. For Hybrid hospitals, normal deliveries are paid $12.50 for walk-in and $25.00 for referred cases.
2 Indicator added after the RBF technical review.

12. There is an additional remoteness bonus based on population density, distance to nearest referral facility, and availability of roads, public transportation and communications. Facilities can receive a bonus of up to 30 percent of their quantity payment, based on their remoteness.

13. The quality of services is measured using a balanced score card covering numerous aspects of structural and process quality, as well as organizational and management systems. The overall subsidies earned from the quality component are calculated up to a maximum 25 percent of the total payment value earned under the quantity and remoteness bonus.[6]

14. The balanced score card is filled out during verification visits by the District Health Executive (DHE) for RHCs, or the Province Health Executive (PHE) for district hospitals once every three months. Appendix 1 contains the detailed quality checklist, on which the maximum score is 100 percent. Until June 2013, facilities received an additional quality bonus equal to their percentage score on the quality measure: for example, if they scored 70 percent on the quality index, they received a quality bonus equal to 70 percent of their quantity payment plus remoteness bonus. Since September 2013, this has been replaced by a threshold system: facilities scoring 76 percent or above receive a bonus of 25 percent, facilities scoring 61-75 percent a bonus of 20 percent, and facilities scoring 51-60 percent a bonus of 15 percent.

15. The user satisfaction surveys, a component of the balanced scorecard, are conducted by contracted community-based organizations (CBOs) for each facility. CBOs visit a sample of users quarterly within the facility catchment area drawn from the facility records to assess the level of satisfaction. The trained CBOs use a standardized Patient Tracer and Satisfaction Tool with a set of satisfaction questionnaire items to assess both the existence of the patient and their levels of satisfaction with the services received during their last visit. The scores allocated to each of the responses contribute to a composite Client Satisfaction Score, which contributes 20 percent of the overall facility quality score.

16. In summary, the formula below shows the way the RBF bonus is calculated for the facilities:

$$P = (1 + Q)\{\sum_{i=1}^{n} a_i b_i + R\}$$

where P = RBF Payment; Q = bonus proportion derived from quality score; a_i = Unit Price for indicator *I*; b_i = Quantity achieved for indicator *i;* R = Remoteness bonus; and n = total number of services incentivized.

17. In terms of how RBF income can be spent, as per the Government's guidelines, a maximum of 25 percent of the bonuses could be shared among the staff as supplements to salaries. The Government requires the remaining 75 percent to be

[6] Refer to the October 2013 Pricing Review Report.

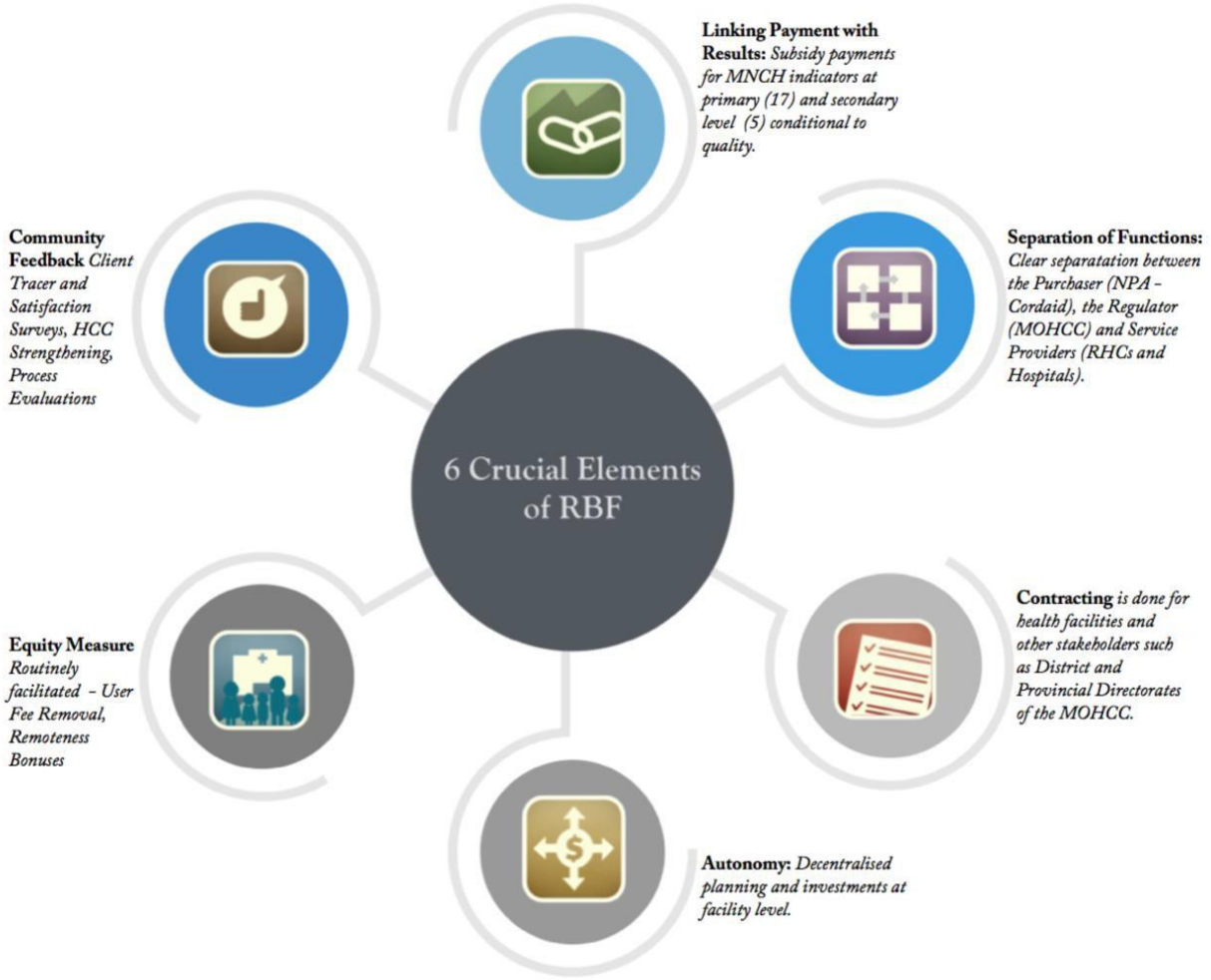
reinvested in improving the working conditions at the facility, for example by spending on infrastructure, supplies and minor equipment.

Other Elements of the Results-based Financing Program

Essential Elements of RBF and the Intervention Design

18. The RBF intervention in Zimbabwe is modeled around the six crucial elements of an RBF mechanism (Figure 1). In addition to the linking of payments to results conditional to quality, the institutional arrangements recognize the concept of the segregation of functions between the service provider, purchaser and regulator. Contracting is done not only with the health facilities but also to other stakeholders such as the district and provincial health executives. Although the system does not exhibit the traditional autonomy of hiring and firing staff, there is decentralizing planning and decision making for investments at the facility level. The RBF facilities had the autonomy to utilize the RBF earnings in consultation with the Health Center Committees (HCCs). Equity measures are incorporated through user fee removals and remoteness bonuses for hard to reach facilities and with small catchment populations. The project recognizes the role of the community voice in improving the quality of services and feedback is sought through regular patient tracer and satisfaction surveys as well as through HCCs.

Figure 1: Six crucial elements of an RBF program



Additional Components of the RBF Design in Zimbabwe

19. Although the contracting for the "pay for service conditional to quality" plays a central role in RBF, the Zimbabwe RBF program's intervention design is anchored on two other key components: (i) management and capacity building; and (ii) monitoring and documentation.

20. The management and capacity building component targets HCCs/RHCs, DHEs, PHEs, district hospitals, CBOs, and district steering committees in the training RBF, strengthening of data quality and reporting, procurement, and financial management. The training, which primarily focuses on strengthening the system for effective RBF implementation, is provided by national and international experts in the relevant disciplines with the oversight of MOHCC. In addition to workshop based trainings, on-the-job capacity development support is provided by staff and consultants from the National Purchasing Agent (NPA) and where possible from MOHCC district, provincial, and national teams.

21. The intervention's structure also provides for adaptive learning through ongoing implementation reviews, periodic process and performance evaluations; and a rigorous impact evaluation integrated in the implementation design. The reviews provide a platform for program modification for performance enhance.

Elimination of User Fees

22. Formal user fees were abolished for those services that RBF was targeting through incentives (see Tables 1 and 2). The design of the RBF project facilitates the adoption of the MOHCC policy of no user fees at the primary level and selected services at secondary level through its fee-for-service mechanism (enabling facilities to decrease/remove user fees) and through the health facility enrolment process into the program.

23. Contracting of a health facility is undertaken after fulfillment of a set of administrative conditions which include having a functional HCC and protocols for waste management followed by establishing the following additional RBF requirements: An operational plan is presented according to the format provided by the NPA/Local Purchasing Unit.

24. A financial plan has been prepared, including adequate community arrangements, user charges for different services, transfer of funds to district, allocation of premiums, application of funds.

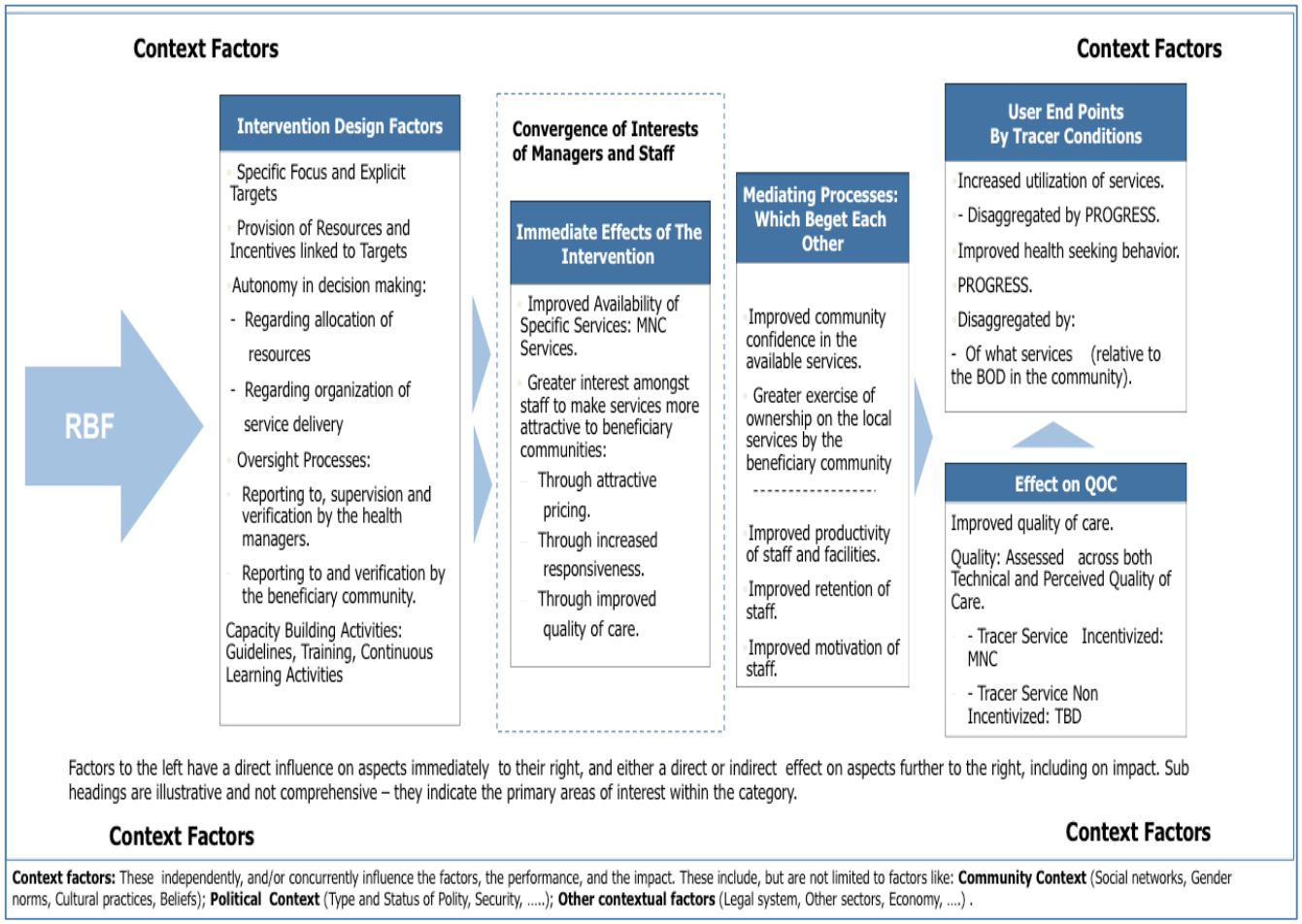
25. A contract has been negotiated between NPA/Local Purchasing Unit and facility with targets and premiums per target.

26. The financial plan should conform to the national policy of no user fees for specific target groups including children and women of child- bearing age seeking maternity services.

Conceptual Framework RBF in Zimbabwe

27. In reality, the transition from inputs to results is not linear, but rather a complex web of factors within the operational space. The trajectory of change can, however, be traced within a Conceptual Framework, which is based on the RBF model's Theory of Change (Figure 2).

Figure 2: Theory of change RBF in Zimbabwe



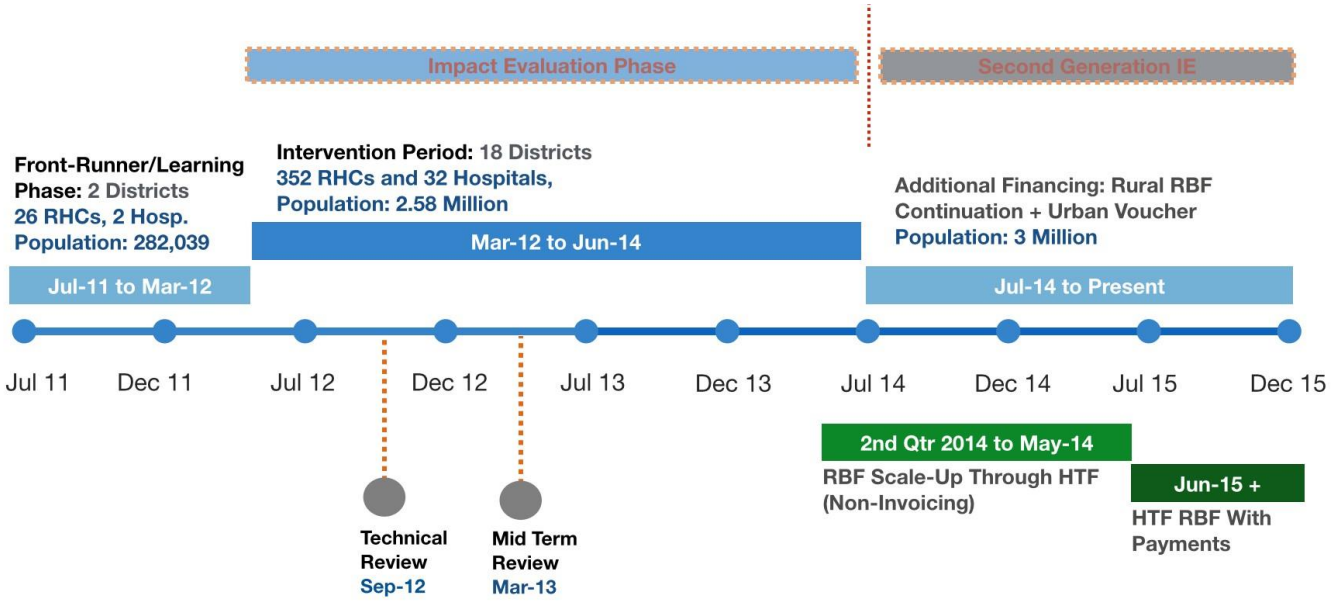
28. The realization of the output, outcomes and impact related to the intervention depends on the interplay of intervention design (i.e. RBF model) factors, the immediate effects of the action, and the influence of mediating and contextual factors. Intervention design factors are those that the model set out to introduce and implement in order to effect positive change. The immediate results of these actions—such as improved availability of services—may influence the attainment of medium-term results. Mediating factors further aide or hinder attainment of results while other contextual factors beyond the intervention's direct control also influence results.

29. In view of this framework, it is through tracking and validating the program impact pathways (PIPs) that we can better understand factors influencing the performance of facilities under the RBF program. A logical start point for the enquiry was therefore to establish the status of the study's outcomes of interest (quality of care and utilization of services) and then assess the extent to which the factors on the left (three boxes) and contextual factors influence the realization of these results. This to a large extent validates the conceptual framework, facilitates its adaptation, and enables the documentation of processes that may have led to the observed outcomes in specific context—all of which enables understanding on how to adapt RBF to context.

Key Implementation and Management Milestones

30. The RBF project was implemented initially in July 2011 in two front-runner districts to learn the modalities of operation and make necessary changes before moving on to the pilot stage (Figure 3). This learning phase included 26 RHCs and two hospitals, covering a population of 282,039. The pilot phase that ran from March 2012 covered a population of about 3.5 million (362 RHCs and 35 hospitals) in 18 districts, out of which 16 were used for the impact evaluation. Apart from the regular supervision, there were two major reviews to the program—a technical review in June 2012 and a mid-term review in January 2013. The reviews resulted in changes in the package of services, in the pricing of individual services, and in the share of various components within the overall incentives (e.g., quality bonus as a threshold). Despite these changes, the core design of the program (and the evaluation) remained the same. Given the nature and timing of the survey data, it is difficult to separately identify any result of the changes in these prices paid. Instead the evaluation will measure the net result of the entire experienced program over the study period.

Figure 3: Implementation and evaluation timelines



6. Design of Evaluation

31. MOHCC and the World Bank agreed to conduct an impact evaluation covering the pilot period in order to help answer the priority policy questions outlined above. This section describes the design of this evaluation. Ethical approval for this evaluation was obtained from the Medical Research Council of Zimbabwe. Participation in this study was voluntary and written informed consent was obtained from the participants after the objectives of the study and the intended use of the information were explained to them.

Impact Evaluation

32. To evaluate whether the pilot scheme improved the provision and quality of health care as intended, a quasi-experimental evaluation was designed. In this evaluation, RBF districts were compared with counterfactual districts, chosen to match RBF districts closely on various characteristics such as remoteness, type of constituent facilities, demographics, and rates of health care utilization. A facility survey and a household survey were carried out in the treatment and control districts both before RBF was implemented (the baseline) and midway through the pilot (midline). The evaluation will estimate program impacts over the period bracketed by the baseline and midline activities.

33. The causal effect of the RBF intervention is most commonly estimated using a "differences-in-differences" estimator, which compares the change in the outcome of interest for treated households or facilities between baseline and follow-up with the change in the outcome for controls over the same period. This approach controls for all fixed differences in the level of the outcome between the treatment and control groups. The only requirement for causal identification is the "parallel trends" assumption that posits that any change in measured outcomes in the comparison districts represents what would have occurred in the RBF districts if not for the RBF program. With this framework, any observed difference in the trend of outcomes in RBF districts is this ascribed to the RBF program.

34. The "parallel trends" assumption is by definition untestable, for it is impossible to observe the change in outcomes in RBF districts both with and without the RBF. However, for many of the outcomes analyzed in this report, it is possible to test whether the observed trends in outcomes before program onset, the so called "pre-trends," are parallel as there is data for the treatment and control districts for several periods before the RBF intervention began. Failure to reject the null hypothesis of parallel pre-trends lends confidence to the validity of the parallel trends assumption. The analysis of pre-trends is explored in detail in Appendix 3. Almost no pre-trend in RBF areas diverged from the comparison area pre-trend, consequently lending confidence to the validity of the "difference in difference" framework in this context.

Selection of RBF and Control Areas

35. Thirty-two districts serve as the total study sample for the impact evaluation, comprising the 16 districts in the RBF pilot and 16 comparators. These 32 districts were purposively sampled from the universe of 64 districts in Zimbabwe and then pair-matched on the basis of observable information described below. The pair-matching process sought to improve the power of inference and helped to provide balance on observable district and facility characteristics. One district in each pair was allocated to the RBF and the other district to the control (business-as-usual) by MOHCC. Thus the identification strategy for the impact evaluation is a quasi-experimental difference-in-difference estimator applied within these matched pairs.

36. The district matching process considered the following characteristics:

- Geographic accessibility—i.e., rural and remoteness
- Type and level of health facilities
- Average facility catchment population
- Proportion of staff in position
- Presence of key staff such as the District Medical/Health Officer
- Health services utilization rates for antenatal and postnatal care coverage, institutional delivery and immunization rates for 2008, 2009, and 2010.

37. For the pair-matching of districts, all indicators were combined into one index through principal component analysis and this index was then sorted into quintiles. Within each province, two districts from the top (high capacity) and two from the bottom (low capacity) of the index score derived from these measures were selected. Leadership in the Zimbabwe MOHCC then purposively selected one of the two districts in each matched pair to receive the RBF intervention. Due to this purposive selection, the evaluation adopts the "difference-in-difference" estimation framework described above.

38. The RBF was introduced in a context with other ongoing interventions implemented in both RBF and comparison districts. As one example, drug supply supported by donors is nationwide and therefore covers both treatment and intervention areas. Based on the study design, the effect of other nationwide interventions should not confound study findings. Instead, the RBF evaluation represents the additional impact of RBF over and above the mix of national and district programs operating at the time of study. The evaluation team also reviewed other known programs in order to assess any risk of confounding, but did not find systematic variation in programs between treated and control districts. Furthermore, the main results are robust if we drop any particular district pair from the analysis, further suggesting that RBF impact estimates are not due to an unknown confounder operating in a small number of treated districts.

39. Most likely a direct result of the purposive district selection process, households in the pilot districts are poorer than those in the rest of the country, with 27 percent of households in the bottom quintile of household wealth, compared with 14 percent in the rest of the country, and 12 percent in the top quintile, compared with 27 percent in the rest of the country (Table 3). Among the pilot districts, the districts receiving the RBF intervention are even poorer than those in the control districts, with 30 percent in the poorest quintile, compared with 23 percent in the control districts. This difference in household wealth between RBF and RBF control districts is likely due to MOHCC's assigning the intervention to the district within each pair perceived to be most in need of additional resources. Again, the difference in baseline levels of key indicators does not confound program impact estimates. These estimates rely on the parallel trends assumption.

Table 3: Household wealth of RBF pilot districts compared with the rest of Zimbabwe

	Quintile of household wealth (%)				
	Poorest	**Poorer**	**Middle**	**Richer**	**Richest**
Pilot districts	27	21	21	19	12
RBF	30	21	20	19	11
RBF control	23	22	24	19	13
Rest of country	14	16	19	24	27

Source: DHS 2010-2011.
Notes: Household wealth is estimated using a wealth index, calculated using data on households' ownership of selected assets, materials used for housing construction, and types of water access and sanitation. The full list of variables used to construct this index and their weights is given at http://www.dhsprogram.com/programming/wealth%20index/Zimbabwe%20DHS%202010-11/zimbabwe%202010-11.pdf. Households are weighted using the DHS sampling weights.

Data Collected

40. Data utilized in this study encompass various sources (Table 4). Primary survey data were collected at baseline and midline at both the household and health facility level. While the survey tools used in the baseline and midline studies were mainly identical, the baseline data at the facility level were collected under the auspices of MOHCC as part of the National Integrated Health Facility Assessment (NIHFA) of 2011, and as such the target sample sizes were determined by a comprehensive committee of which the RBF evaluation was only one was only one of many concerns represented. Complementary administrative data from the national HMIS were extracted to cover the entire study period and qualitative process data were also collected.

Table 4: Data Sources and Sample Sizes

Source	**Sample Size**	
	Baseline (Dec. 2011-Feb. 2012)	**Midline** (May-August)
Facility data		
Facility survey checklist	197	222
Health Worker Interviews	597	415
Exit Interviews—ANC	1864	550
Exit Interviews—child health	1865	844
Direct Observations—ANC	344	729
Direct Observations—child health	235	104
Direct Observations—labor and delivery	189	123
Household data	1610	183

Note: Baseline household data come from the Zimbabwe Demographic and Health Survey, 2010-11.

Facility Survey

41. The facility survey consisted of a facility checklist; a health worker instrument; exit interviews of sick children and pregnant women; and direct observations of antenatal care, sick child care, and labor and delivery. Enumerators were nurses with substantial

experience of clinical practice in the setting and survey data collection. The training for the data collection included classroom instruction and a field visit. The instruments were pre-tested and modified appropriately before the actual survey. The facility survey was undertaken over two rounds using the same data collection procedures and instruments, i.e., baseline (Dec. 2011-Feb. 2012) and follow up (May-August 2014).

Facility Survey Checklist

42. Stratified by district, health facilities (RHCs) were then selected by a simple random sampling technique. District hospitals, however were selected purposively from all the evaluation districts (n=32). In the baseline, 197 health facilities were surveyed whereas 222 were surveyed in the follow up. The facility checklist was used to collect information on infrastructure, administration, availability of basic drugs and equipment, governance, and autonomy.

Health Worker Interviews

43. Up to two health workers were selected for the interview in every facility. The criterion for selection was provision of maternal and child health care on the day of the interview. Sample sizes were respectively 597 and 415 for the baseline and follow-up surveys. The instrument included questions on remuneration, knowledge, job satisfaction, and motivation.

Exit Interviews

44. A patient exit interview assessed patient satisfaction and quality of care received for patients exiting antenatal care and child health consultations. For child consultation, the child's parent or caretaker was interviewed. Up to six clients were selected per service through a systematic random sampling strategy (based on caseload for the same day of previous week for the facility). Sample sizes were the following—child health (baseline 1,865 and follow up 844) and antenatal care (baseline 1,864 and follow up 550). During the follow up, exit interviews were administered only in the rural health centers and rural hospitals. The discrepancies in the sample sizes for exit interviews between both rounds are due to three reasons. First, hospitals were involved in the baseline, but not in the midline follow-on survey. Second, during the midline the required sample size could not achieved in a few facilities due to a lower volume. Third, even though the volume was sufficient in some facilities, the rate of consent participants gave to be interviewed was lower.

Direct Observations

45. Observations were conducted for child health, antenatal consultations and labor and delivery. The observer passively observed the service provision and recorded in a checklist whether necessary protocols were followed as per the standard national guidelines. The checklists included items on provider attitude toward the client, obtaining clinical history, performing clinical procedures and examinations, prescribing relevant drugs and vaccines, counseling, and referral (when indicated). Up to six exit clients were selected per service through a systematic random sampling strategy (based on caseload for the same day of previous week for the facility). Sample sizes for direct observations were the following—child health (baseline 235 and follow up 1,045)

antenatal care (baseline 344 and follow up 729), and labor and delivery (baseline 189 and follow up 123).

Household Survey

46. The first round of household data is taken from the 2010-2011 Zimbabwe Demographic and Health Survey (ZDHS). The second round of data collection took place in 2014, using identical tools to DHS (supplemented with additional topics) to ensure comparability between rounds. The survey was undertaken in 166 enumeration areas (clusters) from the 32 impact evaluation districts. These clusters were enumerated from the 2010-11 ZDHS and every cluster was revisited at midline. The survey team compiled a list of eligible households (households with a pregnancy related outcome, i.e., live birth, stillbirth, abortion and miscarriage within the two years prior to the survey) in each cluster. Twelve households were sampled (e.g., systematic random sampling) in each cluster from this listing. At baseline, 1,610 households in the relevant districts were surveyed, and 1,836 households were surveyed at follow up.

47. The household survey includes questions on coverage of antenatal, delivery, postpartum and postnatal care, child health, delivery outcomes, family planning, and general health-seeking behavior, as well as household assets. The second round of data also includes questions on OOP expenditure and mothers' knowledge of health care.

Process Evaluation

48. The RBF program, in addition to conducting routine program data analysis and periodic reviews, also made use of process monitoring and evaluation (PME) as a tool to explore the causal pathways from implementation to results. In addition to capturing whether the intervention is being implemented as planned, the PME explores and examines salient factors that affect the achievement of targeted performance indicators, whilst attempting to answer the how and why questions commonly associated with the analytic findings of either routine data or evaluation findings.

49. The process evaluation applied a retrospective study design and a theory-based evaluation approach that made use of sequential mixed methods. The retrospective design allowed for classification of observations according to the outcomes of interest and retrospectively assessing their exposure and interaction with specific study factors, e.g., contextual factors and intervention design factors. This is facilitated by the theory-based evaluation approach, which examines the interaction between the context, the actors, and the intervention, and then attempts to explain how this interaction works to produce the outcomes of the intervention by interrogating the intervention's formal theory of change. The theory-driven approach sought to explore the influence of contextual factors on interventions and its outcomes through tracking and validating the program impact pathways.

50. DHE team members, facility managers, health workers, HCCs and health facility catchment communities within World Bank funded RBF districts constituted the sampling frame from which respondents were purposively drawn to participate in a

qualitative inquiry. A multistage sampling approach was used to select the Province, Districts, Facilities and Community Members with each using Purposive Sampling although each had varying “purposes” or specific reasons for selection. The cascade sampling first selected three provinces from the eight rural provinces in which RBF operated. The criteria for selection was based on geographic spread to ensure representation from each geo-region. Then within each of the three selected provinces, one or two districts were selected based on their identification as cases of interest by the project implementing entity. A total of four districts were selected.

51. Finally, the third stage of sampling involved the selection of one high- and one low-performing facility from each selected district. Of note is that the facilities were in part selected based on performance as defined by their actual earnings relative to expected earnings. The classification of performance therefore entailed initially assessing facility performance using quantitative methods and then proceeding to obtain primary qualitative data. The research team collected primary data through in-depth interviews, focus group discussions, and group interviews. The basic principles of analyzing qualitative data were applied. In particular, the processing of data for each facility made use of a desktop matrix analysis of themes drawn from both the conceptual framework and others emerging from transcripts. A comparison of these qualitative data across facilities enabled the research team to identify trends across facilities and to interpret the findings.

Qualitative Follow-on Study

52. A follow-on qualitative study, designed after initial quantitative results from the impact evaluation were available, was fielded from December 2014 to June 2015. The qualitative study sought to contextualize and further explain results identified by the impact evaluation study as it pertains to health worker motivation at health facilities receiving RBF subsidies. This follow-on study was meant to be a short descriptive exercise. The methods and design of the follow-on study involved interviews with a purposive sample of 49 health worker from facilities that, on average, reported relatively poor motivation and satisfaction. To the extent possible, health workers that participated as respondents in the impact evaluation study were included as respondents for the follow-on study.

53. Purposively selected health workers included a variety of cadres (i.e., PHE, DHE, and health workers) from the study facilities in order to explore leadership, teamwork, autonomy and career development. Three topic guides were developed for interviewing respectively managers/supervisors at DHE/PHE level, nurse in charge, and for other health workers at the facility level. Two local qualitative research consultants collected data in four RBF districts. The recordings and field notes were transcribed verbatim and translated to English where necessary. The transcripts were entered and analyzed with NVivo 10. Results were analyzed separately by site to enable in-depth analyses and formulation of case studies to examine and explain aspects of the development and implementation of the program in relation to the context.

7. Findings

54. As the analysis pools various sources of data to triangulate the empirical findings in order to increase the robustness of any conclusion, this section reports results grouped by three major themes: (i) the impact of the RBF program on health service coverage, (ii) the impact of the RBF program on health service quality (including client satisfaction), and (iii) the impact of the RBF on health system development and governance (including health worker job satisfaction).

Health Care Coverage

55. This subsection evaluates the effect of the RBF intervention on key maternal and child health service utilization, using the results of household surveys conducted in 2010-11 and 2014. For each outcome, the causal effect of the RBF program is taken as the difference in the change in the outcome for households in RBF districts and households in control districts over the time periods by the baseline and midline household surveys. The estimates also control for the stratification measure (the matched district pair). The listed p-value conveys the probability that the estimated impact is not significantly different from zero.

Maternal and Neonatal Care

56. Table 5 shows estimates of the effect of RBF on key delivery outcomes for all births taking place in surveyed households in the two years prior to the survey. RBF (plus the elimination of user fees since that cannot be separately identified) increased the share of deliveries attended by a skilled provider by 15 percentage points and deliveries taking place in a facility by 13 percentage points. Among mothers with primary education or less, the intervention resulted in a 20 percentage point increase in deliveries attended by a skilled provider, larger than the increase for mothers with secondary or higher education (Table 6). The intervention also appears to be mildly pro-poor, with a greater increase in skilled and facility deliveries to mothers in households with below median wealth, although these differences are not statistically different and hence only suggestive. The rate of delivery by cesarean section increased more for mothers with above median wealth.

Table 5: Effect of RBF pilot on delivery outcomes

	Mean at baseline		*Mean at midline*		Impact estimate	p-value
	RBF	Control	RBF	Control		
Delivery by skilled provider	0.592	0.720	0.884	0.868	0.147***	0.002
Delivery in facility	0.553	0.681	0.879	0.876	0.134***	0.003
Delivery by cesarean section	0.032	0.047	0.128	0.073	0.069*	0.051

Note: Sample size 2,694 births. * p<0.1 ** p<0.05 *** p<0.01. Linear probability model with difference-in-difference specification, including stratification controls. Errors are clustered at the district level.

Table 6: Effect of RBF pilot on delivery outcomes, by education of mother and household wealth

	Primary educ. or below		*Secondary educ. or above*		*Below median wealth*		*Above median wealth*	
	Impact	**p-value**	**Impact**	**p-value**	**Impact**	**p-value**	**Impact**	**p-value**
Delivery by skilled provider	0.201***	0.003	0.115**	0.031	0.135**	0.025	0.109**	0.028
Delivery in facility	0.118*	0.070	0.141***	0.008	0.116*	0.053	0.099*	0.056
Delivery by cesarean section	0.052	0.213	0.074*	0.068	0.028	0.432	0.103**	0.027

Note: Sample size 2,694 births. * p<0.1 ** p<0.05 *** p<0.01. Linear probability model with difference-in-difference specification, including stratification controls. Errors are clustered at the district level.

57. The effect of the RBF intervention on antenatal coverage for the most recent birth in surveyed households is shown in Table 7. ANC coverage is high: by the midline survey, more than 99 percent of women in both RBF and control districts received at least one ANC from a qualified provider. There is some indication that the pilot may have increased the number of ANC visits but this effect is not statistically significant. Table 8 shows ANC coverage outcomes by household wealth and by mother's education. For mothers with a secondary education or higher, the intervention increases the likelihood of receiving care at a facility and increases the number of ANCs. No other effects are statistically significant. The relatively high level of coverage of these ANC indicators at baseline raise questions about the efficiency of subsidizing these particular indicator versus other high priority indicators that may be provided at lower baseline levels of coverage.

Table 7: Effect of RBF pilot on antenatal care coverage

	Mean at baseline		*Mean at midline*		**Impact estimate**	**p-value**
	RBF	**Control**	**RBF**	**Control**		
Any ANC	0.898	0.915	0.999	1.000	0.018	0.452
ANC from qualified provider	0.896	0.915	0.993	0.991	0.023	0.360
ANC in facility	0.891	0.908	0.999	1.000	0.019	0.433
Number of ANC visits	3.861	4.202	5.310	5.258	0.422	0.124
No. of months pregnant at first ANC	5.071	4.956	4.150	4.205	-0.191	0.223

Note: Sample size 2,573 pregnancies. * p<0.1 ** p<0.05 *** p<0.01. For any ANC, ANC from qualified provider and ANC in facility, linear probability model, including stratification controls. Errors are clustered at the district level. For number of ANCs and no. months pregnant at first ANC, standard OLS regression with province-level controls and errors clustered at the district level.

Table 8: Effect of RBF pilot on antenatal care coverage, by education of mother and household wealth

	Primary educ. or below		*Secondary educ. or above*		*Below median wealth*		*Above median wealth*	
	Impact	**p-value**	**Impact**	**p-value**	**Impact**	**p-value**	**Impact**	**p-value**
Any ANC	-0.011	0.806	0.034	0.132	0.014	0.701	0.017	0.479
ANC from qualified	-0.003	0.947	0.036	0.120	0.020	0.605	0.020	0.406
ANC in facility	-0.025	0.579	0.043*	0.070	0.016	0.661	0.017	0.525
Number of ANCs	0.295	0.359	0.544	0.092	0.440	0.154	0.271	0.393
No. of months pregnant at first ANC	-0.031	0.903	-0.271	0.101	-0.288	0.156	-0.054	0.776

Note: Sample size 2,573 pregnancies. * p<0.1 ** p<0.05 *** p<0.01. For any ANC, ANC from qualified provider and ANC in facility, linear probability model, including stratification controls. Errors are clustered at the district level. For number of ANCs and no. months pregnant at first ANC, standard OLS regression with province-level controls and errors clustered at the district level.

58. Postpartum and postnatal coverage outcomes for the most recent birth in surveyed households are summarized in Table 9. There was a dramatic increase in coverage of postpartum care (PPC) and postnatal care (PNC) from baseline to midline for both the RBF and the control districts. Over and above this large secular increase, the intervention increased the relative likelihood that mothers received PPC from a qualified provider by 13 percentage points. The effect of the intervention on coverage of PNC is not as precisely estimated but of equivalent magnitude. Table 10 shows postpartum and postnatal coverage split by mother's education and household wealth. For mothers in households below median wealth, RBF increases likelihood that PPC is received from a qualified provider by 15 percentage points, and the probability that it is received within two months of birth by 15 percentage points. These results again suggest a pro-poor impact of the RBF intervention.

Table 9: Effect of RBF pilot on postpartum and postnatal care coverage

	Mean at baseline		*Mean at midline*		**Impact**	
	RBF	**Control**	**RBF**	**Control**	**estimate**	**p-value**
Any PPC	0.431	0.511	0.944	0.906	0.119*	0.059
PPC from qualified provider	0.424	0.511	0.929	0.882	0.133**	0.028
PPC received within 2 days	0.236	0.243	0.836	0.813	0.031	0.603
PPC received within 2 months	0.415	0.493	0.940	0.904	0.115	0.068
Any postnatal care	0.427	0.493	0.740	0.685	0.124	0.173
PNC from qualified provider	0.420	0.491	0.719	0.663	0.130	0.145
PNC in facility	0.390	0.442	0.707	0.659	0.107	0.252
PNC received within 2 days	0.117	0.106	0.252	0.313	-0.078	0.223
PNC received within 2 months	0.419	0.486	0.735	0.682	0.123	0.178

Note: Sample size 2,393 births. * p<0.1 ** p<0.05 *** p<0.01. Linear probability model with difference-in-difference specification, including stratification controls. Errors are clustered at the district level.

Table 10: Effect of RBF pilot on postpartum and postnatal care coverage, by education of mother and household wealth

	Primary educ. or below		*Secondary educ. or above*		*Below median wealth*		*Above median wealth*	
	Impact	**p-value**	**Impact**	**p-value**	**Impact**	**p-value**	**Impact**	**p-value**
Any PPC	0.139*	0.061	0.091	0.212	0.146*	0.060	0.085	0.278
PPC from qualified provider	0.145*	0.051	0.107	0.135	0.154**	0.047	0.104	0.180
PPC received within 2 days	-0.007	0.938	0.026	0.669	0.066	0.416	0.005	0.935
PPC received within 2 months	0.129*	0.090	0.088	0.226	0.149*	0.058	0.078	0.320
Any postnatal care	0.150	0.189	0.097	0.298	0.135	0.154	0.125	0.258
PNC from qualified provider	0.145	0.184	0.109	0.248	0.137	0.124	0.135	0.212
PNC in facility	0.124	0.287	0.082	0.400	0.109	0.266	0.121	0.280
PNC received within 2 days	-0.038	0.639	-0.104	0.141	-0.062	0.408	-0.085	0.242
PNC received within 2 months	0.150	0.191	0.094	0.312	0.149	0.123	0.109	0.323

Note: Sample size 2,393 births. * p<0.1 ** p<0.05 *** p<0.01. Linear probability model with difference-in-difference specification, including stratification controls. Errors are clustered at the district level.

59. Table 11 shows that for the full sample of women, the pilot RBF intervention has no significant effect on usage of contraception. However, the intervention appears to increase the use of modern contraception[7] by 12 percentage points among women with primary education or less (Table 12). Note that these estimates are based on the restricted sample of households with women who had experienced a pregnancy-related event in the two years before the survey and hence may not represent program effects on these outcomes for the entire population of age-eligible women.

Table 11: Effect of RBF pilot on family planning outcomes

	Mean at baseline		*Mean at midline*		**Impact estimate**	**p-value**
	RBF	**Control**	**RBF**	**Control**		
Used any contraception	0.544	0.571	0.708	0.705	0.035	0.379
Used modern contraception	0.523	0.566	0.704	0.701	0.049	0.213
Visited by FP worker	0.066	0.085	0.131	0.128	0.025	0.516
Obtained FP in public facility	0.423	0.493	0.698	0.719	0.052	0.164

Note: Sample size 3,377 women aged 15-49. * p<0.1 ** p<0.05 *** p<0.01. Linear probability model with difference-in-difference specification, including stratification controls. Errors are clustered at the district level.

[7] Modern contraception includes male and female sterilization, all hormonal contraception (pill, injectables, implants), both male and female condoms, diaphragm and cervical caps, jellies and spermicides, and "emergency contraception."

Table 12: Effect of RBF pilot on family planning outcomes, by education of mother and household wealth

	Primary educ. or below		*Secondary educ. or above*		*Below median wealth*		*Above median wealth*	
	Impact	p-value	Impact	p-value	Impact	p-value	Impact	p-value
Used any contraception	0.107*	0.075	-0.006	0.906	0.032	0.567	0.033	0.487
Used modern contraception	0.123**	0.043	0.003	0.946	0.042	0.471	0.049	0.308
Visited by FP worker	0.041	0.384	0.023	0.580	0.047	0.287	0.008	0.870
Obtained FP in public facility	0.107	0.101	0.016	0.749	0.089	0.138	0.035	0.524

Note: Sample size 3,377 women aged 15-49. * p<0.1 ** p<0.05 *** p<0.01. Linear probability model with difference-in-difference specification, including stratification controls. Errors are clustered at the district level.

Child Health and Immunization

60. The effect of the pilot RBF intervention on child health outcomes and health-seeking behavior for childhood diarrhea and fever is summarized in Table 13. The pilot intervention reduces the probability that children under 5 years old had reported fever in the two weeks prior to the survey by 6 percentage points. The intervention did not appear to have a significant effect on incidence of diarrhea. There was also no significant effect on the probability that advice was sought for diarrhea or fever, or recommended treatment given. A caveat for theses and various other results concerns the fact that the analysis is conducted on a subsample. Given the relatively few observations in certain subsamples, a modest yet economically or medically significant result for subgroup analysis may not be sufficiently powered. With this in mind, we observe in Table 14 little significant change in these outcomes when stratified by education or wealth levels.

Table 13: Effect of RBF pilot on child health outcomes

	Mean at baseline		*Mean at midline*		Impact	
	RBF	Control	RBF	Control	estimate	p-value
Diarrhea in previous 2 weeks	0.141	0.136	0.109	0.132	-0.031	0.237
Sought advice for diarrhea	0.406	0.432	0.490	0.519	-0.003	0.977
Visited facility for diarrhea	0.332	0.390	0.476	0.504	0.024	0.782
ORS or recommended solution	0.626	0.602	0.713	0.679	-0.007	0.937
Fever in previous 2 weeks	0.113	0.115	0.087	0.148	-0.062**	0.040
Sought advice for fever	0.470	0.530	0.456	0.490	0.046	0.669
Visited facility for fever	0.403	0.460	0.421	0.483	0.005	0.959
Finger or heel prick	0.081	0.090	0.158	0.177	-0.010	0.886
Child took any anti-malarial	0.034	0.010	0.018	0.034	-0.036	0.163

Note: Sample 4,493 children under 5, of which 579 had diarrhea in the 2 weeks prior to being surveyed and 510 had fever; p<0.1 ** p<0.05 *** p<0.01. Linear probability model with difference-in-difference specification, including stratification controls. Errors are clustered at the district level.

Table 14: Effect of RBF pilot on child health outcomes, by education of mother and household wealth

	Primary educ. or below		*Secondary educ. or above*		*Below median Wealth*		*Above median wealth*	
	Impact	**p-value**	**Impact**	**p-value**	**Impact**	**p-value**	**Impact**	**p-value**
Diarrhea in previous 2 weeks	-0.074	0.095	-0.006	0.828	-0.057	0.170	-0.011	0.746
Sought advice for diarrhea	-0.129	0.357	0.076	0.545	-0.086	0.397	0.085	0.536
Visited facility for diarrhea	-0.037	0.808	0.048	0.682	-0.010	0.931	0.058	0.629
ORS or recommended solution	-0.165	0.375	0.073	0.513	0.008	0.944	-0.051	0.683
Fever in previous 2 weeks	-0.057	0.136	-0.069*	0.086	-0.059	0.143	-0.067	0.141
Sought advice for fever	-0.046	0.759	0.104	0.393	-0.051	0.711	0.114	0.461
Visited facility for fever	-0.058	0.707	0.055	0.639	-0.072	0.534	0.057	0.739
Finger or heel prick	-0.053	0.600	0.012	0.875	-0.048	0.671	-0.007	0.922
Child took any anti-malarial	-0.031	0.393	-0.040	0.256	-0.037	0.331	-0.047	0.193

Note: Sample 4,493 children under 5, of which 579 had diarrhea in the 2 weeks prior to being surveyed and 510 had fever. * p<0.1 ** p<0.05 *** p<0.01. Linear probability model with difference-in-difference specification, including stratification controls. Errors are clustered at the district level. For number of tetanus injections and number of days iron taken, OLS with same specification.

61. The effect of the pilot intervention on immunization rates for children aged 12-23 months is shown in Tables 15 and 16. The intervention did not appear to have a significant effect on rates of immunization, either in the full sample or in the wealth and education subgroups shown in Table 16.

Table 15: Effect of RBF pilot on immunization in children aged 12-23 months

	Mean at baseline		*Mean at midline*		**Impact estimate**	**p-value**
	RBF	**Control**	**RBF**	**Control**		
BCG	0.863	0.902	0.819	0.893	-0.031	0.598
DPT 1	0.862	0.897	0.786	0.873	-0.049	0.491
DPT 3	0.717	0.799	0.748	0.839	-0.013	0.894
Polio 1	0.873	0.885	0.801	0.878	-0.063	0.384
Polio 3	0.716	0.782	0.749	0.845	-0.032	0.708
Measles	0.790	0.816	0.787	0.858	-0.042	0.520
All vaccinations	0.593	0.695	0.675	0.767	0.003	0.978
No vaccinations	0.116	0.092	0.173	0.107	0.039	0.542

Note: Sample size 1,157 children between 12 and 23 months old. * p<0.1 ** p<0.05 *** p<0.01. Linear probability model with difference-in-difference specification, including stratification controls. Errors are clustered at the district level.

Table 16: Effect of RBF pilot on immunization in children aged 12-23 months, by education of mother and household wealth

	Primary educ. or below		*Secondary educ.*		*Below median*		*Above median*	
	Impact	**p-value**	**Impact**	**p-value**	**Impact**	**p-value**	**Impact**	**p-value**
BCG	0.030	0.726	-0.049	0.498	-0.019	0.780	-0.050	0.475
DPT 1	0.031	0.746	-0.075	0.346	-0.056	0.523	-0.068	0.427
DPT 3	0.046	0.739	-0.032	0.738	-0.014	0.905	-0.041	0.686
Polio 1	0.031	0.750	-0.094	0.267	-0.092	0.241	-0.055	0.507
Polio 3	0.082	0.485	-0.082	0.394	0.013	0.904	-0.092	0.317
Measles	-0.017	0.860	-0.036	0.614	-0.057	0.479	-0.049	0.590
All vaccinations	0.140	0.289	-0.059	0.559	0.045	0.705	-0.057	0.584
No vaccinations	-0.026	0.771	0.058	0.452	0.046	0.484	0.042	0.588

Note: Sample size 1,157 children between 12 and 23 months old. * p<0.1 ** p<0.05 *** p<0.01. Linear probability model with difference-in-difference specification, including stratification controls. Errors are clustered at the district level.

62. The effect of the pilot intervention on child anthropometry measures is shown in Tables 17 and 18. The intervention led to an observable relative decrease the percentage of children who are severely underweight or stunted (<3sd). In terms of which subgroup experienced the largest relative reductions in stunting and underweight, the intervention has a significant and large effect among children of women with primary education or below. Interestingly, the intervention appears to decrease severe cases of stunting (<3sd) by 5 percentage points among children living in households above median wealth.

Table 17: Effect of RBF pilot on child anthropometry measures

	Mean at baseline		*Mean at midline*		**Impact estimate**	**p-value**
	RBF	**Control**	**RBF**	**Control**		
Weight-for-age <2sd	0.107	0.107	0.073	0.095	-0.021	0.278
Weight-for-age <3sd	0.025	0.015	0.020	0.023	-0.014*	0.069
Height-for-age <2sd	0.331	0.320	0.262	0.279	-0.029	0.391
Height-for-age <3sd	0.123	0.106	0.097	0.124	-0.044**	0.044
Weight-for-height <2sd	0.031	0.032	0.051	0.055	0.00	0.971
Weight-for-height <3sd	0.007	0.010	0.021	0.020	0.00	0.495

Note: Sample size 4,223 underweight children; 4,112 stunted children; 4,127 wasted children. * p<0.1 ** p<0.05 *** p<0.01. Linear probability model with difference-in-difference specification, including stratification controls. Errors are clustered at the district level.

Table 18: Effect of RBF pilot on child anthropometry measures, by education of mother and household wealth

	Primary educ. or below		*Secondary educ. or above*		*Below median wealth*		*Above median wealth*	
	Impact	p-value	Impact	p-value	Impact	p-value	Impact	p-value
Weight-for-age <2sd	-0.008	0.839	-0.022	0.294	-0.026	0.278	-0.006	0.836
Weight-for-age <3sd	-0.018	0.242	-0.012	0.234	-0.016	0.194	-0.009	0.472
Height-for-age <2sd	-0.137***	0.015	0.051	0.170	0.024	0.601	-0.069	0.152
Height-for-age <3sd	-0.065*	0.099	-0.022	0.407	-0.026	0.343	-0.056**	0.034
Weight-for-height <2sd	0.022	0.419	-0.015	0.471	0.020	0.457	-0.022	0.216
Weight-for-height <3sd	0.012	0.338	0.004	0.657	0.008	0.589	0.004	0.611

Note: Sample size 4,223 underweight children; 4,112 stunted children; 4,127 wasted children * p<0.1 ** p<0.05 *** p<0.01. Linear probability model with difference-in-difference specification, including stratification controls. Errors are clustered at the district level.

Corollary Evidence on Health Service Utilization from Administrative Data

63. Alongside the estimates of program impact based on dedicated survey measures, program impacts can also be investigated with official administrative data collected through the HMIS. The data contain a selection of service counts provided at the facility level for eight calendar quarters before the onset of the RBF program and nine quarters after onset. Seven coverage indicators, captured in the HMIS and related to the targeted RBF coverage indicators, are included in this analysis. Figures 4–10 depict the within-quarter difference of service counts between facilities in RBF districts and in control districts. Accompanying the within-quarter difference between RBF and controls is the 90 percent confidence interval to convey a sense of the statistical precision of the estimated difference. One benefit of including differences in reported services for up to eight quarters before program onset is that it also permits an investigation of the validity of the "parallel trends" assumption required by the difference-in-difference method for causal impact. Appendix 3 presents a detailed discussion and analysis of parallel trends before program onset.

64. The indicators investigated include new OPD consultations, completion of four ANC visits, normal deliveries in facility, high-risk perinatal referrals, two or more postnatal visits, completed primary course of immunization, and short-term family planning methods. The impact of the RBF intervention can be seen in the figures when the reported service quantities in RBF districts are significantly higher after the onset of the intervention. This occurs for all recorded services in at least one assessed postintervention quarter with the exception of immunization (consistent with the household data that also did not find an impact of RBF on immunization coverage).

65. For example, Figure 4 shows the number of women completing at least four ANC visits. While there is no significant difference in reported coverage in the eight quarters before the onset of RBF, significant differences emerge by the fifth quarter after the start of the RBF pilot. Approximately 6-12 additional cases of women completing four ANC visits are reported in RBF districts after the first year of the program. This pattern, while most clear for the ANC indicator, holds for most other coverage indicators

investigated, as further evidence that the RBF resulted in significant gains across many dimensions of incentivized services.

Figure 4: OPD new consultations: Relative difference across RBF and control districts, by quarter, in reported services

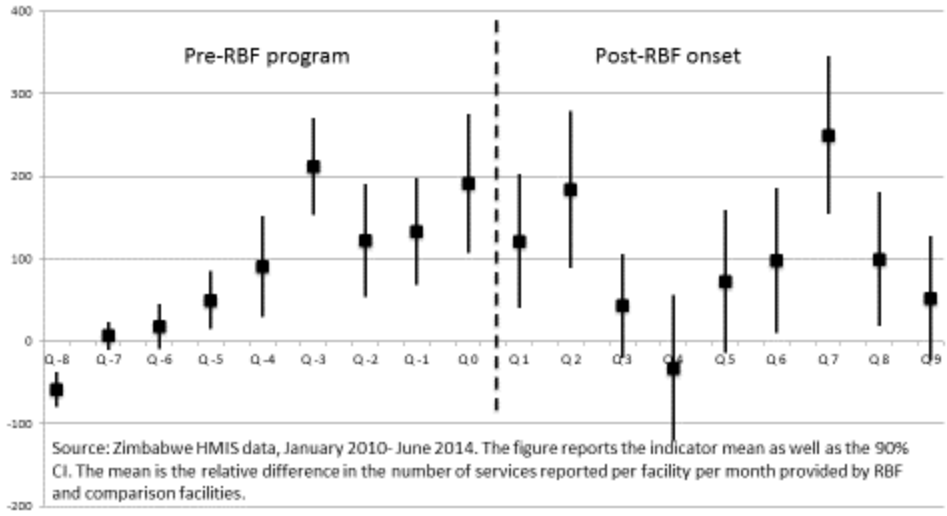


Figure 5: Four ANC visits completed: Relative difference across RBF and control districts, by quarter, in reported services

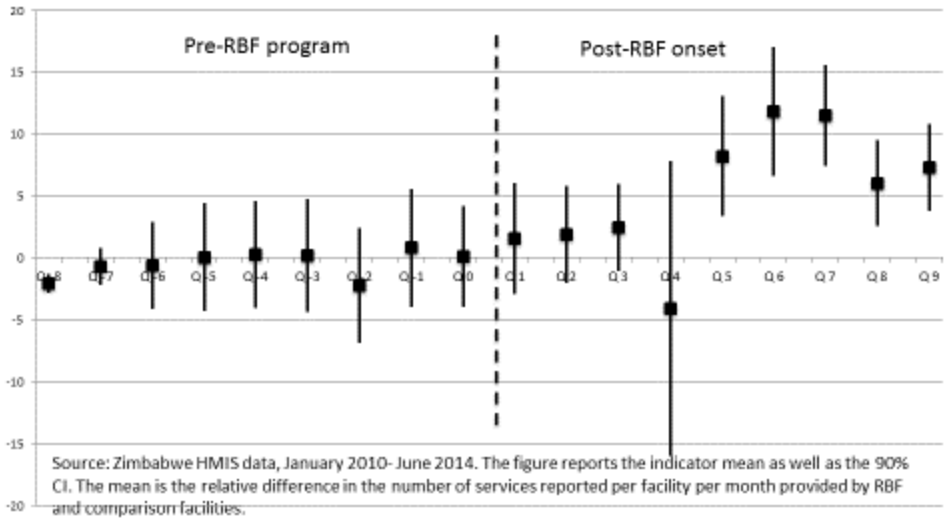
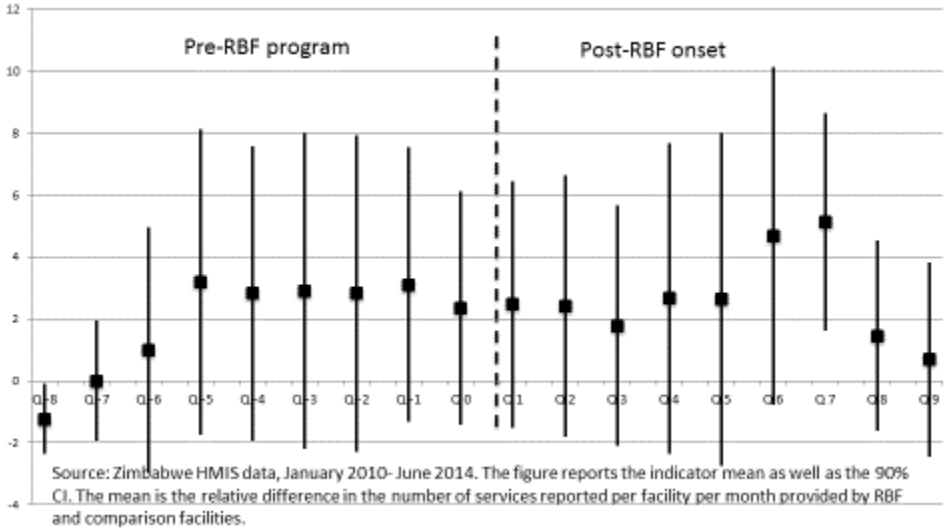
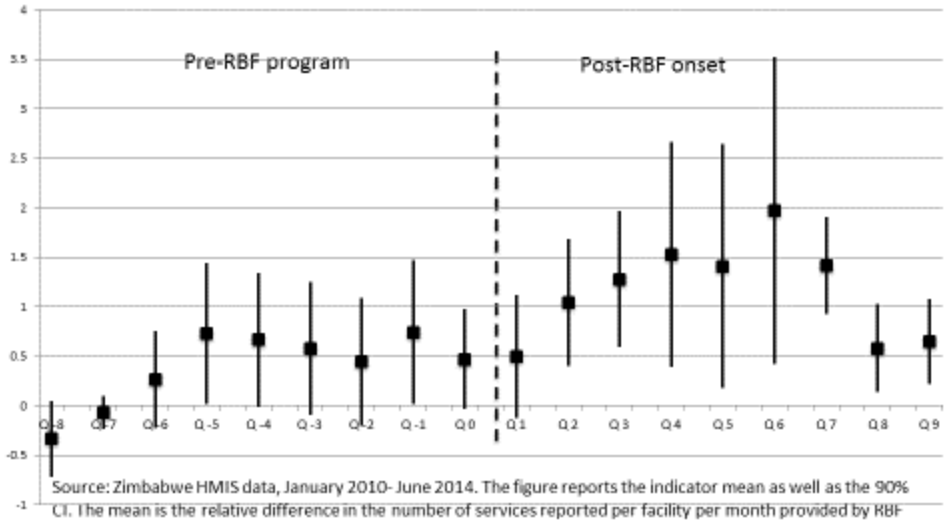


Figure 6: Normal deliveries: Relative difference across RBF and control districts, by quarter, in reported services



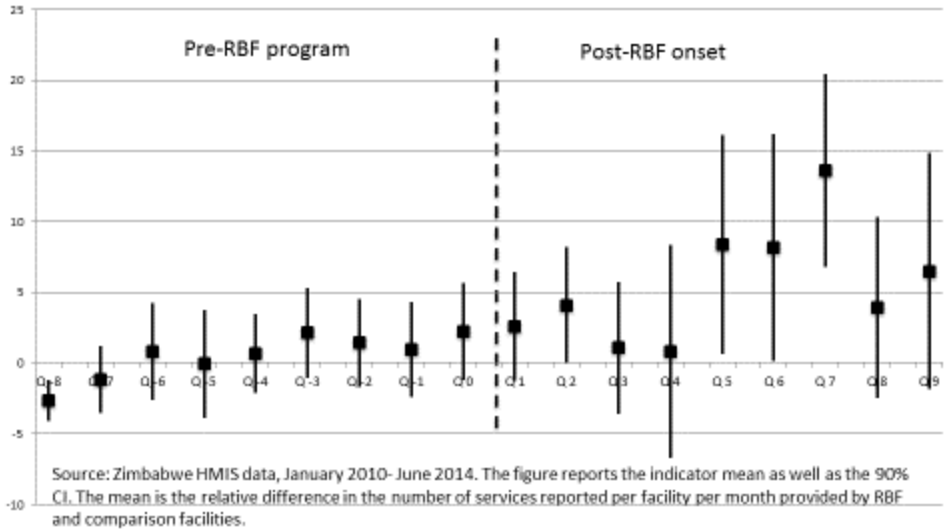
Source: Zimbabwe HMIS data, January 2010- June 2014. The figure reports the indicator mean as well as the 90% CI. The mean is the relative difference in the number of services reported per facility per month provided by RBF and comparison facilities.

Figure 7: High risk perinatal referrals: Relative difference across RBF and control districts, by quarter, in reported services



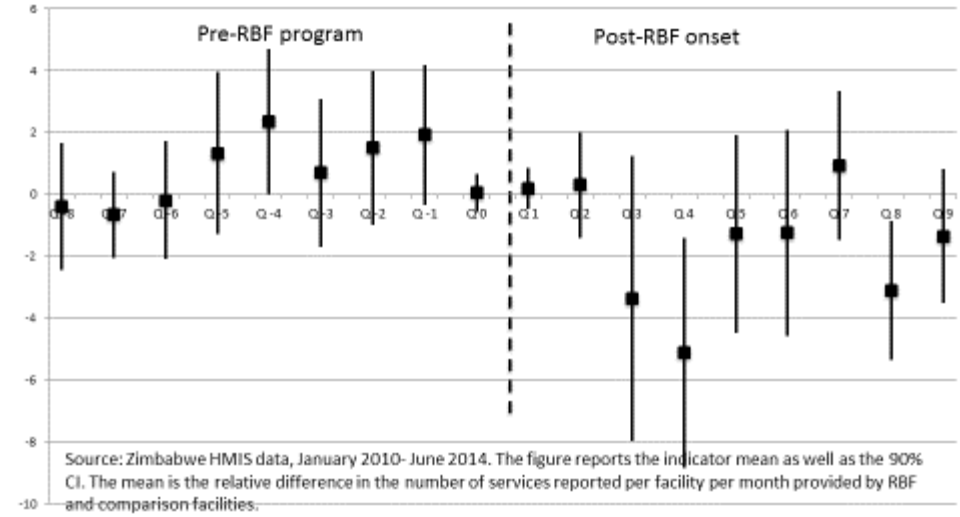
Source: Zimbabwe HMIS data, January 2010- June 2014. The figure reports the indicator mean as well as the 90% CI. The mean is the relative difference in the number of services reported per facility per month provided by RBF and comparison facilities.

Figure 8: Postnatal visits, two or more: Relative difference across RBF and control districts, by quarter, in reported services



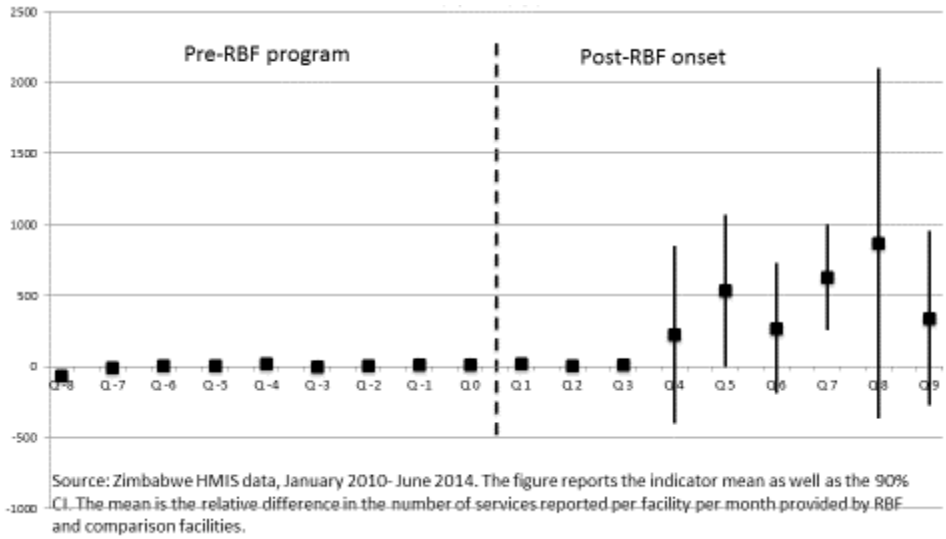
Source: Zimbabwe HMIS data, January 2010- June 2014. The figure reports the indicator mean as well as the 90% CI. The mean is the relative difference in the number of services reported per facility per month provided by RBF and comparison facilities.

Figure 9: Immunization, primary course completed: Relative difference across RBF and control districts, by quarter, in reported services



Source: Zimbabwe HMIS data, January 2010- June 2014. The figure reports the indicator mean as well as the 90% CI. The mean is the relative difference in the number of services reported per facility per month provided by RBF and comparison facilities.

Figure 10: Family planning, short term methods: Relative difference across RBF and control districts, by quarter, in reported services



Source: Zimbabwe HMIS data, January 2010- June 2014. The figure reports the indicator mean as well as the 90% CI. The mean is the relative difference in the number of services reported per facility per month provided by RBF and comparison facilities.

Quality of Services

Structural Quality

66. This section evaluates the effect of the RBF intervention on facility infrastructure and availability of essential drugs and equipment. Data come from the two rounds of the facility survey conducted in RBF and control facilities. As in the previous section, the impact estimate given is the relative change in quality indicators for the RBF facilities compared with the control facilities between baseline and midline surveys.

67. The status of infrastructure at the facilities was assessed through direct observation. Relevant dimensions of infrastructure were availability of power, water, and telecommunication systems, disinfectants, an outpatient consultation room, availability of key elements in the outpatient room for optimal service delivery, and provision of biomedical waste disposal. An infrastructure index was constructed, including the following items with equal weight: continuous availability of power, water, communications, and disinfectants, provision of sharps disposal, and basin with soap and water in the outpatient room. Though RBF facilities reported relatively higher gains in almost all dimensions (Table 19), only the provision of biomedical waste disposal was statistically significant (a 17 percentage point increase at 5 percent significance level).

Table 19: Effect of RBF pilot on facility infrastructure

	Mean at baseline		*Mean at midline*		Impact estimate	p-value
	RBF	Control	RBF	Control		
No. of electric power outages in last 7 days	0.333	0.350	0.563	0.500	0.025	0.932
No. of water outages in last 7 days	0.879	0.893	0.824	0.741	0.156	0.296
Facility has a functioning two-way radio	0.176	0.286	0.029	0.074	0.065	0.635
Facility has phone line, whether a landline or a mobile line	0.853	0.929	0.853	0.815	0.110	0.405
No. of telecommunication (landline, mobile) outages in last 7 days	0.931	0.885	0.875	0.833	0.002	0.993
Facility has a general outpatient consultation room	0.971	1.000	0.971	1.000	0.002	0.965
Outpatient consultation room equipped with a safety box or closed container for disposal of used sharps	0.853	0.929	0.939	0.963	0.064	0.566
Outpatient consultation room has posted procedures for decontamination	0.294	0.321	0.485	0.296	0.259	0.240
Outpatient consultation room has a basin with a water source and soap	0.765	0.786	0.758	0.667	0.139	0.446
No. of stockouts of disinfectant(s) in the last 30 days	0.676	0.821	0.853	0.778	0.199	0.141
Facility has a functional incinerator for disposing of medical waste	0.471	0.607	0.455	0.444	0.169	0.409
Facility has provision for the disposal of bio medical waste	0.912	1.000	1.000	0.926	0.165**	0.027
Infrastructure index	-0.041	0.298	0.156	-0.158	0.679	0.143

Note: Sample size 62 rural health centers. * p<0.1 ** p<0.05 *** p<0.01. Linear probability model with difference-in-difference specification, including stratification controls. Standard errors clustered at district level.

68. The lack of significant differences between RBF and control facilities in many structural quality measures may be partly explained from findings from the qualitative study. One major theme was that resource (including staff) deployment to some facilities has not been consistent with the catchment population. For example, a RHC in a control district had three nurses with a population of about 3,000 yet another clinic in an RBF district was serving a population of over 6,000 with only two nurses. Similarly, many facilities were encountering space shortages to implement all the programs that have been decentralized from hospitals in an effort to offer comprehensive care. As the quote below illustrates, these infrastructure and material constraints potentially undermine various aspects of quality of care:

> We converted the male ward into the HIV and counseling room since the primary counselor wants privacy. We no longer have a room to admit patients. We are now forced to combine a pregnant woman and a general client. The computer room with the data clerk is the injection room. There is no privacy. The female room is the ANC and immunization room. However, plans are underway to build a hospital nearby. *Nurse-In Charge (NIC)*

69. Further, certain facilities do not always receive the counterpart government input financing as was expected and thus have to rely on RBF funds for all facility expenses

during these periods. Given these constraints, RBF facilities may not have been able to fully leverage the additional financing opportunities afforded by the pilot RBF program.

70. Facilities were asked if they had availability of specified drugs on the day of survey and for the previous 30 days. Drugs included general antibiotics, analgesics, family planning, anti-malarials, anti-tuberculosis, antiretroviral, emergency obstetric care (EMOC), vaccines, diagnostic kits, fluids, and electrolytes. Six drug availability indices were constructed. The indices assigned equal weight to the individual items and were further normalized to measures with a mean of zero and an sd of 1. Table 20 shows the impact of RBF on the availability of selected drugs and indices. Availability of iron increased by 16 percentage points, folic acid by 21 percentage points and urine dipsticks by 42 percentage points. The standardized general drug index was also 0.96 sd higher among RBF facilities. TB drugs and diagnostic kit indices also showed large increases in value, although these were not as precisely estimated.

Table 20: Effect of RBF pilot on availability of drugs

	Mean at baseline		***Mean at midline***		**Impact estimate**	**p-value**
	RBF	**Control**	**RBF**	**Control**		
Amoxicillin tabs	0.912	0.929	0.906	0.760	0.142	0.293
Cotrimoxazole	0.853	0.929	0.968	1.000	0.045	0.649
Paracetamol tabs	0.941	0.964	1.000	0.920	0.106	0.124
Iron tabs	0.941	0.964	1.000	0.840	0.157*	0.097
Folic acid tabs	0.059	0.286	0.000	0.000	0.211*	0.070
Vitamin A	0.676	0.714	0.633	0.500	0.132	0.597
Oral contraceptive pills	0.912	0.964	0.935	1.000	0.006	0.946
Implant	0.265	0.000	0.438	0.320	-0.204	0.405
Rifampicin	0.147	0.143	0.000	0.043	-0.058	0.643
ORS	0.912	0.929	0.968	0.800	0.160	0.310
Magnesium sulfate	0.088	0.071	0.839	0.680	0.094	0.522
Diazepam Injection	0.824	0.857	0.517	0.391	0.118	0.554
Misoprostol	0.088	0.000	0.226	0.120	0.038	0.824
Oxytocin	0.824	0.607	0.833	0.680	-0.105	0.640
Pentavalent vaccines	0.912	0.929	0.938	0.875	0.041	0.804
HIV testing kit	0.941	1.000	0.935	1.000	-0.004	0.954
Pregnancy testing kit	0.118	0.000	0.161	0.160	-0.129	0.523
Urine dipstick	0.059	0.036	0.517	0.043	0.422**	0.016
General drug index	-0.125	0.098	0.451	-0.376	0.958**	0.018
EMOC drugs index	0.036	-0.288	0.068	-0.505	0.153	0.751
Family planning supplies index	0.047	-0.328	-0.184	-0.051	-0.569	0.221
TB drugs index	-0.132	-0.142	0.054	-0.496	0.431	0.340
Diagnostic kits index	-0.153	-0.068	0.043	-0.497	0.613	0.115
Vaccines index	0.125	-0.236	0.034	-0.238	-0.212	0.575

Note: Sample size 62 rural health centers. * p<0.1 ** p<0.05 *** p<0.01. Linear probability model with difference-in-difference specification, including stratification controls. Standard errors clustered at district level.

71. The analysis also investigates the availability of medical equipment. Availability of functional medical equipment was assessed through direct observation of outpatient, sterilization, vaccination, delivery and neonatal equipment. Indices were constructed for general outpatient, and EMOC equipment. The indices assigned equal weight to the individual items and were further standardized. Table 21 shows there was an increase

in the relative availability of an electric autoclave (29 percentage points) and refrigerator (27 percentage points) in RBF facilities, but a decrease in availability of Ambubags (30 percentage points) and Guedel airways (26 percentage points). Changes in the overall equipment availability index were not significant.

72. These gains in selected measures of equipment and drug availability may have knock-on effects for health measures not directly incentivized by the RBF. The PME found that clinics improved the diagnosis of selected non-incentivized conditions through the purchase of equipment such as diabetes testing machines or sphygmomanometers. Patients with chronic conditions also at times benefited from commodities directed for incentivized indicators such as atenolol. Even though these types of gains are largely not measured in the impact evaluation as the evaluation focused on the priority indicators stipulated by the RBF, the possibility of such gains should be mentioned.

Table 21: Effect of RBF pilot on availability of medical equipment

	Mean at baseline		*Mean at midline*		Impact estimate	p-value
	RBF	Control	RBF	Control		
Children's weighing scale	1.000	0.964	0.971	0.963	-0.030	0.345
Height measure	0.824	0.786	0.971	0.963	-0.025	0.863
Tape measure	0.941	1.000	0.914	0.926	0.058	0.546
Adult weighing scale	0.882	0.893	0.943	0.963	0.011	0.911
Blood pressure instrument	0.824	0.929	0.914	0.889	0.151	0.256
Thermometer	0.971	1.000	0.914	0.926	0.013	0.877
Stethoscope	1.000	1.000	0.971	0.926	0.043	0.456
Fetoscope	0.941	0.929	0.914	0.963	-0.033	0.656
Otoscope	0.088	0.071	0.171	0.074	0.074	0.451
Electric autoclave (pressure and wet heat)	0.059	0.286	0.114	0.074	0.292**	0.041
Refrigerator	0.824	1.000	0.943	0.852	0.269**	0.014
Delivery table/bed	0.971	0.857	0.971	0.963	-0.107	0.112
Baby scale (infant weighing scale)	0.971	1.000	0.886	0.963	-0.052	0.357
Bag Valve Mask (Ambu bag)	0.765	0.464	0.857	0.852	-0.298*	0.054
Guedel airways-neonatal, child, and adult	0.382	0.250	0.543	0.667	-0.256*	0.082
Partograph	0.765	0.786	0.829	0.889	-0.026	0.867
Delivery light	0.059	0.036	0.114	0.037	0.043	0.481
Umbilical cord clamp or sterile tape or sterile tie	0.853	0.821	0.800	0.852	-0.090	0.591
Equipment index	-0.032	-0.024	0.074	0.040	0.145	0.704
EMOC equipment index	0.016	-0.316	-0.019	-0.044	-0.309	0.432

Note: Sample size 62 rural health centers. * p<0.1 ** p<0.05 *** p<0.01. Linear probability model with difference-in-difference specification, including stratification controls. Standard errors clustered at district level.

73. RBF facilities are supervised every quarter by the DHE, which monitors the quality of services using a quality checklist. This checklist has 13 dimensions, each consisting of several items, weighted differently depending on their perceived importance to service delivery. The quality checklist used by the district health executive and the facility survey instrument used during data collection for this impact

evaluation contain a few common items. These common items were extracted from the facility survey and the weights from the quality checklist applied, to construct a quality index similar to that used by the DHEs. Standardized indices were constructed for each quality dimension. Appendix Table 4.7 maps out common variables in both instruments. Eight of the 13 quality dimensions on the quality checklist could be mapped to the health facility instrument.

74. Table 22 summarizes the results of the quality mapping exercise. RBF facilities report an increase in all standardized indices, though only the "Family and Child Health" dimension shows a statistically significant gain of 0.84 standard deviations (5 percent significance level).

Table 22: Effect of RBF pilot on structural quality (mapping of quality checklist to facility survey)

	Mean at baseline		*Mean at midline*		Impact estimate	p-value
	RBF	Control	RBF	Control		
Administration and planning	0.132	-0.126	0.275	-0.101	0.167	0.674
Medicines and sundries stock management	-0.305	0.135	-0.266	0.110	0.017	0.969
Outpatient department	-0.257	0.014	0.033	-0.121	0.468	0.213
Family and child health	-0.280	0.177	0.012	-0.365	0.837**	0.021
Maternity service	0.138	-0.139	0.125	-0.163	0.009	0.981
Referral services	-0.152	0.021	-0.048	-0.086	0.182	0.667
Community services	0.219	0.124	0.253	0.172	0.049	0.866
Infection control and waste management	-0.190	0.078	-0.164	-0.269	0.492	0.272
Total score	-0.067	0.037	0.133	-0.289	0.579	0.239

Note: Sample size 62 rural health centers. * p<0.1 ** p<0.05 *** p<0.01. Linear probability model with difference-in-difference specification, including stratification controls. Standard errors clustered at district level.

Process Quality

75. This section summarizes the effect on quality of care provided for antenatal, postnatal, and child health care services. There are a number of sources for this data: direct clinical observations of consultations, exit interviews administered to patients as they are leaving their consultations, and data from the household survey as well as semi-structured interviews and focus group discussions in the PME studies as well as the follow-on qualitative study.

Maternal and Neonatal Care

76. Tables 23 and 24 summarize key quality measures for antenatal care, taken from retrospective women reports in the household survey data. Pregnant women in RBF districts are 15 percentage points more likely to have had a urine sample taken, and are 8 percentage points more likely to have had a tetanus injection. There are no other significant differences in quality. Table 24 gives the results by education of the mother and household wealth. The effect of the intervention on urine testing is larger for less educated mothers, and mothers from poorer households, but the effect of the

intervention on tetanus injections appears to be larger for more educated mothers, so the equity implications for process quality improvements appear mixed.

Table 23: Effect of RBF pilot on quality of antenatal care provided: Results from household survey

	Mean at baseline		*Mean at midline*		Impact estimate	p-value
	RBF	Control	RBF	Control		
Blood pressure measured	0.770	0.786	0.970	0.964	0.025	0.570
Urine sample taken	0.445	0.482	0.538	0.426	0.153**	0.027
Blood sample taken	0.763	0.819	0.955	0.927	0.084	0.129
Any tetanus injection	0.771	0.849	0.925	0.928	0.075*	0.056
Number of tetanus injections	1.445	1.618	1.670	1.529	0.312*	0.063
Any iron taken	0.533	0.545	0.911	0.915	0.003	0.951
Number of days' iron taken	17.008	16.180	80.855	80.992	-1.161	0.868
Anti-parasite drugs taken	0.035	0.014	0.086	0.037	0.031	0.117
Malaria prophylaxis taken	0.313	0.304	0.497	0.456	0.033	0.654

Note: * p<0.1 ** p<0.05 *** p<0.01. Linear probability model with difference-in-difference specification, including province-level controls. Errors are clustered at the district level. For number of tetanus injections and number of days iron taken, OLS with same specification.

Table 24: Effect of RBF Pilot on quality of antenatal care, by education of mother and household wealth: Results from household survey

	Primary educ. or below		*Secondary educ. or above*		*Below median wealth*		*Above median wealth*	
	Impact	p-value	Impact	p-value	Impact	p-value	Impact	p-value
Blood pressure measured	0.029	0.678	0.021	0.669	0.020	0.711	0.003	0.942
Urine sample taken	0.265**	0.013	0.098	0.127	0.180*	0.051	0.118*	0.073
Blood sample taken	0.059	0.488	0.095*	0.050	0.052	0.496	0.096*	0.069
Any tetanus injection	0.044	0.480	0.084**	0.040	0.075	0.137	0.058	0.165
Number of tetanus injections	0.246	0.280	0.336**	0.038	0.278	0.157	0.320*	0.091
Any iron taken	-0.087	0.243	0.058	0.258	-0.029	0.732	0.023	0.634
Number of days iron taken	-2.431	0.817	0.481	0.944	5.489	0.592	-8.266	0.213
Anti-parasite drugs taken	0.043	0.120	0.024	0.219	0.039	0.192	0.021	0.282
Malaria prophylaxis taken	0.117	0.158	-0.002	0.978	0.009	0.920	0.042	0.621

Note: * p<0.1 ** p<0.05 *** p<0.01. Linear probability model with difference-in-difference specification, including province-level controls. Errors are clustered at the district level. For number of tetanus injections and number of days iron taken, OLS with same specification.

77. Table 25 presents similar quality measures for ANC, measured using user exit interviews conducted as pregnant women left care facilities. Participants were asked a series of questions as to whether certain ANC services were performed during their visit. The six items were summed to create a composite score for the number of ANC services that were performed. Participants were asked to rate if the overall quality of the services was satisfactory on a Likert-type scale (1=strongly disagree to 5=strongly

agree). Finally, a dichotomous variable was created to measure if all six of the ANC services were completed for each participant. This variable was standardized before using in final analyses. Results indicate no significant difference in quality of services between RBF and control facilities.

Table 25: Effect of RBF pilot on quality of antenatal care: Results from user exit interviews

	Mean at baseline		*Mean at midline*		Impact estimate	p-value
	RBF	Control	RBF	Control		
Weighed	0.902	0.891	0.973	0.983	-0.005	0.948
Blood pressure measured	0.833	0.929	0.851	0.922	0.041	0.571
Urine sample collected	0.057	0.054	0.277	0.243	0.011	0.906
Blood sample collected	0.521	0.424	0.351	0.304	-0.056	0.683
Abdomen measured	0.823	0.815	0.963	0.948	0.036	0.658
Abdomen palpated	0.978	0.978	0.968	0.991	-0.021	0.310
Quality composite	4.114	4.092	4.383	4.391	0.006	0.984
The overall quality of services provided was satisfactory	3.741	3.826	3.878	3.843	0.106	0.215
All 6 quality items met (0/1)	0.009	0.027	0.149	0.113	0.040	0.460
All 6 quality items met (std)	-0.233	-0.163	0.319	0.177	0.157	0.460

Note: Sample size 1,107 clients. * p<0.1 ** p<0.05 *** p<0.01; impact estimates adjusted for district pair matching with standard errors clustered at district level.

78. Table 26 shows results from the direct observations of antenatal care in the health facilities. There is no evidence of impact on antenatal care quality from these observations. However, when the observations are disaggregated by order of visit, RBF has a positive impact on physical examination index (by 1.4 standard deviation) for women visiting for the fourth time or more.

Table 26: Effect of RBF pilot on quality of antenatal care: Results from direct observations

	Mean at baseline		*Mean at midline*		Impact estimate	p-value
	RBF	Control	RBF	Control		
Measure blood pressure	0.880	0.855	0.805	0.891	-0.015	0.903
Weigh the client	0.817	0.790	0.899	0.941	-0.058	0.609
Check for signs of anemia	0.819	0.839	0.776	0.693	0.154	0.283
Examine hands for edema	0.229	0.355	0.522	0.490	0.167	0.347
Palpate the client's abdomen for uterine height	0.964	0.935	0.953	0.950	-0.015	0.767
Perform or refer for urine test for proteinuria	0.072	0.000	0.233	0.162	0.064	0.578
Prescribed iron or folic acid (IFA) or both	0.904	0.790	0.744	0.780	-0.152	0.303
Gave supply of iron or folic acid (IFA) or both	0.892	0.774	0.717	0.760	-0.162	0.298
Explained side effects of iron or folic acid	0.105	0.078	0.197	0.149	-0.007	0.957

Note: Sample size 564 clients. * p<0.1 ** p<0.05 *** p<0.01; impact estimates adjusted for district pair matching with standard errors clustered at district level.

79. Table 27 summarizes the effect of RBF on a few postnatal care quality outcomes of women who had a pregnancy related outcome in the previous two years based on recall as recorded in the household survey. The intervention appears to have had no significant effect on quality of postnatal care as captured in these measures, and no differential effect by the socioeconomic status of the mother. This lack of effect holds if we investigate the more disadvantaged groups as assessed by education or household wealth level. These results are summarized in Table 28.

Table 27: Effect of RBF pilot on quality of postnatal care provided

	Mean at baseline		*Mean at midline*		Impact	p-value
	RBF	Control	RBF	Control	estimate	
Vit A given after delivery	0.398	0.455	0.538	0.594	0.000	0.995
Liquid other than breast milk	0.129	0.107	0.031	0.044	-0.033	0.226
Immediate breast-feeding	0.681	0.724	0.632	0.643	0.038	0.597

Note: Sample size 2,393 births. * p<0.1 ** p<0.05 *** p<0.01. Linear probability model with difference-in-difference specification, including province-level controls. Errors are clustered at the district level.

Table 28: Effect of RBF on quality of postnatal care provided, by education of mother and household wealth

	Primary educ. or below		*Secondary educ. or*		*Below median*		*Above median*	
	Impact	p-value	Impact	p-value	Impact	p-value	Impact	p-value
Vit A given after delivery	-0.063	0.479	0.041	0.583	-0.037	0.714	0.014	0.844
Liquid other than breast milk	-0.077	0.131	-0.014	0.628	-0.041	0.313	-0.026	0.337
Immediate breast-feeding	0.058	0.586	0.044	0.531	0.073	0.483	0.023	0.785

Note: Sample size 2,393 births. * p<0.1 ** p<0.05 *** p<0.01. Linear probability model with difference-in-difference specification, including province-level controls. Errors are clustered at the district level.

Child Health Care

80. The quality of child health care was measured both through patient exit interviews and through direct clinical observations. Patients (specifically caretakers of patients) were asked a series of questions as to whether certain child health care processes were conducted during the visit. These five items are analyzed separately and also summed to create a composite score for the number of child health care services that were performed. Participants were also asked to rate if the overall quality of the services was satisfactory on a Likert-type scale (1=strongly disagree to 5=strongly agree). Finally, a dichotomous variable was created to measure if all five of the child health care services were completed. This variable was standardized before inclusion in the final analyses. The patient exit data show few significant differences between RBF and control facilities, in terms of checks on weight and height and basic examination (Table 29). However, the intervention appears to decrease the likelihood that age of the child is asked. This result should be interpreted with care, since more widespread use of child health cards reduces the need to ask a child age during a consultation.

Table 29: Effect of RBF pilot on quality of child health care: Results from exit interviews

	Mean at baseline		*Mean at midline*		Impact estimate	p-value
	RBF	Control	RBF	Control		
Did someone in the health facility ask the age of the child?	0.987	0.965	0.970	0.988	-0.042**	0.015
Did someone in the health facility weigh the child?	0.810	0.863	0.942	0.963	0.021	0.770
Did someone in the health facility measure the height of the child?	0.026	0.047	0.809	0.753	0.076	0.362
Did someone in the health facility plot weight or height against a growth chart?	0.633	0.682	0.777	0.712	0.128	0.376
Did the health worker physically examine the child?	0.710	0.737	0.960	0.975	0.014	0.858
Quality composite	3.166	3.294	4.453	4.380	0.204	0.470
The overall quality of services provided was satisfactory	3.736	3.690	3.789	3.852	-0.103	0.193
All 5 quality items met (0/1)	0.021	0.031	0.612	0.555	0.064	0.495
All 5 quality items met (std)	-0.614	-0.592	0.671	0.546	0.140	0.495

Note: Sample size 1618 clients. * p<0.1 ** p<0.05 *** p<0.01; impact estimates adjusted for district pair matching with standard errors clustered at district level.

81. Results for clinical quality in child consultations observed by trained nurse enumerators are shown in Table 30. Improvement in correct classification of sick children for general danger signs was 21 percentage points higher in RBF facilities than in control facilities. The intervention also appeared to improve treatment of children with a cough and/or problems breathing: the likelihood that such a child was classified correctly increased by 30 percentage points, and the likelihood that he or she was managed correctly increased by 38 percentage points. The intervention also increased the likelihood that a child due for vaccination was actually vaccinated by 48 percentage points.

Table 30: Effect of RBF pilot on quality of child health care: Results from direct observations

	Mean at baseline		*Mean at midline*		Impact estimate	p-value
	RBF	Control	RBF	Control		
Health worker correctly classifies the sick child for general danger signs	0.013	0.087	0.266	0.224	0.212**	0.022
Health worker correctly classifies a child with cough or difficult breathing	0.162	0.211	0.524	0.460	0.307**	0.030
Health worker correctly manages a child with cough or difficult breathing	0.189	0.316	0.463	0.362	0.382**	0.035
Health worker classifies correctly the child with diarrhea	0.389	0.214	0.458	0.545	-0.094	0.564
Health worker manages correctly the child with diarrhea	0.389	0.143	0.449	0.432	-0.062	0.749
Health worker classifies correctly the child with fever for malaria	0.379	0.056	0.245	0.197	-0.136	0.333
Health worker manages correctly the child with fever	0.355	0.111	0.233	0.182	-0.062	0.666
Health worker classifies correctly the child with ear problem	0.444	0.200	0.639	0.273	-0.005	0.991
Health worker manages correctly the child with ear problem	0.556	0.200	0.667	0.364	-0.083	0.828
Health worker classifies correctly the nutritional status of the child	0.102	0.070	0.159	0.182	0.036	0.729
Health worker manages correctly nutritional problem the child has	0.104	0.088	0.199	0.144	0.141	0.213
Health worker classifies correctly the child for anemia	0.167	0.023	0.311	0.261	-0.034	0.792
Health worker manages correctly the child with anemia	0.146	0.000	0.243	0.155	-0.075	0.625
Health worker classified the child for HIV and managed the child correctly	0.163	0.023	0.333	0.147	0.052	0.707
If a child is due for immunization the Health worker gave the vaccine	0.520	0.600	0.586	0.125	0.487*	0.087

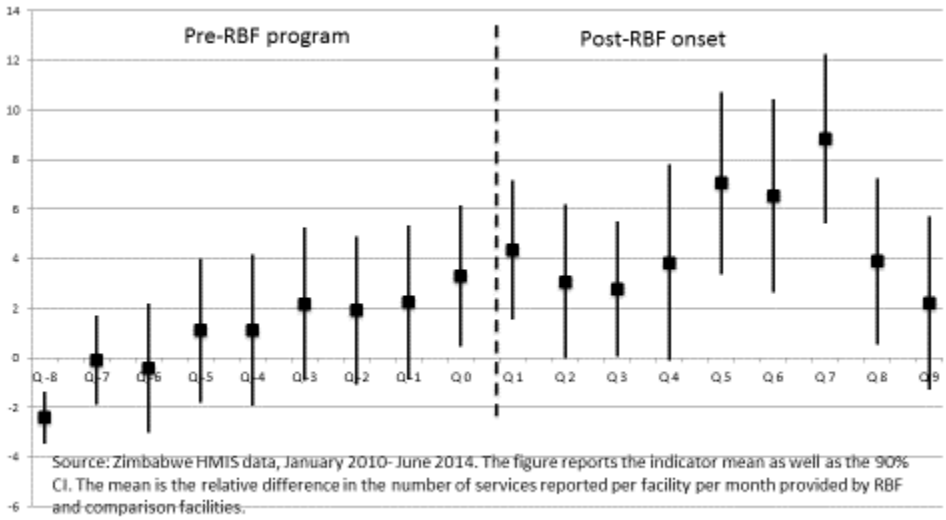
Note: Sample size 868 clients. * p<0.1 ** p<0.05 *** p<0.01; impact estimates adjusted for district pair matching with standard errors clustered at district level.

Corollary Evidence on Health Service Utilization from Administrative Data

82. Alongside the estimates of program impact based on dedicated survey data, the robustness of findings as it relates to process quality can also be investigated with administrative data in the same manner as the HMIS data analysis of service coverage. Figures 11-17 present the within-quarter differences for indicators related to process quality of care. These indicators include the number of HIV VCT given during ANC care, PMTCT, the number of syphilis RPR tests, IPT, and tetanus (TT2+) shots given during ANC care, as well as the number of children receiving Vitamin A supplementation and growth monitoring. All but one of these quality measures follow a pattern showing clear improvement in the number of MCH service users receiving these indicators of process quality especially by the second year of the RBF pilot, which again suggests the importance of a learning period under RBF lasting up to four quarters before population health gains can be achieved on a broad level. As one example, an additional two to seven women in RBF districts receive IPT during ANC care each

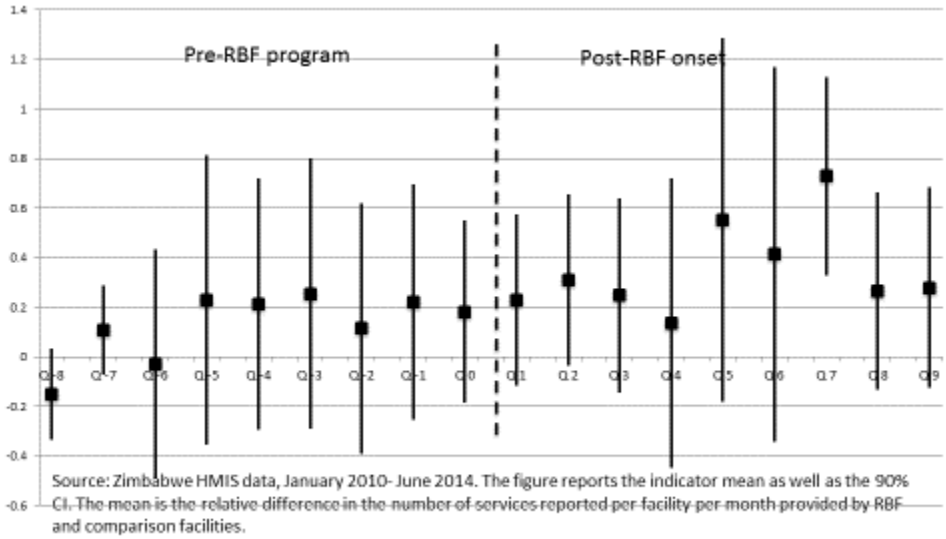
quarter after the first year of the program. There were no gains in process quality related to Vitamin A, although this indicator only had one-quarter of data available before the onset of the program.

Figure 11: HIV VCT in ANC: Relative difference across RBF and control districts, by quarter, in reported services



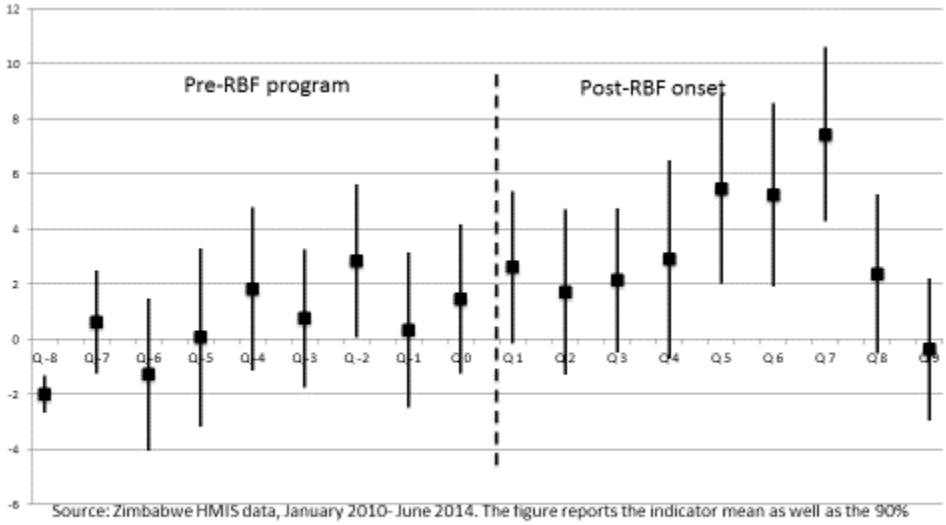
Source: Zimbabwe HMIS data, January 2010- June 2014. The figure reports the indicator mean as well as the 90% CI. The mean is the relative difference in the number of services reported per facility per month provided by RBF and comparison facilities.

Figure 12: ARVs to HIV+ pregnant women (PMCTC): Relative difference across RBF and control districts, by quarter, in reported services



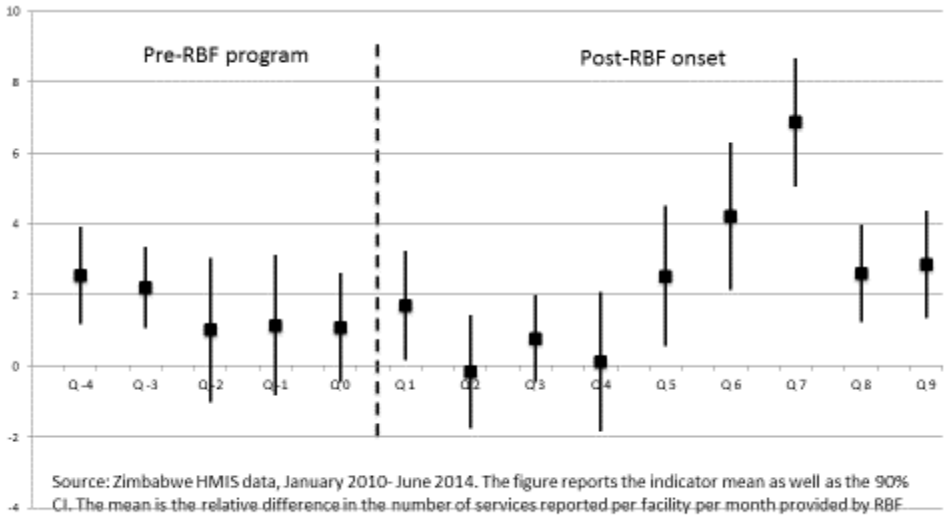
Source: Zimbabwe HMIS data, January 2010- June 2014. The figure reports the indicator mean as well as the 90% CI. The mean is the relative difference in the number of services reported per facility per month provided by RBF and comparison facilities.

Figure 13: Syphilis RPR test: Relative difference across RBF and control districts, by quarter, in reported services



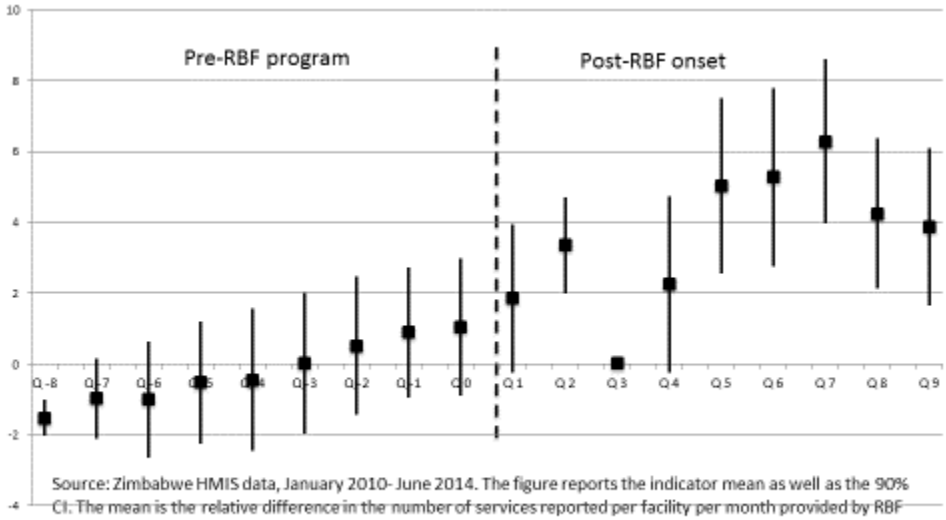
Source: Zimbabwe HMIS data, January 2010- June 2014. The figure reports the indicator mean as well as the 90% CI. The mean is the relative difference in the number of services reported per facility per month provided by RBF and comparison facilities.

Figure 14: IPT (x2 doses): Relative difference across RBF and control districts, by quarter, in reported services



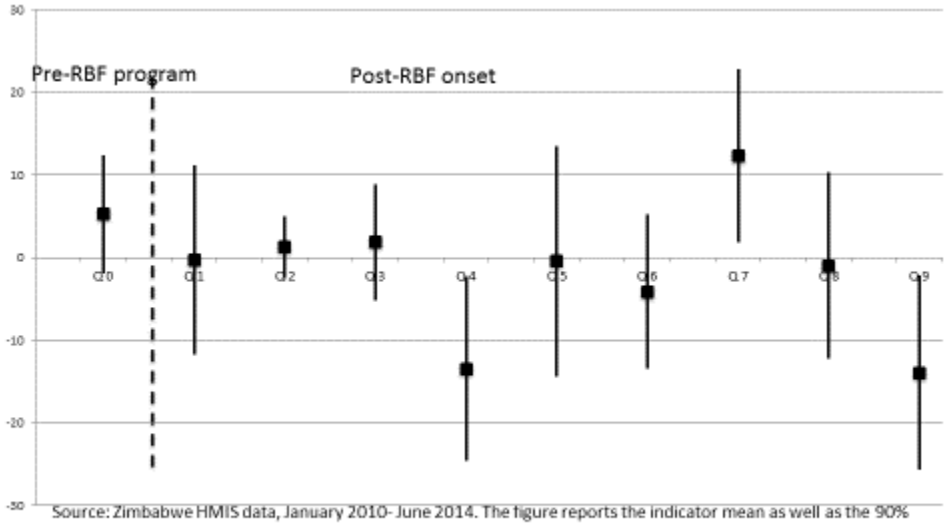
Source: Zimbabwe HMIS data, January 2010- June 2014. The figure reports the indicator mean as well as the 90% CI. The mean is the relative difference in the number of services reported per facility per month provided by RBF and comparison facilities.

Figure 15: Tetanus (TT2+): Relative difference across RBF and control districts, by quarter, in reported services



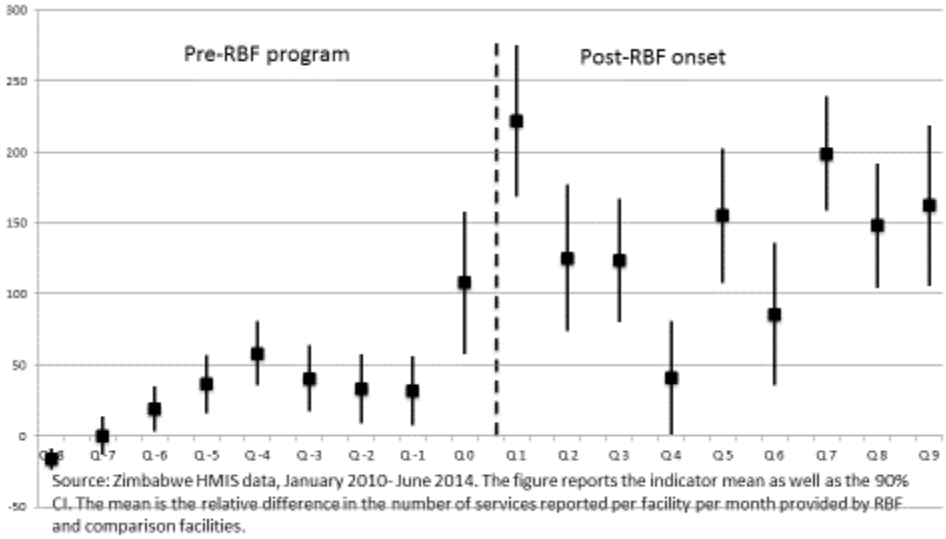
Source: Zimbabwe HMIS data, January 2010- June 2014. The figure reports the indicator mean as well as the 90% CI. The mean is the relative difference in the number of services reported per facility per month provided by RBF and comparison facilities.

Figure 16: Vitamin A supplementation: Relative difference across RBF and control districts, by quarter, in reported services



Source: Zimbabwe HMIS data, January 2010- June 2014. The figure reports the indicator mean as well as the 90% CI. The mean is the relative difference in the number of services reported per facility per month provided by RBF and comparison facilities.

Figure 17: Growth monitoring: Relative difference across RBF and control districts, by quarter, in reported services



Source: Zimbabwe HMIS data, January 2010- June 2014. The figure reports the indicator mean as well as the 90% CI. The mean is the relative difference in the number of services reported per facility per month provided by RBF and comparison facilities.

Client Satisfaction

83. Reported client satisfaction is often taken as another proxy for quality of care.

84. This section summarizes the effect of the intervention on client satisfaction in antenatal care and child health care. Overall client satisfaction in ANC increased for RBF facilities (Table 31), both for the aggregate satisfaction score (i.e., summing scores over cleanliness, waiting time and consultation time, hours, courteousness and perceived competence of staff) and for the patient's overall satisfaction. There appeared to be no significant effect of the intervention on client satisfaction for child curative consultations (Table 32). Shifts in patient satisfaction were also identified in the PME, especially in those areas where the primary clinics were responsive to health issues raised by the community and presented through the HCCs.

Table 31: Effect of RBF pilot on client satisfaction in antenatal care: Results from exit interviews

	Mean at baseline		*Mean at midline*		Impact estimate	p-value
	RBF	Control	RBF	Control		
The health facility is clean	3.331	3.418	3.597	3.470	0.241	0.119
The health staff are courteous and respectful	3.710	3.755	3.793	3.783	0.059	0.450
The amount of time you spent waiting to be seen by a health provider was reasonable	3.446	3.527	3.182	2.990	0.373	0.145
The health worker spent a sufficient amount of time with the patient	3.785	3.853	3.846	3.913	0.014	0.901
The hours the facility is open is adequate to meet the needs of the community	3.791	3.793	3.888	3.722	0.182	0.158
You trust in the skills and abilities of the health workers	3.785	3.777	3.840	3.861	-0.019	0.808
The health workers did a good job of explaining your illness	3.524	3.667	3.844	3.826	0.165	0.131
Satisfaction score—7 items	3.625	3.685	3.723	3.674	0.134*	0.077
Your overall visit was satisfactory	3.776	3.864	3.888	3.835	0.143*	0.072

Note: Sample size 1,107 clients. * p<0.1 ** p<0.05 *** p<0.01; impact estimates adjusted for district pair matching with standard errors clustered at district level.

Table 32: Effect of RBF pilot on client satisfaction on child health care: Results from exit interviews

	Mean at baseline		*Mean at midline*		Impact estimate	p-value
	RBF	Control	RBF	Control		
The health facility is clean.	3.280	3.384	3.640	3.577	0.164	0.259
The health staff are courteous and respectful.	3.654	3.686	3.729	3.730	0.024	0.808
The amount of time you spent waiting to be seen by a health provider was reasonable.	3.309	3.400	3.312	3.258	0.198	0.353
The health worker spent a sufficient amount of time with the patient.	3.744	3.753	3.863	3.853	0.019	0.836
The hours the facility is open is adequate to meet the needs of the community.	3.668	3.714	3.762	3.745	0.048	0.737
You trust in the skills and abilities of the health workers.	3.741	3.753	3.820	3.834	0.000	0.999
The health workers did a good job of explaining your illness.	3.272	3.412	3.676	3.712	0.109	0.428
Satisfaction score—7 items	3.524	3.586	3.686	3.672	0.080	0.289
Your overall visit was satisfactory	3.770	3.729	3.802	3.853	-0.085	0.240

Note: Sample size 1,618 clients. * p<0.1 ** p<0.05 *** p<0.01; impact estimates adjusted for district pair matching with standard errors clustered at district level.

Health Systems

85. Besides broadly understanding how the RBF pilot program affected the coverage and quality of health care directly related to the incentivized services, the evaluation also looked more broadly at potential impacts of various aspects of health system functioning. These aspects included possible changes in OOP expenditures, task-shifting and non-incentivized activities, facility governance and autonomy, and health worker satisfaction and motivation.

Out-of-pocket Expenditures

86. As explained in the earlier "Description of Intervention," user fees were officially abolished in treatment districts as part of the overall package of interventions. In practice, the data suggest that fees and other OOP payments persisted in the RBF districts after program onset. This subsection summarizes the evidence on the incidence and magnitude of user fees for maternal and neonatal health in RBF and control districts. Baseline data on client expenditure are not available, so impact estimates presented are only the difference between the outcome for households in the RBF districts and the control districts at midline, controlling for stratification indicator (province). These data should be interpreted with caution, since there are numerous missing values in the household data on reported incidence and quantity of fees charged, especially for postnatal/postpartum care payments. Additionally, clients may have difficulty distinguishing between formal and informal fees incurred and other payment categories.

87. The incidence of user fees is not significantly lower in RBF districts than in controls (Table 33). Forty-five percent of mothers in RBF districts reported paying a fee for their most recent delivery, and 72 percent reported paying any OOP direct costs. Direct costs include fees, drugs, lab tests, facility stay, and gifts, and any other direct costs not including transport. Incidence of payment is lower for ante- and postnatal care than for delivery, but around one-quarter of mothers in RBF districts reported some OOP payment for ANC and almost one-third reported some OOP payment for PNC. However, when only households below median wealth are considered, incidence of ANC fees is 10 percentage points lower in RBF districts than in control districts (Table 34).

Table 33: Effect of RBF pilot on probability of OOP expenditure

	Mean at midline		Impact estimate	p-value
	RBF	Control		
Paid a fee for ANC	0.207	0.229	-0.035	0.361
Any direct payment for ANC	0.243	0.265	-0.030	0.451
Paid delivery fee	0.454	0.397	0.006	0.931
Any direct payment for delivery	0.723	0.662	-0.005	0.899
Paid a fee for PNC	0.213	0.151	0.093	0.120
Any direct payment for PNC	0.315	0.236	0.073	0.375

Note: Sample size ANC 1,608, births 475, PNCs 200. * p<0.1 ** p<0.05 *** p<0.01. Linear probability model, including province-level controls. Errors are clustered at the district level. Direct costs include fees, drugs, lab tests, stay, and gifts.

Table 34: Effect of RBF pilot on probability of OOP expenditure, by household wealth

	Below median wealth		*Above median wealth*	
	Impact	**p-value**	**Impact**	**p-value**
Paid a fee for ANC	-0.096**	0.037	0.012	0.803
Any direct payment for ANC	-0.085*	0.074	0.005	0.910
Paid delivery fee	0.001	0.988	0.016	0.852
Any direct payment for delivery	-0.104	0.151	0.028	0.585
Paid a fee for PNC	-0.014	0.879	0.189	0.010
Any direct payment for PNC	-0.013	0.921	0.140	0.132

Note: Sample size ANC 1,608, births 475, PNCs 200. * p<0.1 ** p<0.05 *** p<0.01. Linear probability model, including province-level controls. Errors are clustered at the district level. Direct costs include fees, drugs, lab tests, stay, and gifts.

88. Among households that paid for care, there appears to be no significant difference in the payment made, though it should be noted that sample sizes are small (Table 35). Table 36 shows the effect of the intervention on size of payment for households above and below median income. For poorer households that paid any fee for delivery, being in the treatment area reduces the size of delivery fee by 66 percent. It also appears to reduce the size of ANC payments, though this is not significant. For wealthier households, being in the treatment area increases the size of payment for ANC by 40 percent. PNC payments are not shown for the subgroups because the sample size is too small.

Table 35: Effect of RBF pilot on size of OOP expenditure for households that paid for care (USD)

	RBF Intervention/ treatment		*Control*		**Impact estimate**	**p-value**
	Mean	**Median**	**Mean**	**Median**		
ANC fee	19.495	15	12.541	9	0.227	0.318
ANC direct payment	24.493	15	17.527	10	0.115	0.575
Delivery fee	68.038	15	31.857	16	-0.071	0.813
Delivery direct payment	68.565	19	39.029	20	0.199	0.366
PNC/PPC fee	21.444	15	14.750	10	-1.493	0.136
PNC/PPC direct payment	20.593	10	14.960	10	-0.088	0.895

Note: Sample size ANC fees 406; delivery fees 202; PNC fees 36. * p<0.1 ** p<0.05 *** p<0.01. Regression model with province controls. Errors clustered at district level. Dependent variable is natural log of expenditure. Regression includes only patients who paid OOP expenditure. Direct costs include fees, drugs, lab tests, stay, and gifts.

Table 36: Effect of RBF pilot on size of OOP expenditure for households that paid for care, by household wealth (USD)

	Below median wealth		*Above median wealth*	
	Impact	p-value	Impact	p-value
ANC fee	-0.488	0.188	0.333**	0.047
ANC direct payment	-0.417	0.168	0.143	0.409
Delivery fee	-1.095**	0.038	0.211	0.347
Delivery direct payment	-0.239	0.561	0.238	0.212

Note: * p<0.1 ** p<0.05 *** p<0.01. Regression model with province controls. Errors clustered at district level. Dependent variable is natural log of expenditure. Regression includes only patients who paid OOP expenditure. Direct costs include fees, drugs, lab tests, stay, and gifts. Payments for PNC not shown due to small sample size.

89. These results—that the incidence and amount of fees paid by households was largely the same in treatment and control areas after the onset of the RBF pilot—are noteworthy for two reasons: (i) the formal suspension of user fees in RBF areas did not appear to affect, to a noticeable degree, the fees paid by households, except for perhaps the poorer households, and consequently (ii) the increase in service utilization identified under the RBF is likely due to other factors than the suspension of formal user fees.

90. The qualitative follow-on study delved deeper into the quantitative impact evaluation findings on user fees. The study revealed that the government rural health facilities visited in the RBF and control districts do not charge formal user fees and that notices are displayed on the entrance to some clinics. An exception was council clinics and mission hospitals. It was reported that one council clinic was charging user fees but there were exceptions for MCH services and the elderly, as explained by the NIC:

> They pay $1 every time they come to the clinic with the exception of under fives, maternity, and the elderly. *NIC*

91. Fees are the main source of income for councils, which they use to pay staff and finance development at the facilities. However, the follow-on study did not interview the council clinic nor the clients who could have provided more detailed information on payment of user fees. At the sampled mission hospital, patients pay $5 for consultation except for under-5 children, pregnant mothers, the chronically ill, and those above 60. The incidence of OOP expenditures identified in this analysis may partly reflect patient utilization of council clinics or mission hospitals, although the incidence of OOP payments reported in the data is larger than use of council clinics or mission hospitals, suggesting other reasons for fees as well (and further, the relative incidence of council clinics or mission facilities does not vary between RBF and control districts).

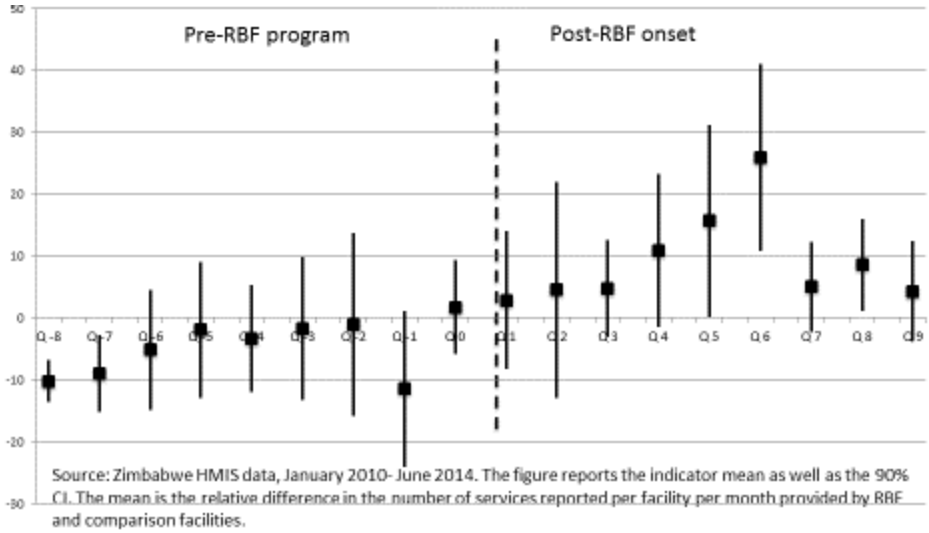
Task-shifting and Non-incentivized Activities

92. One concern with the introduction of pay-for-performance mechanisms in health is the possibility that the newly incentivized services may detract health staff attention and efforts away from non-incentivized routine services, which are sometimes

then left to lower-level, often insufficiently trained, staff to deliver. This possibility can also be investigated with administrative data that record services of relatively non-incentivized services (in so far as all services offered by the clinic fall under OPD consultations, all services are incentivized to a small degree).

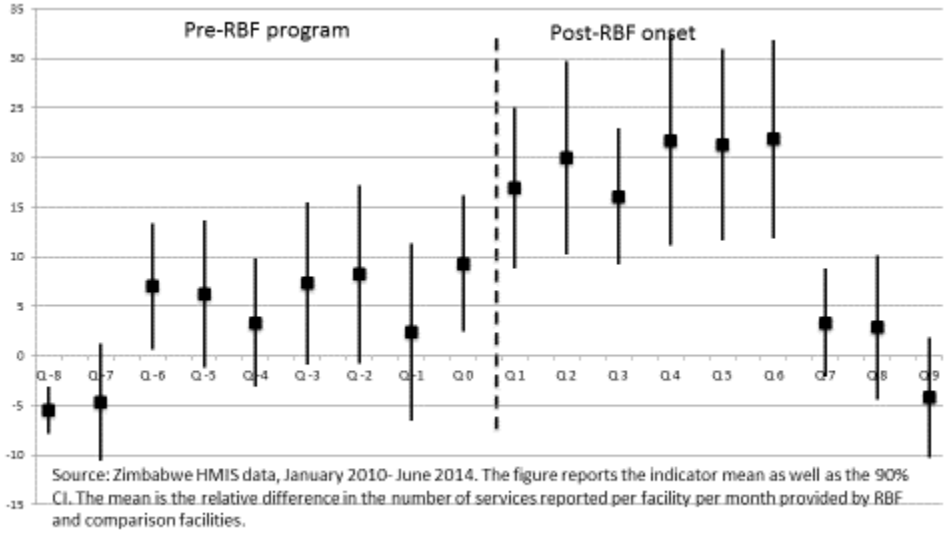
93. Figures 18-25 present the within-quarter differences between RBF and control facilities for the following services: total ARI cases (separately for the over- and under-5 population), total diarrhea cases (also by age group), total skin disease cases (by age group), total diabetes cases (for all ages), and total cases of hypertension. For all of these services investigated there is no decline in the number of cases treated, as would be expected if crowding out were to affect these services. In fact, for many of these services, there appears to be a slight increase in the number of cases treated, suggesting the possibility that service coverage actually increased for a broader set of services than those that were directly incentivized.

Figure 18: Total ARI cases, 5 years and older: Relative difference across RBF and control districts, by quarter, in reported services



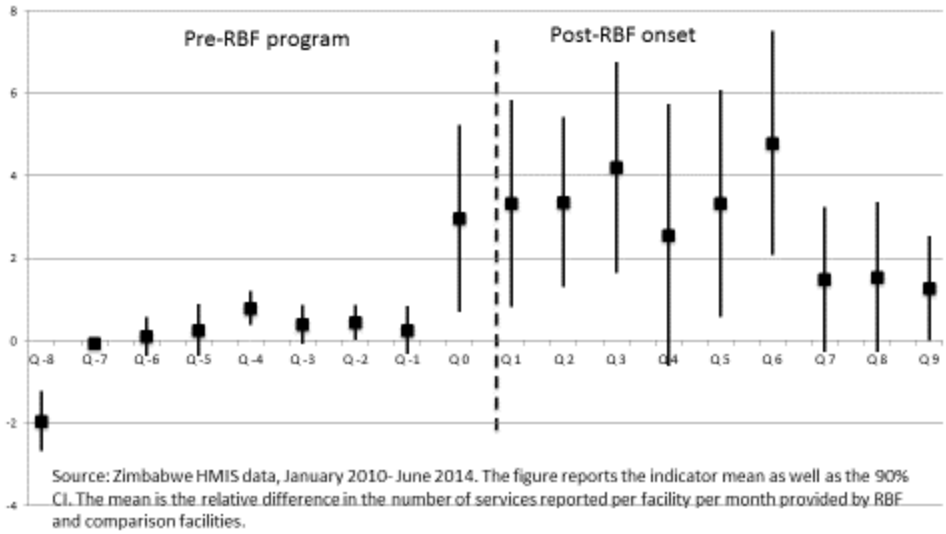
Source: Zimbabwe HMIS data, January 2010- June 2014. The figure reports the indicator mean as well as the 90% CI. The mean is the relative difference in the number of services reported per facility per month provided by RBF and comparison facilities.

Figure 19: Total ARI cases, under 5 years: Relative difference across RBF and control districts, by quarter, in reported services



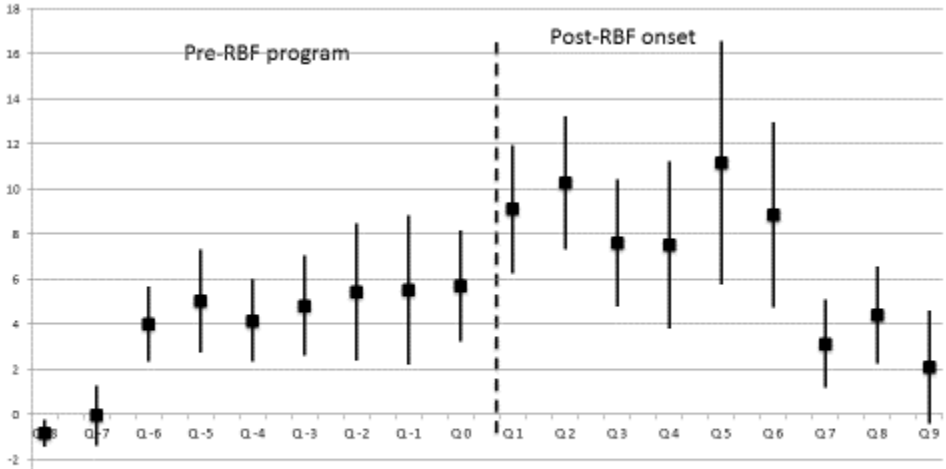
Source: Zimbabwe HMIS data, January 2010- June 2014. The figure reports the indicator mean as well as the 90% CI. The mean is the relative difference in the number of services reported per facility per month provided by RBF and comparison facilities.

Figure 20: Total diarrhea cases, 5 years and older: Relative difference across RBF and control districts, by quarter, in reported services



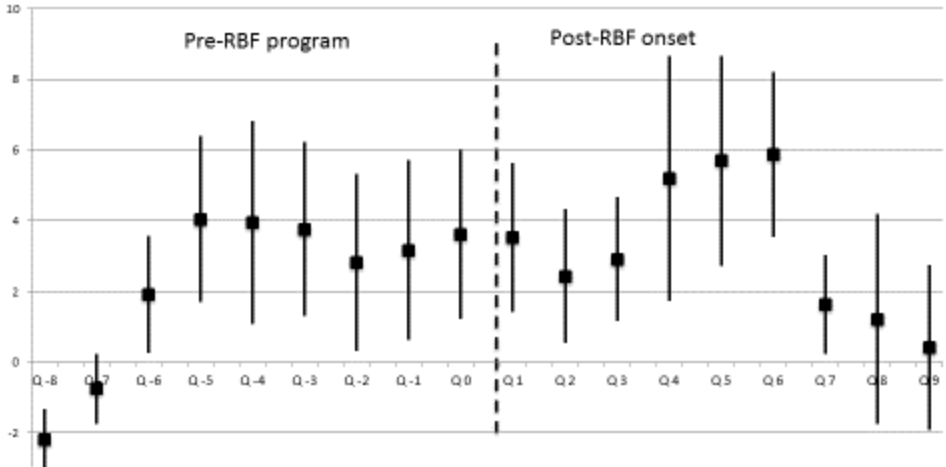
Source: Zimbabwe HMIS data, January 2010- June 2014. The figure reports the indicator mean as well as the 90% CI. The mean is the relative difference in the number of services reported per facility per month provided by RBF and comparison facilities.

Figure 21: Total diarrhea cases, under 5 years: Relative difference across RBF and control districts, by quarter, in reported services



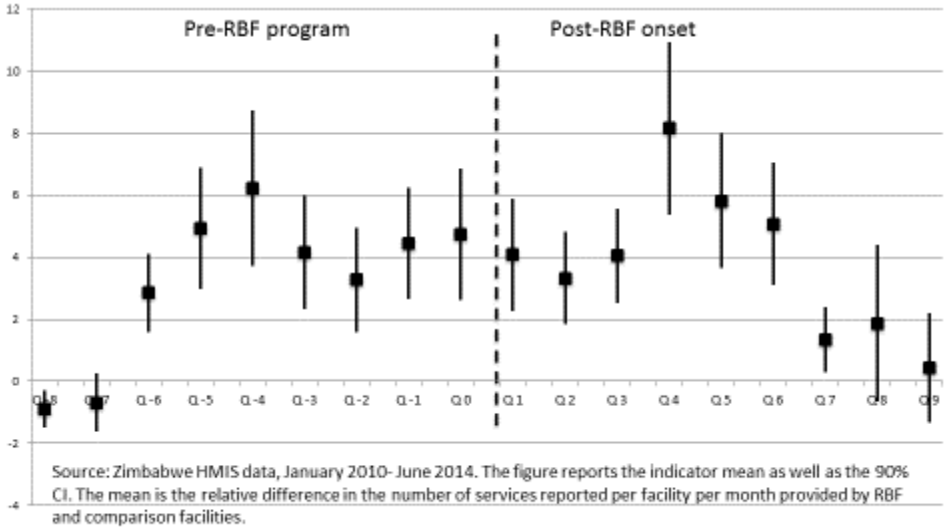
Source: Zimbabwe HMIS data, January 2010- June 2014. The figure reports the indicator mean as well as the 90% CI. The mean is the relative difference in the number of services reported per facility per month provided by RBF and comparison facilities.

Figure 22: Total skin disease cases, 5 years and older: Relative difference across RBF and control districts, by quarter, in reported services



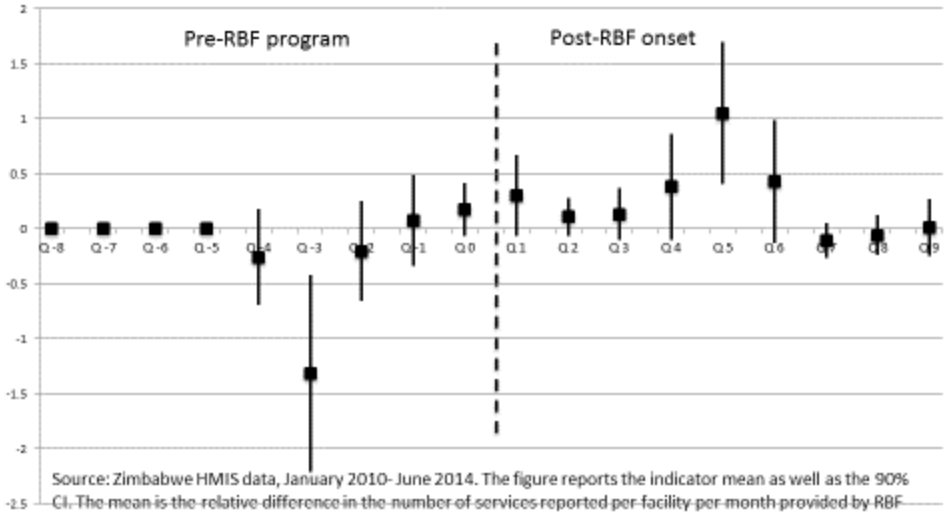
Source: Zimbabwe HMIS data, January 2010- June 2014. The figure reports the indicator mean as well as the 90% CI. The mean is the relative difference in the number of services reported per facility per month provided by RBF and comparison facilities.

Figure 23: Total skin disease cases, under 5 years: Relative difference across RBF and control districts, by quarter, in reported services



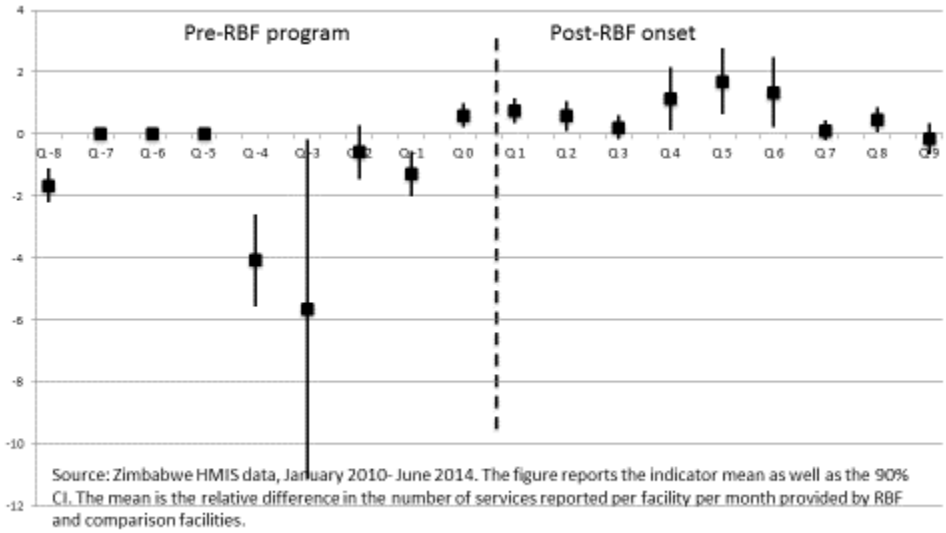
Source: Zimbabwe HMIS data, January 2010- June 2014. The figure reports the indicator mean as well as the 90% CI. The mean is the relative difference in the number of services reported per facility per month provided by RBF and comparison facilities.

Figure 24: Total diabetes cases: Relative difference across RBF and control districts, by quarter, in reported services



Source: Zimbabwe HMIS data, January 2010- June 2014. The figure reports the indicator mean as well as the 90% CI. The mean is the relative difference in the number of services reported per facility per month provided by RBF and comparison facilities.

Figure 25: Total hypertension cases: Relative difference across RBF and control districts, by quarter, in reported services



Source: Zimbabwe HMIS data, January 2010- June 2014. The figure reports the indicator mean as well as the 90% CI. The mean is the relative difference in the number of services reported per facility per month provided by RBF and comparison facilities.

94. Some influence on quality of care of non-incentivized services was reported in the process evaluation. Clinics improved the diagnosis of selected non-incentivized conditions through the purchase of equipment such as diabetes testing machines, sphygmomanometers, adult weighing scales, and height-measuring instruments, using RBF subsidies. RBF resources helped improve the drug situation at clinics generally, as incentives are also being used to transport drugs for non-incentivized conditions, too. RBF incentives were also used to transport collected biological samples to the district laboratory facilities, improving quality of care for patients by reducing the time by which they received test results. Moreover, some patients with chronic conditions benefited from commodities purchased for incentivized conditions, such as Atenolol, Nifedipine, and Methyldopa, although drugs were often inadequate to cater to the needs of all patients.

95. As such, there were also limitations to this positive spillover effect: patients were initiated on treatment at the clinic and referred to hospitals for continuous care since the clinic did not have enough drugs to cater to their needs. In addition, not all clinic drug needs were being catered to through the RBF and generally clinics did not have drugs for asthma, epilepsy, eye ailments, and sexually transmitted infections. The unavailability of some drugs for non-incentivized services was a challenge for clinics in all districts and patients had to incur costs to travel to district neighboring or hospitals where they paid fees to access services. This was particularly so for the elderly and those with chronic illnesses.

Facility Governance and Autonomy

96. The RBF intervention is also expected to impact various dimensions of facility management. RBF facilities reported an increase in weekly operating hours for antenatal and under-five clinics (Table 37); though these differences were not significant in relation to changes in control facilities. The HCCs appear to be more active in RBF

facilities as they reported significantly higher number of meetings (four more meetings per year on average). More active HCCs, in turn, have been linked in the PME to better outcomes as the HCCs contribute to facility performance through their linkages with the community, particularly in the non-clinical operations aspects of facility operations. Looking over a wide range of other facility management indicators, while there is some indication in the point estimates that RBF facilities were more likely to have an annual work plan, hold staff meetings, receive supervision by the district health executive, and obtain patient opinion, none of these differences were statistically significant.

97. Related to this, the PME found that performance in most facilities, particularly the low-performing facilities, was greatly affected by the functionality of HCCs. Although the RBF program provided a beginning for community participation through reviving defunct HCCs, the committees were not properly constituted, not fully representative, exhibited political interference, and lacked capacity on many fronts. This affected community participation, especially for the more remote communities that were often not represented in the committees. There were also limited feedback options for both the near and far communities as some of the communities lacked trust in the HCC and facilities did not create or initiate opportunities to enhance the available beneficiary feedback mechanisms.

98. Supplementary findings from the PME also relate to the role of supervision in contributing to RBF effectiveness. RBF improved communication and cooperation between the Rural District Council and the DHE and facilitated the adoption of a shared goal of improving facility performance. This has helped to foster a localized level of stewardship for service delivery. Facilities improved data capture and recording through the regular support from Health Field Officers but also importantly due to the motivation and interest of facility staff to avoid losing earnings, as they were more aware of implications of poor data quality

99. Regarding supportive supervision, although the use of the new quality supervision checklist for assessment was regarded as cumbersome by both the DHE and the health facility staff, it was viewed as comprehensive and very useful in not only aiding the DHE in undertaking the supervision but in guiding the health facilities to focus on areas requiring attention. This was noted to be helpful in improving performance and, ultimately, facility earnings. However, supervision contributed to demotivation if supervision was irregular, focused on the checklist, and rushed.

Table 37: Effect of pilot RBF on facility governance

	Mean at baseline		*Mean at midline*		Impact estimate	p-value
	RBF	Control	RBF	Control		
ANC clinic hours per week	39.353	41.000	45.143	44.185	3.529	0.570
Under five clinic hours per week	43.794	61.000	49.057	50.481	16.575	0.278
Facility has a hospital/HCC	1.000	0.821	1.000	0.963	-0.129**	0.030
Number of members on this Committee	10.176	10.565	9.364	9.846	0.027	0.991
Number of HCC meetings held in the last 12 months	7.647	8.304	11.697	8.577	4.109**	0.032
Facility has written records of the Hospital/HCC meetings	0.794	0.913	0.939	0.885	0.191	0.195
Facility has a work plan for the current financial year	0.529	0.393	0.788	0.519	0.130	0.552
Number of health facility staff meetings held in the last 3 months	2.971	3.179	2.848	2.778	0.239	0.744
Number of visits made by a district health executive team for supervision or technical assistance in the last 3 months	2.618	2.357	2.750	3.333	-0.802	0.190
Number of meetings made by facility with Community Health Workers for supervision or technical support in the last 3 months	1.739	1.950	2.750	2.741	0.493	0.164
Facility obtains information on patient opinion through client surveys, complaint/suggestion box or other method	0.765	1.000	0.879	0.704	0.426	0.104
Facility has a formal mechanism to inform the staff about patient opinion	0.059	0.125	1.000	1.000	0.010	0.945
In the last 12 months, have any changes occurred as a result of patient opinion?	0.059	0.125	0.862	0.737	0.035	0.900

Note: Sample size 62 rural health centers. * p<0.1 ** p<0.05 *** p<0.01; impact estimates adjusted for district pair matching with standard errors clustered at district level.

100. Facility management staff was interviewed about the level of autonomy during the follow-up survey. The questions concerned the perceived autonomy of the facility in-charge on assigning task to staff, allocating budget, provision of services, and obtaining resources. The responses were recorded on a Likert scale with values ranging from 1 (least autonomy) to 5 (maximum autonomy). An autonomy index was constructed utilizing selected elements of autonomy, such as ability to allocate resources and tasks effectively within the facility. The index was further standardized. As shown in Table 38, RBF facilities reported significantly higher autonomy, e.g., budget allocation, spending on building maintenance, and the autonomy index. Autonomy on allocating tasks to staff, provision of services, or obtaining resources was not significantly different.

Table 38: Effect of RBF pilot on facility autonomy (single difference at midline)

	Mean at midline		Impact estimate	p-value
	RBF	Control		
I am able to allocate my facility budget according to how it is needed. There is enough flexibility in my budget.	4.432	3.886	0.503**	0.024
I am able to assign tasks and activities to staff as needed to achieve the outcomes I want in the facility. There is enough flexibility to use staff to address needs.	4.723	4.528	0.213	0.124
I have choice over who I allocate for what tasks.	4.339	4.167	0.148	0.494
I have choice over what services are provided in the facility.	3.205	3.194	-0.008	0.983
I have enough authority to obtain the resources I need (drugs, supplies, funding) to meet the needs of my facility.	3.982	3.750	0.225	0.365
I have the authority to spend on the maintenance of vehicles	1.518	1.343	0.271	0.184
I have the authority to spend on the maintenance of buildings	3.991	2.722	1.176***	0.000
Autonomy index	0.183	-0.377	0.546***	0.006

Note: Sample size 153 rural health centers. * p<0.1 ** p<0.05 *** p<0.01; impact estimates adjusted for district pair matching with standard errors clustered at district level.

Human Resources: Health Workers' Satisfaction and Motivation

101. This subsection outlines the change in job satisfaction and motivation of the health workers in RBF facilities compared with control facilities. The analytic sample involves only health workers in RHCs to assure homogeneity among the study subjects. The econometric estimation is based on a facility fixed effect model using the balanced panel of RHCs surveyed in the National Integrated Health Facility Assessment of 2011 and at midline. Quantitative results are supplemented with qualitative insight from the PME and from the follow-on study.

102. Job satisfaction is measured through two existing validated tools, the Minnesota Satisfaction Questionnaire and the Job Satisfaction survey. This survey's modules contain numerous satisfaction-related questions recorded on a five-point Likert scale. During the analysis, responses to each question were normalized to a 100 percent scale and then questions were grouped by thematic area, including relationship between staff, working conditions, individual performance, compensation, recognition, and career development. Equal weights were assigned to all questions within a thematic area. Motivation measures were constructed in a similar way, but with a different set of items, relating to "intrinsic motivation" and "extrinsic motivation." Intrinsic motivation includes "self-concept," namely an individual's perception of his or her ability to perform, and "well-being." Extrinsic motivation includes teamwork, autonomy of staff, working environment, recognition of staff, and leadership of facilities.

103. Table 39 presents the effect estimates for component satisfaction constructs and the overall job satisfaction score. Health workers in RBF facilities were more satisfied with their compensation than their counterparts in non-RBF (control) facilities. The individual questions reveal this is driven by the positive effects in employment benefits and living accommodation (Appendix Table 4.8). The coefficients for all constructs including working conditions (a direct RBF input) are positive for RBF facilities. On overall job satisfaction, though not statistically significant, health workers in RBF

facilities scored an average 3.26 points higher than workers in control facilities. The only precisely estimated dimension of satisfaction that responded to the RBF intervention was satisfaction with compensation.

Table 39: Estimated RBF program effect on health worker job satisfaction, RHCs (N=316)

	Relationships with staff in facility and supervisors	Working conditions	Self-performance of staff	Compensation	Recognition	Career dev't	Overall job satisfaction
Impact estimate	-0.679 (3.762)	5.884 (4.069)	0.675 (3.958)	8.436** (3.92)	-0.621 (3.496)	4.214 (5.467)	3.259 (2.613)
Age	0.147 (0.792)	1.018 (1.069)	-0.227 (0.978)	0.384 (0.931)	0.744 (0.858)	-0.391 (1.146)	0.321 (0.61)
Age squared	-0.001 (0.009)	-0.013 (0.013)	0.002 (0.012)	-0.006 (0.011)	-0.010 (0.01)	0.006 (0.013)	-0.004 (0.007)
Male	-0.825 (2.112)	-1.096 (2.256)	0.669 (2.513)	-1.729 (2.141)	-0.635 (2.4)	0.016 (3.036)	-0.698 (1.475)
Obtained more than secondary education	-2.267 (2.014)	-5.311** (2.076)	2.481 (1.743)	-0.263 (2.358)	-1.460 (1.989)	1.947 (3.629)	-1.120 (1.451)
Supervised four times during last year	-1.346 (2.154)	-0.093 (2.646)	0.255 (2.901)	0.160 (2.477)	-0.664 (2.426)	-3.065 (3.781)	-0.620 (1.669)
Supervised more than four times during last year	-2.668 (2.39)	0.010 (2.497)	-2.170 (2.840)	-1.096 (2.722)	-1.294 (2.888)	-2.931 (3.312)	-1.430 (1.799)
Primary care nurse	-2.622 (2.305)	-4.927* (2.634)	1.528 (2.626)	-6.354** (2.775)	-1.091 (2.49)	-6.585* (3.683)	-3.732** (1.668)
Nurse midwife	1.306 (3.305)	1.032 (3.463)	8.052* (4.528)	-0.482 (7.361)	-1.109 (4.037)	-2.990 (6.451)	0.635 (3.465)
Other cadres	-5.100 (3.19)	1.874 (4.432)	4.812 (4.169)	0.047 (3.977)	2.052 (3.967)	-9.607** (4.357)	-1.315 (2.436)
Constant	84.023*** (16.034)	57.911*** (21.008)	84.681*** (18.613)	58.441*** (19.093)	72.037*** (17.584)	76.518*** (23.262)	71.970*** (12.245)
R2	0.457	0.484	0.455	0.480	0.432	0.440	0.515

Note: Facility fixed effects adjusted for age, age squared, sex, education, work experience, cadre, and supervision; SEs clustered at facility level; sample includes RHCs only. * p<0.1, ** p<0.05, ***p<0.01

104. Table 40 presents the effect estimates for health worker motivation. Health workers in RBF facilities reflected less motivation on all constructs. However, this negative pattern is statistically significant only for teamwork, work environment, recognition, and leadership of facility. An in-depth examination of individual questions (Appendix Table 4.9) reveals that these negative results are driven by health workers' low motivation on a number of factors including "the way team performance happens in facility"; "team recognition"; and "leadership and innovative ability of the head of facility." When it comes to personal factors, health workers were also not motivated about their own "hardworking nature."

Table 40: Estimated RBF program effect on health worker motivation, RHCs (N=316)

	Teamwork	Autonomy	Changes in facilities	Work environment	Self-concept	Recognition	Well-being	Leadership of facility	Overall motivation
Impact estimate	-7.499** (3.091)	-3.543 (4.248)	-2.430 (3.846)	-5.486* (2.815)	-2.252 (2.251)	-6.241* (3.719)	-5.917 (4.048)	-7.925** (3.915)	-5.297** (2.258)
Age	-0.772 (0.761)	-1.286 (0.862)	-1.178 (0.855)	-0.106 (0.379)	-0.033 (0.456)	-0.365 (0.685)	-0.161 (0.976)	-0.650 (0.856)	-0.419 (0.403)
Age squared	0.010 (0.009)	0.017 (0.011)	0.014 (0.010)	0.004 (0.005)	0.002 (0.006)	0.006 (0.008)	0.006 (0.011)	0.010 (0.010)	0.007 (0.005)
Male	0.915 (2.136)	1.711 (2.856)	2.458 (2.381)	1.469 (1.296)	-1.457 (1.057)	1.215 (1.961)	-1.105 (2.791)	0.760 (2.086)	0.610 (1.175)
Obtained more than secondary education	1.368 (1.491)	0.565 (2.269)	0.831 (2.064)	1.872 (1.222)	1.266 (0.912)	-0.407 (1.434)	0.558 (2.465)	-1.613 (2.311)	0.988 (1.027)
Supervised four times during last year	1.838 (2.241)	-1.530 (2.552)	0.634 (2.713)	-1.157 (1.850)	0.310 (1.407)	1.611 (1.671)	1.507 (3.045)	-2.557 (2.741)	0.101 (1.488)
Supervised more than four times during last year	-1.918 (2.454)	-3.134 (3.115)	2.682 (2.878)	-1.558 (1.695)	0.186 (1.550)	-1.254 (1.937)	3.599 (2.930)	-1.615 (2.702)	-0.437 (1.469)
Primary care nurse	0.629 (2.307)	1.351 (4.156)	2.601 (2.910)	0.796 (1.738)	1.446 (1.555)	0.294 (2.060)	4.140 (4.042)	-2.630 (2.923)	1.173 (1.468)
Nurse midwife	4.468** (2.095)	10.040** (4.545)	4.251 (5.100)	0.520 (3.000)	-1.445 (1.432)	2.935 (1.954)	-3.159 (5.463)	-0.490 (3.509)	1.276 (1.873)
Other cadres	1.015 (2.808)	0.186 (5.231)	2.100 (3.766)	4.051 (2.600)	0.499 (2.986)	-6.085 (4.415)	8.733** (4.386)	-0.736 (3.616)	2.324 (2.181)
Constant	98.598*** (15.282)	111.154*** (16.529)	96.807*** (16.211)	85.768*** (7.916)	92.450*** (9.097)	99.454*** (13.875)	79.978*** (19.656)	105.949*** (17.885)	92.762*** (8.123)
R2	0.479	0.358	0.416	0.450	0.491	0.450	0.423	0.468	0.477

Note: Facility fixed effects adjusted for age, age squared, sex, education, work experience, cadre, and supervision; SEs clustered at facility level; sample includes RHCs only. * p<0.1, ** p<0.05, ***p<0.01

105. The above regressions drew a puzzling picture on health worker motivation given the documented positive effects of the program on coverage of key services and quality of care.

106. In-depth interviews with managers/supervisors at DHE/PHE level, NICs, and other health workers at the facility level (conducted as part of the follow-on study), provided explanations for the lack of significant improvements in health worker job satisfaction and motivation. Although staff were strongly motivated by the incentives and the improved ability to serve the community, they also expressed their dissatisfaction with the reduced unit prices of services; the relative proportion of incentives for their tasks and that of their peers; not having adequate living accommodation; limited capacity of supervisors; and limited leadership ability of the head of facility. Increased patient load contributing to a higher workload and consequent burnout was also a major concern for health workers.

107. Similarly, institutional arrangements, unclear roles, responsibilities, and lines of reporting, ability (or not) of the local management to foster teamwork, the local level/DHE leadership of and support to health services, and untimely disbursements were key reasons in health workers' motivation (or lack thereof).

108. Further, the qualitative study found that the lack of a systematic process for managing change at the facility level. Specifically, the deployment of Registered

General Nurses (RGNs) as facility-in-charge, in both RBF and control facilities, led to friction and demotivation of the facility-level staff. According to policy, it is the RGN who is in charge by virtue of holding higher qualifications. In four of the seven primary-level facilities, sampled RGNs were appointed as NIC, which involves them supervising existing cadres. When RGNs were deployed to RHCs, some problems occurred with them being accepted as the new bosses, especially when they were young and inexperienced.

109. At some facilities, where some of the Primary Care Nurses (PCNs) in charge before the arrival of the RGN had long experience, the PCNs did not cooperate in orienting the new RGN as required. Further, many RGNs were not well versed with RBF as they did not receive the RBF training. Some facilities' performance declined.

110. The follow-on study showed that the age and experience gap between the RGN and other staff could also foster team work and, wherever the younger RGN/NIC was open to learn from their subordinates, the facility staff worked better as a team:

> When I came here I did not know much. During that time clients were still paying user fees so I did not know the procedures. It was easy for me to approach the nurse aid who was responsible and ask on how to write the receipts. I had never written a receipt book before so the first time I wrote just near the margin and it was difficult for me to tear it off. The nurse aid taught me this. She taught me how to do the balances and the cash book. *RGN NIC*

111. In other facilities problems occurred between the RGN and the Environmental Health Technician (EHT). While there is clarity at Provincial Medical Director and DHE level on EHT and NIC relationships at facilities, the institutionally assigned roles and relationships are such that they create friction, no matter the broader incentive arrangements. EHTs report to parallel structures while the head of facility is the NIC. In addition, the EHTs tended to be older and had been at the station for longer, whereas the RGNs tended to be younger and newer. In some facilities the EHT refused to take instructions from the RGN/NIC. Communication between EHTs and nurses was so poor that an EHT would go for field visits without informing nurses, or an EHT would not want to inform the NIC of his whereabouts at the clinic. In such cases a nurse would mark the EHT as absent from duty, resulting in EHTs losing out on RBF incentives, as illustrated by this quote from a PCN:

> An EHT went for study leave without communicating with the nurse in charge at his clinic but the district knew he had gone for study leave. When the RBF funds came he also wanted the incentives but the staff refused since he was on study leave. He complained to the district about the issue and this was addressed by the DHE. It was resolved that he be paid the number of days he worked at the facility and should also strengthen communication with his colleagues. This was last year 2014. These challenges have been in existence for long but now they are exposed because of RBF, which requires team effort. *PCN*

112. In some instances, quality of care was compromised due to a lack of teamwork between EHT and nurses. This was a result of some districts emphasizing parallel

structures where cadres may be focusing on a specific program, and excluding others. This was more prevalent during the pre-RBF period where MCH was seen more as a nursing issue. Although transition to RBF has prompted some changes, elements of misunderstandings remain between the two cadres that affect quality of care, as this PCN describes:

> Usually when you want to do follow-ups, for example the DBS follow-ups and you request the EHT to conduct it, usually he says he is committed. Even if it's urgent you will have to wait for him until he creates time for you and you will be stuck. *PCN*

113. There were instances where quality of care improved when the nurse and the EHT worked well as a team, and conversely where quality was compromised when the EHT and nurses did not work together, for instance, in a facility when there was good teamwork the EHT got slots to do health education in the waiting shelter and collaborated with other facility staff in getting lists of contacts to be followed up. These processes have been strengthened by RBF as these specific indicators contribute to the overall scores, as illustrated by this quote:

> There are some programs which involve mainly the nursing department (e.g., measles and rubella immunization campaigns that took place 3 weeks ago). EHT had to do the mobilization scheduled by nurses who did the actual vaccinations. During that exercise EHTs follow up to make sure there are no children missed. *EHT*

114. In both RBF and control districts, the leadership problems were local; for instance, the follow-on study found that issues of favoritism while selecting staff to attend workshops and taking annual leave days were a source of demotivation and overall dissatisfaction among many health workers. Besides learning, staff would want to attend the workshops because they benefited from the allowances. Interviews in all facilities revealed that some members of staff did not have a chance to attend workshops. This was confirmed by an EHT at one clinic:

> The malaria case management workshop is a workshop that should also include EHTs as well, and the coordination is also supposed to be done at the DHE level but we are not invited. We need to get new knowledge and be innovative, things are changing, and how do you expect us to know new knowledge when we are not attending workshops? *EHT*

115. Moreover, when DHE supportive supervision was focused on fault finding and lacked confidentiality, it demotivated the supervised heath workers, as would be expected. According to one PCN, on several occasions the DHE did not praise them:

> At times lack of praise by the DHE affects our performance. At times the DHE comments using discouraging words (*kushora*) "chii chamurikutiitira apa"'. If you are praised you become happy. *PCN*

116. This sentiment was confirmed by a District Medical Officer who remarked "Or maybe it's because on some occasions we shout at them for poor performance, but it's not so many times." Although RBF incentives were a strong motivator, they were also a major concern at the facility level with delays in disbursements. The processes to collect

the money were reported to be tedious and, sometimes, forms were returned for trivial mistakes. Moreover, health workers did not adequately understand the calculation of incentives. Most health workers knew that incentives for each person were based on seniority and position but very few knew their number of years working at the facility, staff category, responsibility, days worked or extra hours worked. In some instances, nurses felt the incentive payment were unfair based on the level of work between them and other cadres:

> There are some cadres who contribute less to RBF but get high percentages in incentives like the EHT. For them to do their work, we compile [patients] for them (e.g., we see a patient and if they have TB we refer to EHT). For them to follow up a patient bitten by a dog we see the patient and refer to EHT. Yet the EHT may get higher incentives because they have been here for a long time. *PCN*

8. Conclusions and Lessons Learned

Conclusions

117. RBF is a health systems management tool designed to increase the efficiency of health system inputs to improve the coverage and quality of priority MCH services. The impact evaluation and PME investigated the project's impact on priority incentivized and non-incentivized services. In addition to the impact and process evaluation, an analysis trends of non-incentivized services—including those unrelated to MCH, such as the management of noncommunicable diseases in adults—was done to determine whether RBF-biased health workers focus on a narrow package of incentivized services. The PME also explored RBF's broader effects on various health systems dimensions through a mixed-methods approach.

118. The results of Zimbabwe's 2014 Multiple Indicator Cluster Survey reflect an increase in MCH service coverage nationwide between 2010 and 2014, as shown by key indicators such as ANC attendance (at least four visits) and institutional deliveries, which increased from 56.8 percent to 70.1 percent and from 60.2 percent to 80 percent, respectively. However, a key finding of the 2015 RBF project impact evaluation for the period March 2012 to June 2014 is that, despite general increases in coverage of MCH services across Zimbabwe, key indicators improved faster in RBF districts. The accelerated gains for RBF districts are pronounced for **delivery indicators**, i.e., delivery by skilled provider (15 percent, p=0.002), in-facility delivery (13 percent, p=0.003), and cesarean section deliveries (6 percent, p=0.005; significant at α =0.10). Findings also show that the RBF intervention has increased the likelihood that mothers received PNC from a qualified provider (13 percent, p=0.028).

119. The RBF project also appears to have an effect on child anthropometry measures. Findings show a notable relative decline in the proportion of children who are underweight and stunted. This effect is significant for severely stunted (-5 percent, p=0.04) and underweight cases (-1 percent, p=0.069; significant at α = 0.10).

120. Not all coverage indicators demonstrate relative improvement under RBF. There are no significant differences for ANC services, perhaps because of the already high ANC coverage at baseline in the country. The Multiple Indicator Cluster Survey estimated 95 percent ANC coverage at program inception, and the impact evaluation at least 99 percent of women in both RBF districts and control districts having received any ANC service.

121. The impact evaluation suggests that RBF has had no significant effect on **family planning** in general. Only small gains in use of modern contraceptives are observable for the sample (i.e., women who had pregnancy in the past two years). Similarly, coverage and access—as reflected by visits by a family planning worker or utilization of family planning services at a health facility—show minimal differences from baseline to midline between RBF and control districts. Zimbabwe already had higher baseline indicators on modern family planning than regional peers. The high rates of coverage at baseline for certain incentivized indicators raise questions on the efficiency of RBF spending on these indicators—perhaps funds can be diverted to other priority indicators currently delivered at lower rates of coverage in order to improve the efficiency of RBF spending.

122. For **child health services**, with the exception of the incidence of fever among children, the reported occurrence of disease among children and care-seeking practices did not change from baseline to midline. Although there was a significant reduction on the incidence of fever among children (6 percent, p=0.04), the impact evaluation does not show project impact on incidence of diarrhea or health seeking behavior for both fever and diarrhea.

123. Differences in **coverage** between RBF and control districts are corroborated by trends in utilization based on national HMIS administrative data. For most coverage indicators similar to those showing positive effects as described above, the trend analysis shows no significant difference in reported coverage in the eight quarters before the onset of RBF, while significant differences emerge by the fifth quarter after the start of the RBF pilot. These results also suggest the timing at which coverage gains begin to emerge under the RBF program. The number of women completing four or more ANC visits prominently exhibits the dispersion in trends following introduction of the intervention. Approximately six to 12 additional cases of women completing four ANC visits are reported in RBF districts after the first year of the program. This finding is somewhat inconsistent with the observed lack of significance in the household data (number of ANC visits). The positive change in trend occurs for all recorded services in at least one assessed postintervention quarter with the exception of immunization, (consistent with the household data that also did not find any impact of RBF on immunization coverage).

124. An investigation of **equity** suggests that RBF has pro-poor or pro-marginalized group effects as reflected by two core dimensions of the PROGRESS framework: education and socioeconomic status. Relatively poorer households benefit disproportionately from RBF. The findings show accelerated gains or greater positive effects for less-educated groups and the poor, particularly for those indicators in which

differences between RBF and control districts were already significant. Differences for delivery by a skilled provider and in-facility delivery as well as PNC were apparent across education and wealth levels. As for family planning, significant differences between RBF and control districts are only observed when stratified across the education for any contraception use (11 percent, p=0.075: significant at α=0.10) and use of modern contraception (12 percent, p=0.043). This is not the case for immunization and child health outcomes, with the exception for height for age, which reflects significant decreases in severe cases of stunting among children born to less educated mothers.

125. In total, the results refute any suggestion that RBF impacts are greater among the more advantaged segments of beneficiaries. In addition, the districts selected for RBF were poorer in aggregate relative to both control districts and to the country as a whole, reflecting the Government's interest to improve priority MCH services among the poor.

126. The impact evaluation findings show a mixed but positive message around **measures of quality of care,** with some dimensions showing significant improvements under RBF. Within the RBF districts, relative improvements are observed for a few selected measures of structural quality, such as higher incidence of biomedical waste disposal (16 percent; p = 0.027), increased availability of iron tablets (16 percent, p=0.097), folic acid (21 percent, p=0.07), and urine dipsticks (42 percent, p=0.016). There was increased availability of selected equipment such as electric autoclave (29 percent, p=0.041) and refrigerator (27 percent, p=0.014). Yet there were no gains in many measures. While a constructed general drug index showed an overall increase in drug availability, the EMOC drugs index, family planning supplies index, vaccines index, and equipment index showed no differences. For both RBF and control districts, the availability of the majority of medicines, supplies, and equipment remained largely unchanged, with minor fluctuations across products from baseline. This relative lack of impact may be suggestive of the effects of crosscutting interventions and which to a large extent is consistent with the contextual analysis of the supply chain, and indicating notable supply-side support from interventions such as the Health Transition Fund.

127. While the RBF is associated with increases in coverage of services, evidence in Zimbabwe also confirmed the intervention's significant effect on **key process measures of care**. Household survey data show that patients in RBF districts are 15 percentage points more likely to have had a urine sample taken and 8 percentage points more likely to have had a tetanus injection during ANC. Quality of service indicators recorded in the HMIS, such as women receiving TT2+ and IPT (x2) doses during pregnancy, exhibit a consistent story by recording significant relative increases in the supply of these services. Indicators for direct clinical observation also showed significant differences in quality for specific indicators under child health, including the correct classification for danger signs (21 percent, p=0.022) and cough or difficult breathing (30 percent, p=0.030); and correct management of cough or difficult breathing (38 percent, p=0.0385). However, health facility exit interviews for ANC and child health indicators showed no significant changes, although client satisfaction was significantly higher for ANC care received in RBF facilities.

128. Quality of care is **multidimensional, difficult to precisely measure, and more complex to improve than service coverage.** This is somewhat reflected by the mixed results on the process measures of care. Future iterations of the RBF program likely need to: (i) find new ways to intelligently incentivize quality measures of care; and (ii) combine RBF with complementary supply-side interventions specifically dedicated to quality improvement to amplify the RBF's effects on measures of care. One concern with the introduction of pay-for-performance mechanisms in health is that incentivized services may **detract health staff attention and efforts away from non-incentivized routine services**, which are sometimes then left to lower-level, often insufficiently trained, staff to deliver. An analysis of HMIS data on various less-incentivized services, mostly related to treatment of adult cases of noncommunicable diseases, actually indicates a slight increase in the number of cases treated, suggesting the possibility that service coverage increased for a broader set of services than those that were directly incentivized. These findings lessen the concern that RBF promotes task shifting by health workers through a priority package of services.

129. Related to the above point, the PME indicated some influence of RBF on quality of care of non-incentivized services. Clinics improved the diagnosis of some non-incentivized services through purchase of equipment—such as diabetes testing machines, sphygmomanometers, adult weighing scales and height measuring instruments—using RBF subsidies (although these broad-based findings were not echoed in the quantitative analysis). RBF resources helped improve the general drug situation at clinics, as incentives are also being used to transport drugs for non-incentivized conditions. RBF incentives were also used to transport test specimens to the district laboratory facilities, improving quality of care for patients by reducing the time by which they received test results.

130. Moreover, some patients with chronic conditions benefited from commodities (e.g., Atenolol, Nifedipine, and Methyldopa) purchased to treat incentivized conditions, although drug quantities were often inadequate to adequately treat all patients. There were limitations to this positive effect: patients were initiated on treatment at the clinic and referred to hospitals for continuous care since the clinic did not have a consistent supply of drugs to meet their needs. In addition, RBF did not provide all necessary clinic drugs. For example, most clinics did not have drugs for asthma, epilepsy, eye ailments, and sexually transmitted infections.

131. The Zimbabwe RBF project approach includes a focus on strengthening core health system functions. The PME found **other systemwide effects of RBF** especially on improved accuracy and timelines of health providers reporting HMIS data; planning at decentralized levels; management and stewardship of financial resources at decentralized levels; and accountability for results at various levels of the health system. Governance is one key area in which the quantitative impact evaluation found **the RBF to contribute to systems improvements**. RBF facilities reported an increase in weekly operating hours for ANC and under five clinics, though these differences were not significant. HCCs are more active in RBF facilities as they reported significantly more meetings (i.e., four more meetings per year on average). In addition, there is some indication that RBF facilities were more likely to have an annual work plan, staff

meetings, supervision by the DHE, and mechanisms to gather patient opinion, however none of these differences were statistically significant.

132. The positive effects of coverage for both **incentivized and non-incentivized services** are likely enabled, in part, by governance changes at the facility level. These changes include improved autonomy and decentralized decision making and strengthened facility level management and governance. Facilities enjoy more autonomy under RBF as the autonomy index showed a 55 percent (p=0.06) relative increase and in particular staff under the RBF are more likely to be able to allocate their facility budget according to how it is needed (50 percent, p=0.024).

133. Regarding the **RBF's effect on OOP payment by households**, the incidence of user fees is not significantly lower in RBF than control districts. Forty-five percent of mothers in RBF districts reported paying a fee for their most recent delivery, and 72 percent reported paying any direct OOP costs. Direct costs include fees, drugs, lab tests, facility stay, and gifts, as well as any other direct costs, but not including transport. Incidence of payment is lower for ANC and PNC than for delivery, but around one-quarter of mothers in RBF districts reported some OOP payment for ANC and almost one-third reported some OOP payment for PNC. However, when only households below median wealth are considered, incidence of ANC fees is somewhat lower in RBF districts than in control districts.

134. These results are noteworthy for two reasons: (i) the formal suspension of user fees in RBF areas did not appear to affect to a large degree the fees paid by households, except for perhaps the poorer households; and (ii) consequently the increase in service utilization identified under the RBF is likely due in large part to other factors than the suspension of formal user fees. The waiving of user fees for the package of RBF services might have been interpreted narrowly and exclude auxiliary services such as lab tests. Results point to the need for complementary verification mechanisms to ensure removal of user fees beyond the routine client tracer surveys instituted under the RBF intervention to strengthen accountability of health providers.

135. On **health worker motivation**, the RBF program has had mixed effects to date. According to the qualitative findings, although staff were strongly motivated by incentives and their improved ability to serve the community, they also expressed their dissatisfaction with the reduced unit prices of services; the proportion of incentives relative to their tasks and those of their peers; inadequate living accommodations; limited capacity of supervisors; limited leadership ability among heads of facilities; and increased patient load contributing to a higher workload and consequent burnout. The lack of a systematic process for managing change at the facility level, specifically the deployment of registered general nurses as facility in charge, has in both RBF and control facilities likely led to friction and demotivation of facility-level staff, as echoed in the qualitative results. This friction may have been exacerbated by the introduction of RBF and guidelines concerning salary bonuses.

136. The mixed results on health worker motivation and satisfaction call for human resource management strengthening within MOHCC in parallel to RBF interventions.

Strengthening health facility leadership and human resource management practices, supportive DHE supervision practices will mitigate some unintended effects of the RBF incentives captured by the quantitative and qualitative evaluation data. The qualitative work also augments these findings, highlighting important channels of influence that include: regular and structured supervision yielding feedback to improve performance; enhanced community participation; and team-based incentives facilitating teamwork. Improvement in poorly functioning health services administrative processes, such as those controlling disbursement of funds, may also serve to improve health worker satisfaction and motivation.

137. The qualitative inquiry also highlights **contextual factors** that played a significant role in health facility performance for both good and poor performance. Performance in most facilities, particularly low-performing facilities, was greatly affected by the functionality of HCCs. Although the RBF program galvanized community participation through reviving defunct HCCs, the impact evaluation revealed that some committees were not properly constituted, fully representative, or capacitated on many fronts. This affected community participation, especially for the more remote communities that were often not represented in the committees. There were also limited feedback options for both the near and far communities as some of the communities lacked trust in the HCC, and facilities did not create or initiate opportunities to enhance the available beneficiary feedback mechanisms. Other important contextual factors introducing difficulties for good performance under RBF include remoteness, which presents many challenges to care seeking, as well as the availability of private providers in the local area, which may limit the degree to which RBF facilities can increase their service coverage.

Lessons Learned

138. The RBF in Zimbabwe presented significant opportunities for policy makers and health providers at the frontlines of service delivery to learn from an innovative approach to financing health care in a low-income country setting. A brief summary of the key lessons is now outlined.

- The study demonstrates that RBF can be successfully implemented to increase the quality and coverage of priority services in a low-income country setting. The separation of functions through use of an international NGO (Cordaid) and associated technical support to government structures provided a platform for the successful roll-out and implementation of the RBF at a time when core public sector systems had declined. RBF played a role revitalizing public sector accountability functions in the health sector.

- Some of the coverage indicators that exhibited the lowest degree of change under the RBF also exhibited the highest baseline coverage rates, suggesting that incentivizing these indicators may not present a highly efficient leverage of program funds. Careful thought should be given to selected indicators in future program designs in order to maximize the efficiency of spending.

- Learning from implementation is critical for the successful implementation of an RBF program. Mid-course changes effected in the Zimbabwe program were largely informed

by the PME studies jointly commissioned by the Government and the Bank. The PME also enabled evidenced-based policy planning and management decision making, particularly during the scale-up phase of the pilot.

- The study demonstrates the importance of continued innovations on ways to intelligently incentivize quality measures of care, which are more complex than coverage indicators. Related to this, given that quality of care is multidimensional, starting with structural quality indicators and then progressively introducing process measures of clinical care is critical to allow the health providers to address less complex quality-of-care issues first, develop a better understanding of RBF and quality of care, and then shift gradually toward more demanding measures of care under RBF.

- The quantitative results on human resources for health outcomes, such as health worker satisfaction and motivation, and evidence from the qualitative study, point to the following: (i) uncompensated price reductions of RBF indicators can have negative effects on health workers, which can potentially impact priority indicators; (ii) it is important to start at a low and sustainable level in pricing structures of incentive schemes and introduce increases based on robust financial analysis; and (iii) team incentives play a positive role in health facilities beyond just the monetary transfers. Qualitative evidence found significantly improved teamwork due to the team-based incentives under the RBF pilot.

- The autonomy associated with RBF enables more responsiveness to health facility-level needs by health workers and the HCC. This responsiveness not only benefits incentivized indicators but perhaps also enables health providers to address broader health systems challenges such as stockouts for drugs and non-incentivized conditions such as noncommunicable diseases, as exhibited by increased reported services in these areas.

- RBF should not be isolated from broader health systems reforms and complementary interventions. Instead, it should be viewed as an entry point to tackling wider systemic issues that are brought to the fore when RBF is rolled out. A good example is seen in the human resources for health management and coordination challenges at health provider level reported in the follow-on qualitative study as well as the functioning, composition, and influence of HCC: these potential constraints could greatly benefit from parallel health sector reforms to strengthen health facility management and accountability.

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Appendixes

Appendix 1: Quality Checklist Component Indicators Rural Health Center Level

Date received by
_____

For RBF use:
% Structural score (35%Weight): ……..

% Clinical care score (65% weight): ……
Final Combined Score from Database: .....

RURAL HEALTH CENTRE QUALITY SUPERVISION CHECKLIST
Province:

District:
Health facility name:
Number of observation beds: _____ Catchment area population:
Date of supervision:
Name of supervisors:

EVALUATION SUMMARY

	STRUCTURAL INDICATORS	**Available Points**	**Number of composite indicators**	**Total points scored**
	General Appearance	8	4	
	Administration finance and planning	20	10	
	Health information systems management	21	6	
	Infection control and waste management	16	8	
1S	Out Patient Department/consultation area (Childhood pneumonia, TB referral criteria, PEP)	22	10	
3S	Family and Child Health (ANC, PNC, FP, Immunizations)	4	2	
4S	Maternity Service (routine maternal newborn best practices, PPH, sepsis)	14	14	
	Observation/inpatient services	8	4	
	Referral services	8	3	
	Community services	12	6	
	Medicines and sundries stock management	28	2	
	Environmental health services	8	4	
	TOTAL	**169**	**73**	

	CLINICAL QUALITY OF CARE	Max. points	Number of composite indicators	Total points scored
1 C	Out Patient Department/consultation area (Childhood pneumonia, TB referral criteria, PEP)	22	10	
3 C	Family and Child Health (ANC, PNC, FP)	62	14	
4 C	Maternity Service (routine maternal newborn best practices, PPH, sepsis)	96	21	
5	EPI	26	11	
	Health information systems management	15	15	
	Medicines and sundries stock management	28	24	
	TOTAL STAFFING	**249**	**95**	

	Establishment	In post	Vacant
Nurses			
Nurses with midwifery	[redacted]		
PCN upskilled			
EHT			
Nurse aides			
General hands			
Other (Non-medical staff or unqualified staff)			

Appendix 2: Methods

Household Analysis

Where both baseline and midline data exist, the model specification is as follows:

$$Y_{it} = \alpha + \delta t + \rho D_i + \beta D_i t + \boldsymbol{\gamma}' \boldsymbol{X_i} + \varepsilon_{it}$$

Y is the outcome of interest, *t* is a period dummy equal to 1 in the second period, *D* is a treatment dummy equal to 1 in the RBF districts, and *X* is a full vector of province controls. The coefficient of interest is the coefficient on the period-treatment interaction term. Errors are clustered at the district level. For binary outcome variables, the specification is a linear probability model, effectively identical to the specification for continuous outcome variables. No correction to the error terms has been made to account for the multiple hypotheses being tested.

Where only midline data exist, the model specification is as follows:

$$Y_{it} = \alpha + \beta D_i + \boldsymbol{\gamma}' \boldsymbol{X_i} + \varepsilon_{it}$$

Notation is the same as for the difference-in-difference specification above, and errors are again clustered at the district level.

Facility Analysis

Most of the facility-level analysis (e.g., availability of drugs, equipment) is conducted using exactly the same model specification as for the household analysis, described above.

The effect of the intervention on motivation of health workers is assessed using the following model specification:

$$Y_{it} = \alpha + \delta t + \rho D_i + \beta D_i t + \boldsymbol{\gamma}' \boldsymbol{F_i} + \propto' \boldsymbol{W_{it}} + \varepsilon_{it}$$

Y is the outcome of interest, *t* is a period dummy equal to 1 in the second period, *D* is a treatment dummy equal to 1 in the RBF districts, *F* is a full vector of facility-level dummies, and W is a vector of health-worker covariates, including age, age squared, sex, education, work experience, cadre, and supervision.

Appendix 3: Test of Parallel Trends Assumptions

This appendix contains results of tests comparing the pre-intervention trends for treatment and control households and facilities. This type of test is only possible for a limited number of outcomes where pre-intervention data are available for multiple periods, specifically those relating to coverage of ANC, skilled attendance at delivery, and PPC/PNC care, taken from DHS 2011, and those relating to service volumes, taken from HMIS data.

The following specification is used to test for parallel trends in treatment and control facilities in the baseline household data:

$$Y_{it} = \alpha + \boldsymbol{\delta}'\boldsymbol{t} + \rho D_i + \boldsymbol{\beta}' D_i \boldsymbol{t} + \boldsymbol{\gamma}' \boldsymbol{X_i} + \varepsilon_{it}$$

In this model, *t* is a 3x1 vector of time dummies (for 2008, 2009, and 2010), *D* is a treatment dummy equal to 1 in the RBF districts, and *X* is a full vector of province controls. The coefficients of interest are the three elements of the coefficients on the period-treatment interaction terms. An F-test is done to test the hypothesis that the coefficients on the treatment-year interaction terms are jointly equal to zero. The higher the p-value, the less evidence there is to reject the hypothesis that all the time-treatment interaction coefficients are equal to zero, so the more convincing the parallel trends assumption is.

Appendix Tables 3.1–3.3 show tests of parallel trends for the main delivery, antenatal and PPC/PNC coverage outcomes. There is no evidence to suggest that the parallel trends assumption is violated for any of these outcomes. Difference-in-differences therefore appear to be appropriate for estimating the causal effect of the RBF intervention on these outcomes.

Appendix Table 3.1: Test for parallel trends in delivery outcomes, 2007–10

	Interaction 2008	Interaction 2009	Interaction 2010	p-value for F-test
Delivery by skilled provider	0.049	-0.056	-0.045	0.268
Delivery in facility	0.091	-0.028	-0.038	0.103
Delivery by cesarean section	0.009	-0.027	0.001	0.323

Note: Sample size 1,981 births. Linear probability model, with province level controls. Errors clustered at the district level.

Appendix Table 3.2: Test for parallel trends in antenatal coverage outcomes, 2007–10

	Interaction 2008	Interaction 2009	Interaction 2010	p-value for F-test
Any ANC	0.031	0.045	0.035	0.780
ANC from qualified provider	0.031	0.042	0.036	0.808
ANC in facility	0.043	0.061	0.042	0.554
Number of ANCs	0.017	0.259	-0.309	0.217
No. of months pregnant at first ANC	-0.059	-0.147	0.100	0.796

Note: Sample size 1,686 pregnancies. Linear probability model, with province level controls, for any ANC, ANC from qualified provider and ANC in facility. Simple multiple regression with identical specification for number of ANCs and no. months pregnant at first ANC. Errors clustered at the district level.

Appendix Table 3.3: Test for parallel trends in postnatal coverage outcomes, 2007–10

	Interaction 2008	Interaction 2009	Interaction 2010	p-value for F-test
Any PPC	-0.029	-0.092	-0.066	0.618
PPC from qualified provider	-0.016	-0.104	-0.074	0.426
PPC received within 2 days	-0.048	0.003	0.020	0.653
PPC received within 2 months	-0.061	-0.052	-0.059	0.829
Any postnatal care	0.002	-0.108	-0.070	0.320
PNC from qualified provider	0.017	-0.119	-0.068	0.198
PNC in facility	-0.038	-0.119	-0.059	0.560
PNC received within 2 days	0.044	0.015	0.065	0.412
PNC received within 2 months	-0.031	-0.069	-0.048	0.758

Note: Sample size 1,686 pregnancies. Linear probability model, with province level controls. Errors clustered at the district level.

Appendix Table 3.4 shows tests of parallel trends for the main ANC quality outcomes analyzed in the text. There is some evidence that the likelihood of a mother taking iron was decreasing in the treatment group compared with the control in 2010.

Appendix Table 3.4: Test for parallel trends in antenatal quality outcomes, 2007–10

	Interaction 2008	Interaction 2009	Interaction 2010	p-value for F-test
Blood pressure measured	-0.027	0.026	0.026	0.79
Urine sample taken	0.033	0.012	0.049	0.89
Blood sample taken	0.039	0.062	0.073	0.81
Any tetanus injection	0.006	-0.021	-0.077	0.26
Number of tetanus injections	0.251	0.018	0.070	0.25
Any iron taken	0.036	-0.024	-0.119	0.06
Number of days iron taken	-2.724	-0.696	-2.035	0.88
Anti-parasite drugs taken	-0.028	-0.006	-0.006	0.69
Malaria prophylaxis taken	-0.044	-0.014	-0.053	0.84

Note: Sample size 1,686 pregnancies. Linear probability model, with province level controls. Errors clustered at the district level.

Appendix Table 3.5 shows tests of parallel trends the PNC quality outcomes. There is some evidence that the likelihood of vitamin A being taken was decreasing in the treatment group compared with the control group in the pre-intervention period. For both

of these outcomes, this may mean the effect of the intervention may be underestimated in the main results. The other outcomes show approximately parallel trends.

Appendix Table 3.5: Test for parallel trends in postnatal quality outcomes, 2007–10

	Interaction 2008	Interaction 2009	Interaction 2010	p-value for F-test
Vit A given after delivery	-0.105	-0.084	-0.024	0.096
Liquid other than breast milk	0.002	-0.010	0.027	0.688
Immediate breast-feeding	0.140	0.115	0.125	0.177

Note: Sample size 1,686 pregnancies. Linear probability model, with province level controls. Errors clustered at the district level.

Appendix 4: Results from Hospitals

Appendix Table 4.1: Effect of RBF pilot on facility infrastructure: hospitals

	Mean at baseline		*Mean at midline*		Impact estimate	p-value
	RBF	Control	RBF	Control		
No. of electric power outages in last 7 days	0.250	0.500	0.400	0.455	0.200	0.555
No. of water outages in last 7 days	0.438	1.000	0.600	0.857	0.277	0.304
Facility has a functioning two-way radio	0.313	0.154	0.333	0.071	0.077	0.784
Facility has phone line, whether a landline or a mobile line	0.938	0.923	0.933	0.857	0.077	0.591
No. of telecommunication (landline, mobile) outages in last 7 days	0.875	0.750	0.929	0.857	-0.020	0.928
Facility has a general outpatient consultation room	0.938	0.923	0.933	1.000	-0.077	0.591
Outpatient consultation room equipped with a safety box or closed container for disposal of used sharps	0.933	0.917	0.929	1.000	-0.108	0.509
Outpatient consultation room has posted procedures for decontamination	0.333	0.333	0.643	0.571	-0.025	0.949
Outpatient consultation room has a basin with a water source and soap	0.667	0.833	0.857	0.714	0.358**	0.040
No. of stockouts of disinfectant(s) in the last 30 days	0.750	0.615	0.733	0.929	-0.308	0.362
Facility has a functional incinerator for disposing of medical waste	0.563	0.538	0.600	0.571	0.067	0.831
Facility has provision for the disposal of bio medical waste	0.938	0.846	1.000	0.929	-0.010	0.929
Infrastructure index	-0.618	0.224	-0.260	0.205	0.458	0.388

Note: Infrastructure index takes into account no outages of power, water, communication and disinfectants; provision of sharps disposal +basin with soap and water in OP room; Sample size 29 hospitals. * p<0.1 ** p<0.05 *** p<0.01; impact estimates adjusted for district pair matching with standard errors clustered at district level.

Appendix Table 4.2: Effect of RBF pilot on availability of drugs: hospitals

	Mean at baseline		*Mean at midline*		Impact estimate	p-value
	RBF	Control	RBF	Control		
Amox_tabs	0.875	1.000	0.929	0.714	0.297	0.229
Cotrimoxazole	0.938	0.923	0.929	0.929	-0.012	0.946
Paracet_tab	0.938	1.000	1.000	1.000	0.059	0.343
Irontabs	0.938	1.000	0.846	0.714	0.214	0.393
Folicacid tabs	0.313	0.308	0.000	0.000	-0.030	0.891
Vitamin A	0.563	0.769	0.357	0.643	-0.017	0.956
Ocp	0.938	1.000	0.923	0.857	0.132	0.246
Implant	0.500	0.462	0.692	0.643	-0.131	0.572
Rifampicin	0.438	0.385	0.071	0.167	-0.156	0.542
ORS	0.938	0.769	0.769	0.929	-0.307	0.240
Magsul	0.375	0.154	1.000	1.000	-0.265	0.204
Misoprostol	0.063	0.000	0.385	0.077	0.242	0.291
Oxytocin	0.750	0.769	0.929	0.786	0.142	0.536
Pentavalent	0.938	1.000	1.000	1.000	0.098	0.349
HIV kit	0.938	1.000	0.929	1.000	-0.018	0.873
Pregnancy kit	0.313	0.231	0.429	0.462	-0.151	0.629
Urine dipstick	0.375	0.154	0.643	0.538	-0.152	0.584
General drug index (standardized)	-0.095	0.230	-0.133	-0.201	0.473	0.511
EMOC drugs index (standardized)	0.376	0.062	0.669	0.076	0.128	0.814
Family planning supplies index	0.191	0.349	0.306	0.240	0.046	0.883
TB drugs index (standardized)	0.278	0.311	0.380	0.384	0.075	0.873
Diagnostic kits index (standardized)	0.435	0.012	0.277	0.517	-0.824	0.275
Vaccines index (standardized)	-0.087	0.288	0.100	0.281	0.424	0.247

Note: Sample size 29 hospitals. * p<0.1 ** p<0.05 *** p<0.01; impact estimates adjusted for district pair matching with standard errors clustered at district level

Appendix Table 4.3: Effect of RBF pilot on availability of medical equipment: hospitals

	Mean at baseline		*Mean at midline*		Impact estimate	p-value
	RBF	Control	RBF	Control		
Children's weighing scale	0.875	1.000	0.800	0.857	0.010	0.964
Height measure	0.875	0.846	0.933	0.929	-0.087	0.627
Tape measure	0.875	0.923	0.933	0.857	0.067	0.736
Adult weighing scale	0.938	0.923	0.933	0.929	-0.077	0.603
Blood pressure instrument	1.000	0.923	0.867	0.929	-0.210	0.218
Thermometer	1.000	0.923	0.933	0.929	-0.144	0.224
Stethoscope	0.938	0.923	0.800	0.929	-0.210	0.115
Fetoscope	0.813	0.923	0.667	0.643	0.097	0.518
Otoscope	0.250	0.308	0.400	0.143	0.287	0.300
Electric autoclave (pressure and wet heat)	0.313	0.385	0.533	0.357	0.200	0.272
Refrigerator	0.875	1.000	0.867	0.857	0.077	0.603
Delivery table/bed	0.875	0.923	1.000	0.929	0.056	0.662
Baby scale (infant weighing scale)	0.875	1.000	1.000	0.857	0.210*	0.087
Bag Valve Mask (Ambu bag)	0.625	0.769	0.933	0.857	0.179	0.453
Guedel airways-neonatal, child, and adult	0.500	0.385	0.467	0.571	-0.297	0.251
Partograph	0.875	0.769	0.933	0.929	-0.164	0.225
Delivery light	0.125	0.154	0.467	0.071	0.410**	0.014
Umbilical cord clamp or sterile tape or sterile	0.813	0.769	1.000	0.786	0.056	0.770
Equipment index (standardized)	0.062	0.058	-0.093	-0.162	-0.199	0.761
EMOC Equipment index (standardized)	0.359	0.196	0.438	-0.337	0.325	0.561

Note: Sample size 29 hospitals. * p<0.1 ** p<0.05 *** p<0.01; impact estimates adjusted for district pair matching with standard errors clustered at district level

Appendix Table 4.4: Effect of RBF pilot on structural quality (mapping of quality checklist to facility survey instrument): hospitals

	Mean at baseline		*Mean at midline*		Impact estimate	p-value
	RBF	Control	RBF	Control		
Administration and planning	0.117	-0.220	-0.155	-0.328	-0.105	0.831
Medicines and sundries stock	-0.084	0.612	0.026	0.426	0.378	0.452
Outpatient Department	0.280	0.298	0.110	0.033	-0.131	0.828
Family and Child Health	-0.151	0.536	0.236	0.421	0.519	0.370
Maternity Service	0.035	-0.104	0.576	-0.616	0.903	0.055
Infection control and waste management	0.043	0.276	0.697	0.182	0.776	0.287
Total score	0.139	0.060	0.364	-0.297	0.543	0.230

Note: Sample size 29 hospitals. * p<0.1 ** p<0.05 *** p<0.01; impact estimates adjusted for district pair matching with standard errors clustered at district level.

Appendix Table 4.5: Effect of RBF pilot on facility autonomy (single difference at midline): hospitals

	Mean at midline		Impact estimate	p-value
	RBF	Control		
I am able to allocate my facility budget according to how it is needed.	4.439	3.826	0.624***	0.001
There is enough flexibility in my budget.				
I am able to assign tasks and activities to staff as needed to achieve the outcomes I want in the facility. There is enough flexibility to use staff to address needs	4.750	4.553	0.234**	0.042
I have choice over who I allocate for what tasks.	4.321	4.149	0.183	0.318
I have choice over what services are provided in the facility.	3.243	3.128	0.074	0.802
I have enough authority to obtain the resources I need (drugs, supplies, funding) to meet the needs of my facility.	3.971	3.617	0.320	0.138
I have the authority to spend on the maintenance of vehicles	1.607	1.435	0.242	0.232
I have the authority to spend on the maintenance of buildings	3.879	2.638	1.197***	0.000
Autonomy index (standardized)	0.188	-0.428	0.618***	0.000

Note: Sample size 71 hospitals. * p<0.1 ** p<0.05 *** p<0.01; impact estimates adjusted for district pair matching with standard errors clustered at district level

Appendix Table 4.6: Effect of RBF pilot on facility governance: hospitals

	Mean at baseline		*Mean at midline*		Impact estimate	p-value
	RBF	Control	RBF	Control		
ANC clinic hours per week	42.250	44.077	42.867	46.143	-2.072	0.652
Under five clinic hours per week	48.625	73.308	51.133	53.786	21.626	0.323
Facility has a Hospital/Health Center Committee	0.625	0.769	0.667	0.786	0.067	0.768
Number of members on this Committee	12.200	8.900	9.200	9.000	-4.415	0.279
Number of Health Center Committee meetings held in the last 12 months	8.100	6.700	9.700	8.000	1.382	0.764
Facility has written records of the Hospital/Health Center Committee meetings	0.800	0.700	0.800	0.818	0.029	0.909
Facility has a work plan for the current financial year	0.813	0.538	0.800	0.571	0.000	1.000
Number of health facility staff meetings held in the last 3 months	2.938	4.308	2.733	2.857	1.185	0.439
Number of visits made by a district health executive team for supervision or technical assistance in the last 3 months	1.938	2.538	2.357	1.929	1.008	0.463
Number of meetings made by facility with Community Health Workers for supervision or technical support in the last 3 months	1.667	1.909	2.429	1.857	0.895	0.151
Facility obtains information on patient opinion through client surveys, complaint/suggestion box or other method	0.818	1.000	0.800	0.786	0.224	0.186
Facility has a formal mechanism to inform the staff about patient opinion	1.000	0.800	0.917	1.000	-0.184	0.218
In the last 12 months, have any changes occurred as a result of patient opinion?	1.000	0.800	0.917	0.727	0.056	0.869

Note: Sample size 29 hospitals. * p<0.1 ** p<0.05 *** p<0.01; impact estimates adjusted for district pair matching with standard errors clustered at district level

Appendix Table 4.7: Mapping quality checklist to facility instrument

	YES (available, complete and up to date)	NO (not available & guidelines not followed)
ADMINISTRATION AND PLANNING		
Annual plan, operational plan, and quarterly plan *Available, approved and up to date, plans being followed*	5	
Documentation of activities. Minute books, for staff meetings, health center committee meetings, quarterly and annual progress reports *All reports and minutes should be available and filed (well stored)*.	5	
OPD/CONSULTATION AREA		
National Malaria guidelines put on wall and accessible to staff *National guidelines for diagnosis and treatment of uncomplicated and severe malaria*	1	
Stethoscope &Sphygmomanometer available and functional (stethoscope for all qualified staff) *Check blood pressure of somebody to verify functionality*	1	
Thermometer available and functional *Inspect the thermometer*	1	
Otoscope available and functional *Inspect: available charged batteries with strong light, back up batteries*	1	
Adult Weighing Scale available and functional		
Inspect in comparison with a known weight, after weighing the indicator should come to zero	1	
FAMILY AND CHILD HEALTH (FCH)		
Necessary functional equipment (fetoscope, tape measure, scale, stethoscope, sphygmomanometer, HB meter) *Equipment should be readily accessible for use by relevant staff*	1	
Availability of diagnostic test kits: *Urine test kit, RPR kit, HIV rapid test kits, RDT for malaria*	2	
Focused ANC protocol (availability of guidelines and displayed)	2	
Cold Chain Assured *- Dial thermometer/stem thermometer available* *- Presence of a fridge* *- Temperature booklet available, filled twice a day* *- Temperature remains within the recommended range of + 2 and+ 8 degrees celsius (Supervisor verifies functionality of thermometer - Temperature between +2 and + 8 degrees Celsius)*	5	
Availability of antigens (BCG, measles, polio, Penta, tetanus, vitamin A, (pneumococcal and rotavirus vaccine) *Presence of stock control cards - Supervisor verifies physical stock in the fridge*	5	
Availability of sharps boxes *Sharps boxes being used correctly and available in immunization room/corner/area*	2	
Salter scale (baby scale) available and in good state *Balance calibrated to zero + Pants available, clean and in good state*	1	
REFERRAL SERVICES		
Availability of communication, radio or mobile phone with airtime	2	
COMMUNITY SERVICES		
Monthly minutes of HCC meetings. *Available for every meeting held, issues discussed should address their challenges in meeting their planned activities and targets.*	4	
INFECTION CONTROL AND WASTE MANAGEMENT		
Infection control policy, available and being used	3	
Staff sterilises instruments according to standards *Steam steriliser functioning. guidelines available and utilized* *Check for the sensitive tape, no cord should be used to tie packs*	2	
Disinfectants available and being used according to guidelines	2	

	YES (available, complete and up to date)	NO (not available & guidelines not followed)
MATERNITY SERVICES		
Light in delivery room 24 hours *Electricity, solar light, rechargeable battery lamp, torch, candles*	1	
Waste from maternity correctly collected *Bin with liners + sharps containers.*	2	
Availability of the partographs *At least 10 filled partographs*	1	
ADMINISTRATION AND PLANNING		
Availability of a baby scale, tape measure, a fetoscope and a functional manual / electrical suction machine and suction tube	1	
Availability of sterile gloves *(at least 10 pairs)*	2	
Delivery bed in good state *(not broken, mattress not torn)*	1	
Available equipment for care of newborns and baby blanket *Sterile cord clamps, rescuscitaire, ambubag, HBB kit, 1 % tetracycline ointment, vitamin K*	1	
MEDICINES, SUNDRIES AND STOCK MANAGEMENT		
Staff maintains stock cards for essential medicines showing minimum stock level = *Monthly Average Consumption (MAC)/3* *Supply on stock card corresponds with physical count, (use sample of three medicines)*	2	
Drugs are stored correctly in a well secured storeroom *Clean place, well ventilated with cupboards, labelled shelves, and medicines stored in alphabetical order also observing the FEFO and FIFO rule*	2	

Appendix Table 4.8: Econometric estimation results for individual 'satisfaction' questions

Variable	Impact estimate	SE
Relationships with staff in facility and supervisors		
Working relationships with other facility staff	-4.595	5.242
Working relationship with district health executive/provincial health executive	-0.879	5.122
Working relationships with Provincial MoHCW staff	2.432	4.527
Management of the health facility by MOHCW or mission/NGO	-0.877	6.087
Relationships with local traditional leaders	0.651	5.341
Working conditions		
Availability of medicine in the health facility	2.991	5.378
Availability of equipment and supplies in the health facility	6.231	5.122
The physical condition of the health facility building	8.430	5.638
Self-performance of staff		
Your ability to provide high quality of care	2.655	4.291
Your ability to meet the needs of the community	-1.510	4.798
Compensation		
Your salary	7.415	6.693
Employment benefits (travel allowance, bonus, etc)	9.306*	5.323
Safety and security to live and practice in the community	8.949	7.161
Living accommodations for your family	13.965**	6.603
Recognition		
Your respect in the community	2.567	4.030
Your boss' recognition of your good work	-3.721	4.416
Career development		
Your opportunities for promotion	-0.400	6.585
Your training opportunities to upgrade your skills and knowledge	6.717	6.392
Overall satisfaction		
Overall, your satisfaction with your job	3.913	4.457

Note: Facility fixed effects adjusted for age, age squared, sex, education, work experience, cadre, and supervision; SEs clustered at facility level; sample includes RHCs only. * p<0.1, ** p<0.05

Appendix Table 4.9: Econometric estimation results for individual worker motivation questions

Variable	Impact estimate	SE
Teamwork		
Staff willingly share their expertise with other members	-6.420	4.832
When disagreements occur among staff, they try to act like peacemakers to resolve the situation themselves	-5.778	8.216
Staff willingly give their time to help each other out when someone falls behind or has difficulties with work	-6.091	3.716
Staff talk to each other before taking an action that might affect them	-10.465**	4.571
Staff take steps to prevent problems arising between them	-7.342	5.158
Staff spend their time chatting amongst themselves about things that are not related to work	-6.584	5.870
Staff spend time complaining about work-related issues	-9.811	6.571
Autonomy		
My job allows me freedom in how I organize my work and the methods and approaches to use	-3.395	5.982
I am given enough authority by my supervisors to do my job well	-3.691	4.287
Recognition		
It is important for me that the community recognizes my work as a professional	-5.089	4.142
It is important for me that my peers recognize my work as a professional	-7.394**	3.706
Changes in facility		
Changes in the facility are easy to adjust to	-3.687	6.647
Rapid changes are difficult to cope with	1.373	7.792
Changes bring opportunities to make improvements in the facility	-4.976	5.175
Self-concept		
My job makes me feel good about myself.	-3.048	3.141
I am proud of the work I'm doing in this facility.	-2.046	2.863
I complete my tasks efficiently and effectively.	-0.720	5.163
I am a hard worker.	-10.328*	5.596
I am punctual about coming to work.	1.814	8.711
These days, I feel motivated to work as hard as I can.	-0.856	5.438
Work environment		
I am proud to be working for this health facility.	-0.297	3.335
I am glad that I am working for this facility rather than in other facilities in the country	-3.624*	1.932
I would prefer to work somewhere else than in this facility.	-2.811	2.804
This health facility inspires me to do my very best on the job.	-1.688	4.007
My facility is a very personal place. It is like an extended family and people share a lot with each other.	-4.411	5.113
My facility is very dynamic and an innovative place. People are willing to take risks to do a job well-done.	-9.087**	4.235
My facility is very formal and structured. Policies and procedures are important for doing our work.	-3.789	3.894
In my facility, we focus on achieving daily goals getting our work done. Relationships between staff are less important.	-18.382**	7.486
Innovation and being first to try something new are important in my facility.	-6.419	4.942
Following procedures and rules is very important in my facility.	-3.274	3.138
Achieving results and high performance is very important in my facility.	-4.896*	2.626

Variable	Impact estimate	SE
Leadership		
The head of my facility is a mentor and a role model.	-6.081	4.715
The head of my facility is willing to innovate and take risks in order to improve things.	-10.982**	4.323
The head of my facility motivates staff to achieve goals	-6.711	4.416
Well-being		
In the past two weeks, I have felt cheerful and in good spirits…..	-8.718*	5.001
In the past 2 weeks, I have felt calm and relaxed…	-15.715**	7.158
In the past 2 weeks, I have felt active and vigorous…	-2.083	5.615
In the past 2 weeks, I woke up feeling fresh and rested…	-3.245	6.178
In the past two weeks, my daily life has been filled with things that interest me….	0.176	7.279

Note: Facility fixed effects adjusted for age, age squared, sex, education, work experience, cadre, and supervision; SEs clustered at facility level; sample includes RHCs only. * p<0.1, ** p<0.05.