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Impact of performance-based financing on primary health care services in Haiti

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To strengthen Haiti's primary health care (PHC) system, the country first piloted performance-based financing (PBF) in 1999 and subsequently expanded the approach to most internationally funded non-government organizations. PBF complements support (training and technical assistance). This study evaluates (a) the separate impact of PBF and international support on PHC's service delivery; (b) the combined impact of PBF and technical assistance on PHC's service delivery; and (c) the costs of PBF implementation in Haiti. To minimize the risk of facilities neglecting potential non-incentivized services, the incentivized indicators were randomly chosen at the end of each year. We obtained quantities of key services from four departments for 217 health centres (15 with PBF and 202 without) from 2008 through 2010, computed quarterly growth rates and analysed the results using a difference-in-differences approach by comparing the growth of incentivized and non-incentivized services between PBF and non-PBF facilities. To interpret the statistical analyses, we also interviewed staff in four facilities. Whereas international support added 39% to base costs of PHC, incentive payments added only 6%. Support alone increased the quantities of PHC services over 3 years by 35% (2.7%/quarter). However, support plus incentives increased these amounts by 87% over 3 years (5.7%/quarter) compared with facilities with neither input. Incentives alone was associated with a net 39% increase over this period, and more than doubled the growth of services ($P < 0.05$). Interview findings found no adverse impacts and, in fact, indicated beneficial impacts on quality. Incentives proved to be a relatively inexpensive, well accepted and very effective complement to support, suggesting that a small amount of money, strategically used, can substantially improve PHC. Haiti's experience, after more than a decade of use, indicates that incentives are an effective tool to strengthen PHC.

Keywords Performance-based financing, health financing, primary health care, maternal-child health services, Haiti

KEY MESSAGES

- The addition of performance-based incentives to training and technical assistance for non-governmental health facilities in Haiti increased key services over a 3-year period by 39%.
- For children under 1 year and pregnant women, the increases in services were statistically significant and large (1.7 to 2.2 times the baseline rates).
- Incentives proved more effective and substantially less expensive than training and technical assistance alone.

Introduction

To help meet the Millennium Development Goals in developing countries and improve the quality and efficiency of health care in industrialized countries, policy makers have implemented pay-for-performance (P4P), performance-based financing (PBF) or performance-based incentives (PBI) in health systems. The Performance-Based Incentives Working Group at the Center for Global Development defines PBF/PBI as the transfer of money or material goods from a funder or other supporter to a recipient, conditional on the recipient taking a measurable action or achieving a predetermined performance target (Eichler *et al.* 2009). The goal of tying payment to performance is to promote hard work, innovation and improvements along specified dimensions.

In developing countries, performance of facilities operating under a PBF scheme is often measured by the quantities of essential services (e.g. vaccinations or prenatal care) provided to vulnerable populations, while sometimes also including indicators of quality of care. Major international donors, such as the World Health Organization, the World Bank and the United States Agency for International Development (USAID) have supported projects with PBF elements (Soeters *et al.* 2011; The AIDSTAR-Two Project 2011). A rigorous randomized trial from Rwanda reported favourable results (Basinga *et al*. 2011). Other applications of this approach, in many cases with apparently favourable results, occurred in Afghanistan, Burundi, Cambodia, Democratic Republic of the Congo, Haiti, Kenya, Liberia, Sudan and Uganda (Soeters *et al*. 2006; Sabri *et al.* 2007; Rusa *et al.* 2009). Concurrent increases in resources or poorly controlled evaluations, however, often confounded the interpretation of existing experience. Additionally, policy makers are advised to look for potential adverse effects, such as neglecting non-incentivized services, reducing quality of care, expensive monitoring structures and short-lived benefits, and to encourage more controlled evaluations in a variety of contexts (Ireland *et al*. 2011). This evaluation from Haiti seeks to address these concerns.

Haiti is one of the least developed countries in the world, ranking 145th out of 169 countries in the United Nations Human Development Index (United Nations Development Programme 2010). While the performance of Haiti's health system is improving, the country still ranks worst in health indicators in the Western Hemisphere. In 2008, the infant mortality rate was 61 per 1000 live births in comparison with global average of 43 and regional average of 20. The under 5 years of age mortality rate was 87 per 1000 births, which is higher than the global average (80) and regional average (18). The maternal mortality ratio was 300 deaths per 100 000 live births, while the regional and global average maternal mortality ratios were 66 and 260, respectively (World Health Organization 2008). The main causes of death in children under age 5 are acute respiratory infection, and pneumonia in particular, as well as diarrhoeal diseases (United Nations Children's Fund 2010). The 3-year United Nations sanctioned embargo from 1991 to 1994 left Haiti with a weak health system and an underserved population. Primary health care (PHC) became a key priority and the strategic focus of Haiti's National Health Policy, published in 1996 and revised in 1999 (Ministère de la Sante Publique et de la Population 1999).

PBF was initiated in 1999 in three health facilities of non-governmental organizations (NGOs) delivering PHC services through the 'Santé pour le Développement et la Stabilité d'Haïti' (SDSH) Project implemented by Management Sciences for Health (MSH) and funded by USAID. The preliminary evaluation showed great success from PBF, with a substantial increase in rates of completely vaccinated children and of prenatal care among pregnant women (Eichler *et al.* 2001). MSH then scaled up the PBF initiative, and, by 2005, all 27 NGOs supported by USAID were operating under a PBF scheme. An evaluation in 2009 found that NGO health facilities enrolled in the scheme performed better than those in the rest of Haiti in complete immunization coverage, prenatal care, assisted deliveries and postnatal care (Eichler *et al.* 2001; Eichler and Levine 2009).

The tenets of the MSH PBF scheme include regular, accurate and timely monitoring and reporting; technical assistance to organizations to help them understand, set and meet targets; suggestions for corrective actions if goals are not met; and an innovative mechanism of selecting incentivized indicators. MSH's support (technical assistance and training) includes procurement procedures, minor renovations to the facilities and advice on community mobilization, communication, public relations and promotion of family planning.

This evaluation examines the PBF scheme in place through 2010, which applied to all NGOs served by SDSH. This scheme paid a varying percentage of 'budgeted' spending (the expected cost of delivery of a full package of services based on historical costs of service delivery) to each contracted NGO each year based on its performance on selected indicators. Each year, MSH worked with each NGO to set targets and incentives for candidate services based on the organization's historical performance and to agree on the budget. MSH disbursed 95% of budgeted funding to NGOs on a quarterly basis after receiving required information from them (e.g. data reporting and action plan), and kept 5% of budgeted funding as incentives. Thus the NGO received lowest percentage (95%) of its budgeted funding if it met none of its service targets and the highest percentage (105%) if it achieved all the targeted goals set by SDSH by the end of each year. The budgeting assumed that, on average, a facility would earn 50% of this possible 10 percentage points of bonus. For the study years, on average, facilities received 60% of their maximum bonus, corresponding to 6% of budgeted spending through incentives. The NGO had the discretion about how to use its bonus. While the amount of additional resources was modest, these incentives sought to focus the organization's attention on critical but underutilized PHC, such as vaccinations, prenatal and postnatal care, and institutional deliveries. To allow for timely assessment of NGOs' performance, data were reported monthly by each facility to the MSH office in Port-au-Prince for monitoring and payment by MSH and, separately, by each facility to the department (provincial) office for incorporation into the country's health information system.

The contract model, instituted before the start of the study period, randomly selects one indicator for payment in each category of services (such as HIV/AIDS or maternal health) just after the end of each year. Depending on services available in health facilities, there are often four to five indicators selected for actual payment. This approach prevents NGOs from

knowing beforehand which services will be incentivized and neglecting non-incentivized services. It also reduces the likelihood that the NGOs will try to game the system by falsifying data and minimizes administrative costs, as only data for the selected indicator need to be validated. Table 1 lists the potential indicators used in 2011 for incentives.

While previous evaluations have described the design and initial functioning of PBF in Haiti (Eichler *et al*. 2001; Eichler and Levine 2009), facility-level data for a controlled evaluation were not previously available. This evaluation is the first to use data from Haiti's health information system, which became active in 2009, to evaluate PBF. As suggested by Ireland *et al.* (2011), several contextual factors in Haiti should be noted. First, PBF operates in a sophisticated, multi-layered environment within which the contracting NGOs often have multiple sites, with multiple health care providers at each site. Second, since training and technical assistance are prominent features of the SDSH project, we hypothesized that the incentives to facilities have had a synergistic effect, magnifying the interest of facility managers and providers in applying the lessons from the technical assistance and training. Finally, because incentives had been integrated into facility operations and financing for over 11 years by the end of the evaluation period, we hypothesized that incentives augmented the facilities' ability to improve their output, resulting in a higher compound growth rate. Compounded over time, changes in growth rates, if found, would be very powerful effects. To reflect these factors, this evaluation covers the maximum period (3 years) available from Haiti's health information system and combines quantitative and qualitative methods. This evaluation addresses these issues through a controlled design comparing PBF and control facilities (which were conventionally funded via cost reimbursement or fixed budget).

In all, this study aims to assess for the period from 2008 through 2010: (a) the separate impact of PBF and technical assistance on delivery of PHC services; (b) the combined impact of technical assistance and PBF on service delivery; and (c) the costs of PBF implementation.

Methods

Quantitative component

The earthquake on 12 January 2010 destroyed the Ministry of Health building, other national computers and much of Haiti's West department, which includes Port-au-Prince, where the earthquake was centred, and which accounted for 40% of total NGO facilities (31 out of 77) and 7% of total public facilities (5 out of 70) supported by SDSH in Haiti in 2011. Therefore, the quantitative component of this study relied on health information system at the department (provincial) level data in Haiti from 2008 through 2010. Our analysis included data from all the 217 health facilities in four departments (Northeast, North, South and Central). Of these facilities, 15 were implementing PBF (all NGO facilities), while the remaining 202 facilities were not (a mix of public and NGO facilities with a majority of public ones). The public facilities were often different from NGO facilities in terms of less autonomy and flexibility in resource allocation and management etc. This data set was independent of the one MSH used for determining incentive payments. It is important to note that the loss of quantitative data from the West department may have resulted in our underestimating the impact of technical assistance as well as PBF because the West department probably received more rigorous monitoring and evaluation.

Table 1 List of potential indicators for incentives by dimension

Number	Description
I. Child health services	
1	Percentage of children under 5 years affected in nutrition programmes (children weighed)
2	Percentage of children 6–59 months who received at least one dose of Vitamin A
3	Percentage of children <1 year who received complete diphtheria, pertussis, tetanus (DTP3) vaccination
II. Maternal health services	
4	Percentage of pregnant women for whom the birth plan was prepared at the first prenatal visit
5	Percentage of pregnant women attending the first prenatal visit in the first trimester
6	Percentage of new mothers who received a postnatal home follow-up visit in the range of 0–3 days after delivery
7	Percentage of pregnant women who received three antenatal care visits
8	Percentage of new mothers who received a postnatal visit
III. HIV/AIDS services	
9	Number of clients tested for HIV
10	Number of pregnant women tested for HIV
IV. Tuberculosis (TB) detection	
11	Number of new TB cases detected by sputum
12	Number of TB cases tested for HIV
V. Quality of services	
13	Self-perceived quality of services at health centres
14	Medical waste treatment meets the standards of the Ministère de la Sante Publique et de la Population

To assess the quality of departmental data, at least for health facilities that implemented PBF, we obtained a data set from the MSH Haiti office consisting of volumes of services for the same years for the same 15 SDSH-supported facilities. As MSH conducted data verification periodically to avoid over-reporting of service provision from health centres by interviewing a small sample of patients, we hypothesized that the data from MSH were reported accurately. Thus the consistency checking of the data from department and MSH would allow us to examine the quality of department data for implementing analyses. From the 48 indicators in the MSH data set, we identified the following four, which were also in the data from the health information system: number of DPT vaccinations, number of completely vaccinated children, number of women receiving their third prenatal visit, and number of women delivering in a health institution. We created a validation index defined as the ratio of difference (Source1 − Source2) to the mean over all facilities of Source1, where Source1 is data from departments (government system) and Source2 represents data from MSH.

Table 2 shows the means and standard deviations of indicators from the two sources, as well as the validation index. These findings show that the data are reasonably accurate. The median values are zero and the mean differences are small fractions, below 15% in magnitude. Furthermore, the signs of the differences do not reveal systematic bias. Whereas the MSH data were higher for three indicators (number of completely vaccinated children, number of DPT vaccinations, number of women receiving their third prenatal visit), they were lower for the fourth indicator (institutional delivery). The high standard deviation reflects the presence of a few outliers for each indicator, where the greatest upper outliers showed deviations of 11, 8, 7 and 5 times the mean.

Our quantitative analysis examined the most robust available PHC service indicators: all types of consultations (i.e. generic) for children under 1 year of age, children aged 1–4, children aged 5–14, pregnant women and adults excluding pregnant women. The PBF scheme pays providers primarily based on indicators related to maternal-child health, such as vaccinations, prenatal and postnatal care. We did not include HIV/AIDS services in the analysis because many health centres did not provide those services. We created two summary indexes: one for potentially incentivized services (consultations for children under age 1, aged 1–4 and pregnant women) and one for non-incentivized services (consultations for children aged 4–15, and other adults).

In both descriptive and regression analyses we used quarterly, rather than annual observations, to increase statistical power. To control for the individual health facility effects, we used a random-effects model after controlling for seasonal (quarterly) variation and time trends, as follows:

$$\log(services)_{it} = b_0 + b_1 PBF_i + b_2 time_t + b_3 PBF_i * time_t + B_4 quarter + \alpha_i + \varepsilon_{it}$$

where i denotes the health facility and t is time (i.e. the number of quarters, where 1 is the first quarter of 2008). The dependent variables (log services) are the natural logarithms of the volumes of the categories of services provided by health facilities. PBF is a dummy variable indicating whether the health facility was implementing PBF or not (0 for no and 1 for yes), and time is coded from 1 to 12 to measure the time trend in quarters. The key variable is the interaction term between PBF and time, which shows the differential growth rate between PBF and non-PBF facilities. This variable indicates the net impact of PBF. The variable quarter is a vector of three dummy variables to adjust for seasonal variation, with the first quarter (January through March) as the reference group. The variable α_i is the individual health facility effect, and ε_{it} is random error. To separate the effect of incentives from technical assistance and training offered to all sites, we compared the coefficients of interaction terms between incentivized and non-incentivized services, using a seemingly unrelated regression. This difference indicates the pure effect of the incentives. Using both the difference-in-difference approach as well as random-effects model would alleviate the concerns regarding the comparability between control and PBF facilities in evaluating the effect of PBF.

Qualitative study

The qualitative study consisted of 12 interviews in four PBF NGOs based in the West Department in Haiti. The sample of NGOs was selected based on geography, varied levels of performance, security and proximity to Port-au-Prince.

Geography: All four interview sites were in the West Department, where 31% of health facilities in Haiti are located. MSH sponsors 27 NGOs in Haiti, which provide health services in 77 health delivery points. Of the 77 health delivery points, 31 are located in the West (Ministère de la Sante Publique et de la Population 2005).

Varied levels of performance: Discussions with NGOs achieving different levels of performance allowed us to capture information about both the weaknesses and strengths of the PBF policy. We selected two low-performing NGOs (i.e. attaining less than 80% of the maternal and child health target indicators) and two high-performing sites (attaining at least 80% of these indicators) based on 2010 performance.

Table 2 Summary statistics for four indicators for validation

Indicators	Mean ± SD			Health-facility quarter-year periods (*n*)
	(Department data)	(MSH data)	(validation index)	
Complete vaccination	46.67 ± 58.62	53.51 ± 67.28	−0.16 ± 1.30	306
Key vaccination dose[a]	53.74 ± 64.02	58.67 ± 73.88	−0.10 ± 1.18	257
Three prenatal care visits	38.98 ± 54.48	43.61 ± 59.30	−0.13 ± 1.09	330
Institutional delivery	18.29 ± 28.91	15.73 ± 25.56	0.15 ± 0.94	252

Notes: [a]Third dose of diphtheria-pertussis-tetanus vaccine (to children). SD denotes standard deviation. MSH = Management Sciences for Health.

Security: All the sites were in secure (relatively safe) regions to allow the research team to conduct interviews at the health delivery points run by the NGOs.

Proximity to Port-au-Prince: All the sites visited were within a 1–2 hour drive from Port-au-Prince.

A four-member research team with expertise in public health and health service research conducted interviews, with at least two members present for each interview. Each interview lasted one hour on average. Most interviews were performed in French. All subjects were told that their participation was voluntary and that individual responses would remain confidential. Six respondents were NGO managers or senior management staff, and six were managers of service delivery points or medical staff. As neither the qualitative nor quantitative components entailed obtaining or accessing patient-level data, the study was not considered human studies research. The interview guide and form is provided in the Supplementary Web Appendix.

Results

Quantitative study

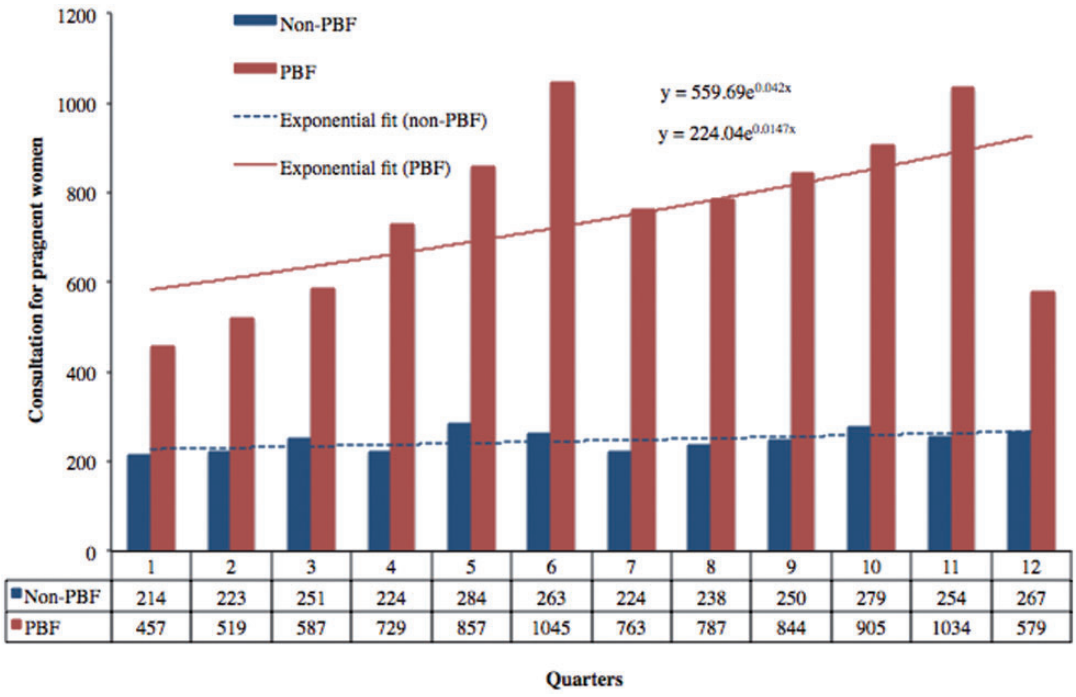
To illustrate the data for an individual service, Figure 1 shows the average number of consultations for pregnant women by quarter. The fitted (ordinary least-squares) trend line indicates that the rate of growth of this service in PBF facilities (4.2%/quarter) exceeded that in non-PBF facilities (1.5%/quarter), but there is substantial variability from one quarter to the next. Other individual services (not shown) exhibited similar tends and variability.

These trends have to be interpreted with caution, however. First, we have data only for 12 quarters. Second, the service volumes are substantially higher during the last two quarters in PBF facilities; these observations may have raised the growth rate in the intervention group. Third, the sample size for the intervention group is small, with only 15 facilities. With a much smaller sample size than the control group of 202, the averages of PBF facilities are less stable.

Figures 2 and 3 graph the summary indexes for incentivized services and non-incentivized services. As expected, the summary index for incentivized services shows a higher growth rate of 10.0%/quarter in PBF-implementing facilities, compared with 1.1%/quarter in non-PBF-implementing facilities. The corresponding summary for non-incentivized services shows the opposite pattern from the incentivized services: a higher growth rate of 0.8%/quarter in the non-PBF-implementing facilities vs −1.7%/quarter in PBF-implementing facilities.

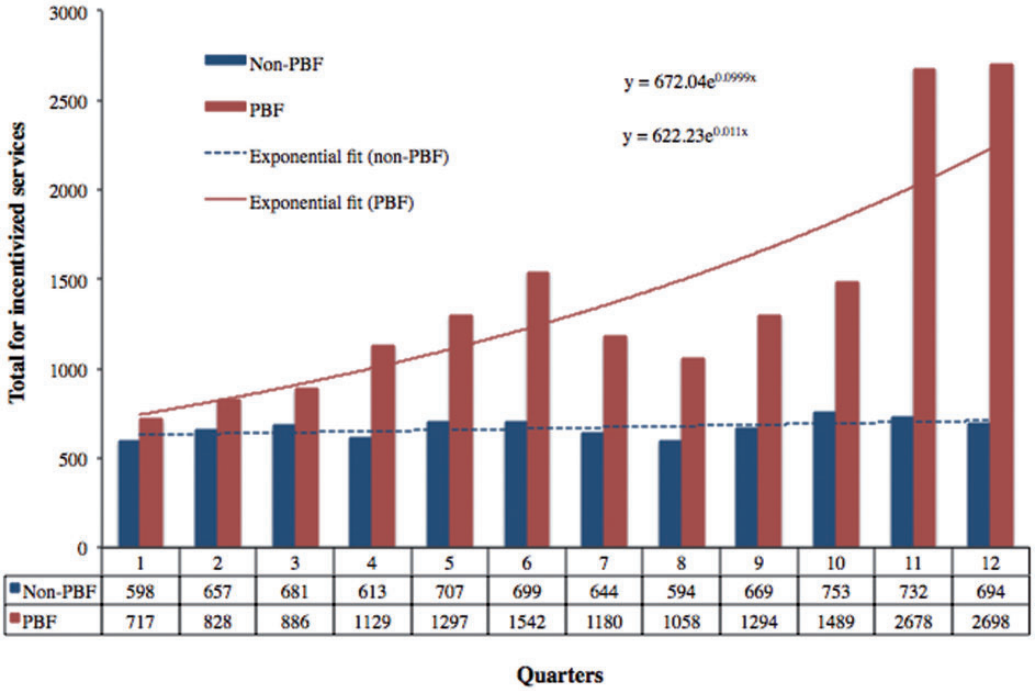
Table 3 summarizes the regression results from the random effects models. PBF increased utilization of consultations for children under age 1 by 9.4%/quarter, 5.7%/quarter for children aged 1–4, and 4.0%/quarter for pregnant women. While the consultations for children 5–14 also increased, we did not find higher utilization for consultation for other adults. In sum, the incentivized services grew by 5.7%/quarter, while the non-incentivized services grew by 2.7%/quarter. When we compared the growth rates between incentivized and non-incentivized services, the difference of 3.0%/quarter was statistically significant ($P = 0.05$, Chi square = 3.71).

The cumulative effect of these growth rates over the 3-year period of analysis is shown in Figure 4. Over the 3 years, the incentivized services grew by 87%, indicating the combined effect of incentives and the strengthened monitoring and technical assistance. The non-incentivized services grew by 35%, reflecting the strengthened monitoring and technical assistance. Thus, the estimated pure effect of the incentives (3.0%/quarter) led to a cumulative 39% improvement over the 3-year period.



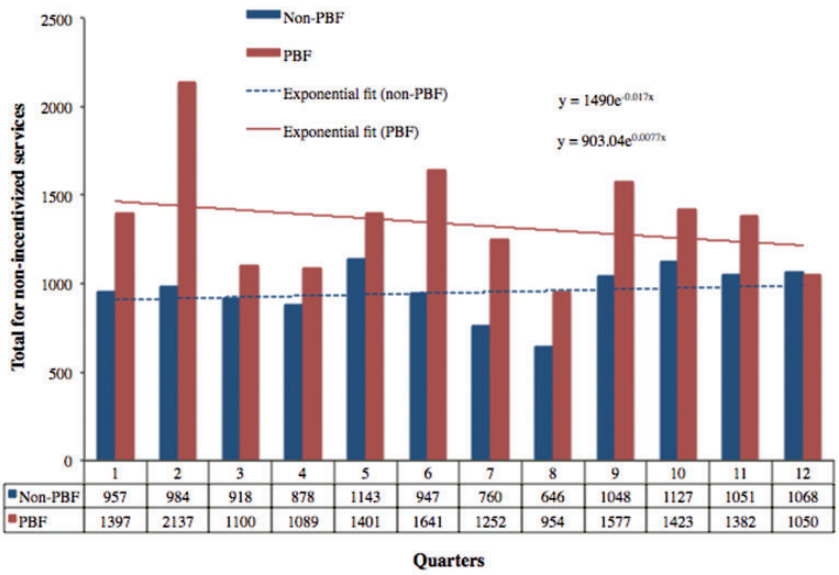
	1	2	3	4	5	6	7	8	9	10	11	12
Non-PBF	214	223	251	224	284	263	224	238	250	279	254	267
PBF	457	519	587	729	857	1045	763	787	844	905	1034	579

Figure 1 Average number of consultations for pregnant women (incentivized services) by non-PBF ($n = 202$) and PBF facilities ($n = 15$), 2008–2010



	1	2	3	4	5	6	7	8	9	10	11	12
Non-PBF	598	657	681	613	707	699	644	594	669	753	732	694
PBF	717	828	886	1129	1297	1542	1180	1058	1294	1489	2678	2698

Figure 2 Average number for total incentivized services by non-PBF ($n = 202$) and PBF facilities ($n = 15$), 2008–2010



	1	2	3	4	5	6	7	8	9	10	11	12
Non-PBF	957	984	918	878	1143	947	760	646	1048	1127	1051	1068
PBF	1397	2137	1100	1089	1401	1641	1252	954	1577	1423	1382	1050

Figure 3 Average number for total non-incentivized services by non-PBF ($n = 202$) and PBF facilities ($n = 15$), 2008–2010

As shown in the descriptive results, quarters 11 and 12 may contain some outliers. Table 4 shows the use of the data in the first 10 quarters to conduct the sensitivity analysis for the regression results. After excluding the last two quarters from the analysis, the positive growth rate for incentivized services, such as consultation for children under age 1 and pregnant women, remains statistically significant, while the growth rate for services that were not incentivized showed no statistical difference.

The last two rows in Table 4 show a growth rate of 5.3%/quarter for incentivized services and no statistical significance for non-incentivized services (3.4%/quarter), in spite of a positive trend toward encouraging utilization of services. However, the difference in growth rates between the two types of facilities of 1.9%/quarter is not statistically significant ($P = 0.24$, Chi square = 1.38). Thus, non-incentivized services did not perform significantly lower than incentivized services.

Qualitative study

Overall, the qualitative study identified several contributors to the improvement in incentivized services at PBF facilities,

especially better management, higher accountability for results and increased staff motivation.

Management and technical staff interviewed at NGOs had a good understanding of the PBF system. The medical staff had excellent knowledge of the target indicators they were supposed to achieve, but NGOs did not always reward their staff with the bonus that NGOs would receive from SDSH. Discussions with NGOs and health care providers indicated that a sound monitoring system was in place for reporting to SDSH in conjunction with the PBF mechanisms.

The bonus (up to 10% of a contract's budgeted amount) was usually redistributed by NGOs at the facility level. In some cases, the bonus was used to upgrade health facilities and mobile health clinics. In other cases, the NGO provided individual incentives to medical staff based on their performance in order to motivate them. They rewarded community health workers (termed health agents) and medical staff by organizing parties, providing small gifts and presenting certificates of performance.

Interviews at the management and service delivery levels showed that PBF improved the coverage of services and revealed no instances of adverse quality impacts and several beneficial quality changes. For example, PBF reportedly encouraged NGO staff to be proactive in encouraging women and children to visit the clinic for recommended services and to internalize a sense of accountability for their work. Most NGOs have seen positive effects from PBF at the service delivery level because it has led to more effective management, through systematic planning and monitoring. In addition, the bonus policy and target indicators make medical staff more accountable for results.

Table 3 Differences in quarterly growth rates between PBF and non-PBF facilities (PBF – non-PBF facilities) from the random-effects regression models

Service (consultation for)	Difference in growth rates	Z value	*P* value
Children <1 year	9.4%***	5.49	0.00
Children 1–4 years	5.7%***	3.37	0.00
Pregnant women	4.0%*	1.90	0.06
Children 5–14 years	3.9%*	2.48	0.01
Other adults	2.8%	1.21	0.23
All incentivized services	5.7%***	3.89	0.00
Non-incentivized services	2.7%	1.66	0.10

Notes: *denotes $P < 0.05$, ***denotes $P < 0.001$; the number of observations is 1713.

Resources

To interpret the magnitudes of incentive payments, it is useful to relate them to other budget categories. The SDSH project years that most closely match the time period of this evaluation are its 'basic' period of 3 August 2007 through to 2 August 2010. According to the SDSH summary budget for 2009, the budget for direct costs of services by MSH over those 3 years totalled US$47.65 million. The average annual budget of

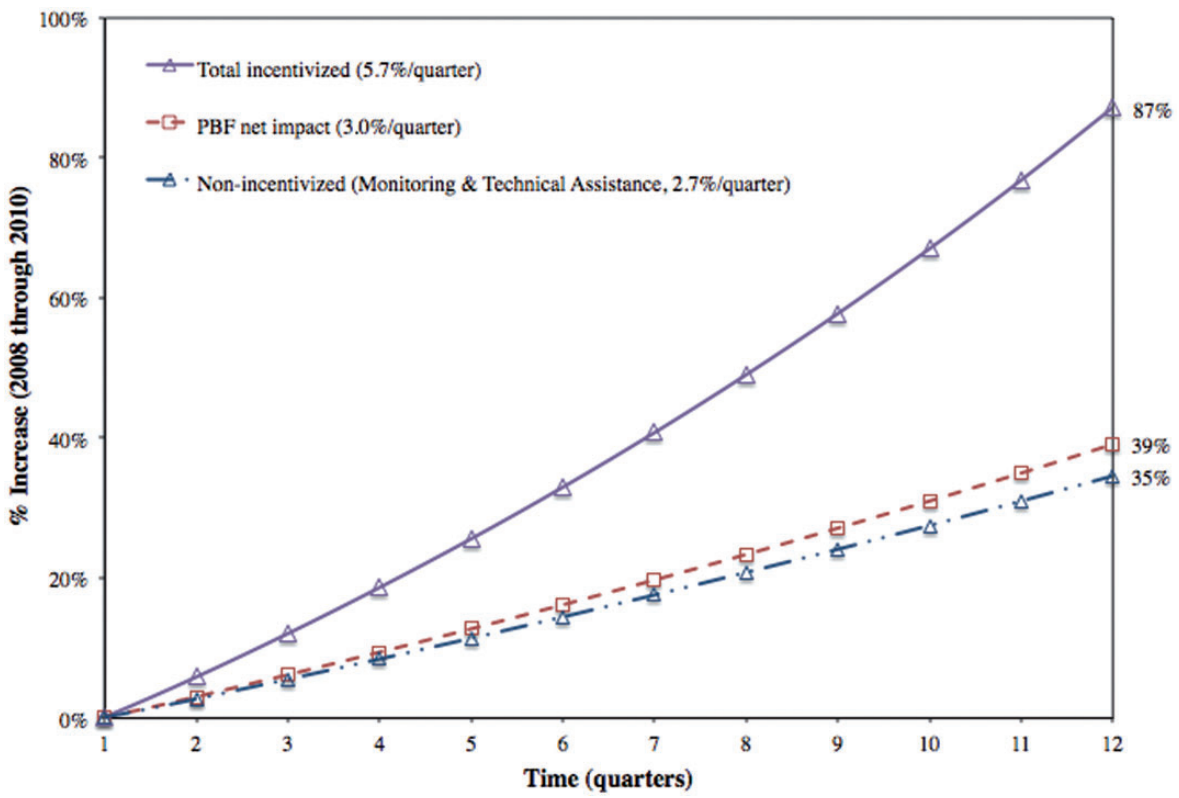


Figure 4 Cumulative growth over 3 years (12 quarters) under alternative growth

Table 4 Sensitivity analyses of differences in quarterly growth rates between PBF and non-PBF facilities (PBF – non-PBF facilities)

Service (consultation for)	Difference in growth rates	Z value	*P* value
Children <1 year	7.7%***	3.77	0.00
Children 1–4 years	3.1%	1.50	0.13
Pregnant women	5.7%*	2.24	0.03
Children 5–14 years	3.2%	1.68	0.09
Other adults	4.5%	0.03	1.64
Incentivized services	5.3%***	3.00	0.00
Non-incentivized services	3.4%	1.71	0.09

Notes: *denotes $P < 0.05$, ***denotes $P < 0.001$; the number of observations is 1466.

US$15.88 million per year consists of US$11.07 million (70%) for contracted health facilities (NGOs and public facilities in target zones), and US$4.81 million (30%) consumed by MSH for support (monitoring and technical assistance). The payments to health facilities can be decomposed into 'basic' amounts (US$10.44 million) and the budget for potential award fees or incentives (estimated at 6% of the basic amount, or US$0.63 million). Of the amounts spent by MSH on internal costs, project managers attribute approximately 85% (US$4.09 million) to support, while the remaining 15% (US$0.72 million) went to project administration.

MSH provides technical support and training to maintain or improve quality of services and organizational development support for strengthening the health system elements required for effective health service delivery, including the areas of leadership and governance, health management information system, service organization, health care workforce, financial management and drug management. In SDSH supported sites, technical assistance often consists of two full-time technical and financial officers in each of the 10 districts. Technical and financial officers are, respectively, responsible for 3–5 SDSH supported sites and assist district health authorities in monitoring sites' health outputs, implementing new health programmes and managing their finances. On a monthly basis, the SDSH headquarters monitoring unit assesses the health outputs of the Minimum Package of Services components (e.g. HIV/AIDS/TB, reproductive and sexual health, and nutrition and child health) across all supported sites. In addition, SDSH headquarters technical units (e.g. HIV/AIDS/TB, reproductive health, child health, capacity building/training unit) provide support in upgrading protocols and standards of the Minimum Package of Services and implementing them among supported sites through, among other activities, training. All these activities raise awareness of facility staff on resource management and target of health outputs, and contribute to better performance in SDSH supported sites.

These breakdowns show that the budget for support was 39.2% of the basic costs. Current levels of incentives are small in relation to both basic and support costs, with payments for support costs being six times those for incentives. In terms of staffing, the project has about 60 technical staff based in Port-au-Prince or in departments. Together, they support 66 organizations (27 NGOs and 39 public facilities) across the country. By all measures, the resources for training and technical assistance are substantial. The synergistic value of incentives in reinforcing the application of this support is potentially very large.

Discussion

Consistent with PBF evaluations in other countries, such as Rwanda and the Democratic Republic of Congo (Basinga *et al.* 2011; Soeters *et al.* 2011), our results show that PBF has led to the improvement of health care delivery in Haiti. As noted, with both incentives and support, PHC services increased by 87% over 3 years, whereas with support alone, this change was only 35%. As the effects are multiplicative, PBF alone was associated with a net 39% increase (i.e. 1.87/1.35–1) over this period.

We found that improvements related to the use of PBF were particularly associated with the utilization of services for children under age 1 year and for pregnant women. This was not surprising, since the major services utilized by these two population groups, such as vaccinations, prenatal and postnatal care, and attended delivery, are the key indicators tied to incentives.

The interviews found that PBF was valued by all staff at health facilities. As indicated in the previous evaluation, facilities receiving PBF enjoy more flexibility in spending these payments compared with revenues from cost-based reimbursement, which requires carefully justified expenditures (Eichler and Levine 2009). Under PBF, NGOs were able to negotiate their budgets, provide services at known prices and receive reimbursement quarterly. Thus, incentives offered health facilities greater autonomy to allocate their budgets.

Incentives also encouraged staff at all levels of the NGOs, from service providers to senior managers, to pay attention to the facility's performance indicators, thereby strengthening facility management. The facility director generally assigned targets to community health workers, convened routine meetings, monitored and evaluated staff members' performance, and formulated strategies to help staff to face challenges in meeting the targets. Those behavioural and management changes induced by PBF were critical drivers for improving the performance of health facilities.

Rwanda has been widely cited for its effective PBF scheme (Ireland *et al.* 2011). An important difference between Rwanda's and Haiti's PBF schemes is the way in which payments are distributed. Unlike Rwanda, where the payments are linked to units of service (e.g. payment of US$0.09 for an initial prenatal visit), Haiti's payment scheme was attached to targeted coverage of maternal child services. The payment mechanism in Haiti may help mitigate concerns that health providers focus too much on services with high payment rates (e.g. attended delivery in Rwanda) and neglect those with lower rates (Basinga *et al.* 2011). Haiti's innovation of randomly selecting indicators for monitoring and evaluation appeared to further address this concern. Among the specific incentivized services, we did not find a statistically significant impact of PBF on services for children aged 1–4, for whom the key services are follow-up vaccinations, providing vitamin A, monitoring nutrition status, and treatment of pneumonia and diarrhoea. One explanation is that compared with the services for children less than 1 year old and pregnant women, some of these services for children aged 1–4 may be regarded as less critical by service providers.

As expected, we did not find a statistically significant impact of PBF on the two indicators for non-incentivized services: consultations for children aged 5–14 years and consultations for other adults. But these results also point in a positive direction with higher growth rates in PBF-implementing facilities. The improvement is possibly due to three factors. First, the beneficial management innovations and technical assistance incorporated into PBF systems encourage provision of more services. Second, with the improvements in key services for children under 5 and pregnant women, health facilities are gaining greater trust by the communities they serve, and more people, in turn, are more willing to seek care in these health facilities. Third, incentivized services may spill over into non-incentivized services. For example, treatment of sexually transmitted infections, a potentially incentivized indicator, may encourage subsequent adult consultations, a non-incentivized indicator.

As of 2012, PBF has been implemented in Haiti for 13 years since the pilot study in 1999 and for 7 years since the scale-up in 2005. Unless the use of PBF expands to more health facilities, the current growth rate does not indicate that there will be a continued positive trend in the future, since demand may become saturated.

In 2011, MSH, with the support from the Government of Haiti, expanded the PBF scheme to more public health facilities, starting with those that needed the resources most. As of April 2012, there were 81 private and 79 public facilities under the PBF scheme, covering 42% of total population in Haiti. The Government of Haiti has decided to develop the capacity to pay incentives to public facilities directly, and will be working with USAID, the World Bank and MSH to develop a system to integrate PBF programmes (for public and private facilities) that are operational in all 10 departments. With more health facilities in the PBF scheme, several policy initiatives would be helpful to maintain the momentum of PBF in improving utilization and the quality of medical services. First, as some services may be saturated after many years of implementation of PBF, it would be beneficial to include more indicators on quality of services for the payment of incentives. Second, expansion of customized contracts with NGOs may serve the growing diversity of participating NGOs (e.g. in terms of stage of development and type of ownership). Some NGOs may not provide HIV/AIDS services, so the percentage of incentives for meeting each target must be adjusted compared with NGOs providing all potential incentivized medical services. Third, the inclusion of the demand side (e.g. community-based health insurance) incentives is likely to enhance the effect of PBF in increasing the use of under-utilized services to achieve MDGs, as has been found elsewhere (Palmer *et al*. 2004; Shepard *et al*. 2012).

Limitations of the study

Several limitations must be acknowledged. First, our quantitative data could examine only the quantity and not the quality of services. However, financial incentives were modest and generally indirect and the qualitative comments of those interviewed identified no adverse effects and suggested some potential improvements to quality. Therefore, we do not think this limitation was serious. Second, our control group (facilities with neither PBF nor support) consisted primarily of public facilities, and might have differed in some systematic way from the incentivized facilities. Two techniques—use of longitudinal data for estimating the effect of PBF and use of difference-in-difference to isolate the effect of incentives—helped us to adjust for both baseline and systematic differences between PBF and non-PBF facilities. As SDSH targeted poor-performing health facilities for implementing PBF since the scale up in 2005, our methodology may have underestimated the impact of PBF. Third, the data in the control group were not verified, and thus we were not able to assess the quality of the reporting in those health centres. If there were a systematic over-reporting of service delivery in health centres in the control group, we may be underestimating the impact of the PBF. Fourth, although our sample of 15 PBF health facilities accounts for 37.5% of the total of 40 PBF health facilities supported by SDSH in the four departments, the sample size of 15 is small from a statistical perspective, resulting in a higher probability of type II errors and the lack of statistical significance for some services that were hypothesized to be statistically significant, such as consultations for children aged 1–4.

Conclusions

Despite the absence of a standard policy on the distribution of incentives to direct care providers, this study found enthusiasm about incentives at all levels. Overall, the incentives seem to work synergistically with technical assistance and training under the PBF scheme. While modest incentives were associated with notable growth rates in incentivized services, slightly higher incentives and more frequent disbursement would likely strengthen the impact even more. Given the current low share of incentives in the total budget and their high impact, we recommend doubling incentives to an average of 10% of basic costs. We also recommend that incentives be paid quarterly rather than annually. This would make the incentives payment consistent with SDSH's current disbursement schedule for basic services and provide more frequent reinforcement. We recommend that facilities be sure to distribute a portion of the incentives to their staff, so they personally receive benefit from their extra work. This distribution should apply to health workers at all levels, especially the lower levels. The health agents (community health workers), the lowest paid workers, have a critical role in encouraging vulnerable populations to seek services and would likely respond very favourably to receiving a portion of the incentives directly.

In conclusion, this study suggests that appropriately designed PBF incentive systems helped hold health facilities and staff accountable for the outputs that are directly related to beneficial outcomes. Hence, this mechanism is likely to accelerate progress toward the Millennium Development Goals (Montagu *et al.* 2011) to reduce child and maternal mortality.

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Conflict of interest

Katherine D. Wright is an employee of Management Sciences for Health. She collected some of the data and assisted with drafting background information, but was not responsible for the study design or conclusions.

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