

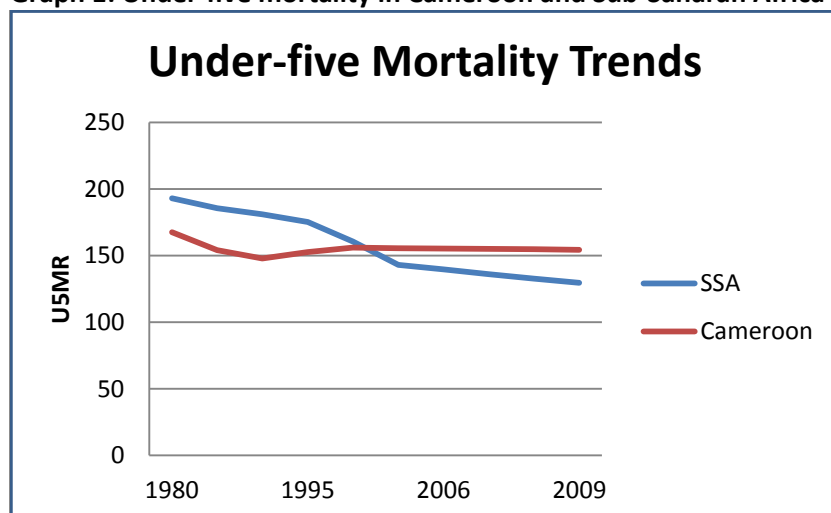
**CONCEPT NOTE FOR THE IMPACT EVALUATION OF A PBF PILOT IN  
CAMEROON**

November 6 2012

## Background

Cameroon has made little progress towards achieving the MDGs. In fact, with a few exceptions like immunization, most key indicators of maternal and child health and nutrition have stagnated or worsened since 1990. Cameroon is seriously off-track for reaching the child mortality MDGs. Under-five mortality rose in Cameroon in the 1990s and has stagnated in the 2000s (see graph 1). Cameroon is unlikely to attain the nutrition MDG of reducing the proportion of underweight children either, and close to a third (32%) of children under five are chronically malnourished. Although the government has mounted a major effort to expand access to key child health and nutrition services that can reduce mortality, their coverage remains low (see table 1 below) and rich-poor differentials remain an important concern. Similar problems are evident in the case of maternal health. Maternal mortality has remained high. Although a relatively large proportion of women receive some prenatal care ( $\geq 1$  visit: 83%), a much smaller proportion benefit from skilled assistance at birth (62%). Furthermore, only 13% report using a modern method of contraception. Improving access to critical child health services (immunization, ARI and diarrhea treatment, nutrition services and insecticide treated nets) and maternal health services (prenatal care, delivery care and contraception) is a priority if maternal and child health are to improve in Cameroon.

**Graph 1: Under-five mortality in Cameroon and Sub-Saharan Africa**

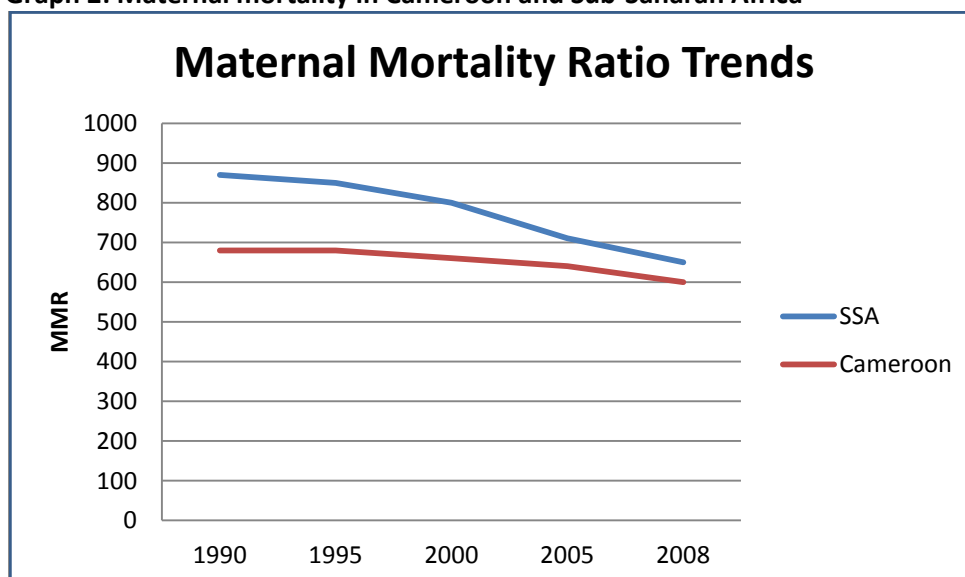


Sub-optimal allocation of resources and resource use inefficiencies are key underlying determinants of the limited improvements achieved in the health sector. Cameroon spends \$ 50 per capita on health, however its epidemiological profile corresponds to that of countries that spend \$ 10 to \$ 15 per capita. An important part of the problem is that the operational level receives a small fraction of the health budget. Although the health sector budget has more than doubled in recent years, the lion's share of resources has been allocated for administration, rather than to the front lines where health services are provided. This has resulted in a scarcity of funds to meet operating expenses incurred in the day-to-day business of a district health system (e.g., consumables, drugs, regular maintenance, community outreach, etc). Inefficiencies are also created by the inadequate alignment between the burden of disease in Cameroon and health expenditures. AIDS, malaria, TB and maternal and childhood illnesses represent 45% of the total Disability Adjusted Life Years (DALYs) but received only 25% of funding in the Medium Term Expenditure Framework 2002-07.

Governance problems are at the root of the second key constraint to district health system functioning. An excessive focus on controls without a corresponding focus on results creates few incentives for health workers to deliver good quality health services or promote service use.

Furthermore, non-transparent human resource management practices combined with low salary levels drive health workers to abuse public funds by charging informal payments or over-billing patients for services and, ultimately, to deter use by the poor.

**Graph 2: Maternal mortality in Cameroon and Sub-Saharan Africa**



Limited physical and financial access to health services contributes to low coverage levels and rich-poor inequities in maternal and child health service utilization. Cost recovery mechanisms are extensively used in Cameroon, and are a source of revenue for health facilities. Apart from creating perverse incentives to focus on curative care, these mechanisms have resulted in a heavy financial burden on households, particularly for the poorest households.

Appropriately designed Performance Based Financing (PBF) can potentially help to address many of these challenges identified above by:

1. Improving the alignment between resources and maternal and child health priorities by purchasing priority service delivery indicators at higher rates
2. Allowing facilities to retain PBF funds for use at the operational level, and giving facilities management autonomy on how to use these funds
3. Creating incentives for health facility managers and health workers to expand the coverage of important public health services and improve their quality by linking facility payments to service delivery and quality indicators, and offering health workers bonuses that are linked to facility performance
4. Improving governance through better verification and oversight of performance and incentives for good performance

There are promising indications from a number of countries in Sub Saharan Africa that suggest that PBF may be a useful approach to address the types of challenges evident in Cameroon. The Rwandan experience with PBF has attracted considerable interest and has had promising results in terms of increasing the proportion of staff in public sector facilities, increasing financing to the district level and improving the coverage of key maternal and child health services<sup>1</sup>. Neighboring Burundi has also – albeit more recently – implemented a PBF program that is similar to the one planned in Cameroon. Some promising preliminary results are available from Burundi. Since PBF has been implemented, facilities in Burundi are more likely to have the full complement of skilled staff (an increase from 37% in 2006 to 71% in 2010) and coverage of important health services such as

skilled birth attendance has increased from 57% in 2006 to 82% in 2010 while contraceptive prevalence – often slower to change – has increased from 9% to 16%<sup>ii</sup>.

## **Prior experience with PBF in Cameroon**

Cameroon, too, has some experience with implementing PBF on a small scale. The project REDSSEC (Redynamisation des Soins de Sante a l'Est du Cameroun- Phase II) has been implementing a pilot Performance Based Financing (PBF) program in Faith Based Organization (FBO) facilities since 2006 in the East region with support from Cordaid and Catholic Relief Services. Starting with 4 FBO facilities in Batouri district, the PBF program has since expanded to FBO facilities in Bertoua, Doume and Yokadouma districts<sup>iii</sup>.

REDSSEC's experience suggests that implementing PBF is feasible in Cameroon. A systematic evaluation of results from this pilot is not as yet available in the public domain. Preliminary findings from an unpublished assessment of the pilot experience in PBF facilities in Batouri district in the East are not unambiguously positive and point to potential pitfalls that future RBF implementation in Cameroon can learn from and avoid. In general, although perceived quality of care improved in the pilot facilities the estimated coverage for many key MCH indicators and general curative care declined. The researchers studying the pilot attribute this to a combination of stock-outs, infrequent supervision and payments, staff turnover and the failure of the PBF pilot to improve financial access to care at pilot facilities. Health workers in public sector facilities have, in general, greater job security, better pay and perks than their counterparts in FBO health facilities. The net result is a 'brain drain' from FBO to public sector facilities. The introduction of PBF with performance bonuses for staff was not been able to address this problem. Budgetary shortfalls restricted the number of supervision visits by project personnel to PBF facilities, and the frequency of supervision dropped from six-monthly to once per year from Oct 2008 onwards. The frequency of performance-linked payments also dropped to once per year– far less frequent than is usually the case with PBF payments and perhaps too infrequent to motivate staff. Moreover, the pilot PBF facilities continued to rely heavily on user charges, and the proportion of total funding from user charges increased from 10% in 2007 to 17% by 2009 despite the injection of additional PBF funds to facilities. This may have further increased financial barriers to using health services. PBF facilities also had no autonomy to procure medicines and supplies from alternative sources when the monopoly supplier failed to deliver on time, and faced frequent stockouts.

## **PBF pilot in Cameroon**

The proposed pilot will learn from prior experience with PBF in Cameroon. The pilot will implement PBF in public and Faith Based Organization (FBO) facilities across 26 districts in the Littoral, North-West, South-West and East regions of Cameroon covering a total population of approximately 2.5 million<sup>1</sup> (see table 1 below). International NGOs with the best PBF technical proposals will be hired to design PBF programs in each of these three regions in consultation with the Ministry of Health. However, drawing on the experience of Cameroon, Burundi and Rwanda, the PBF implemented will likely have the following key features:

- Performance contracts will be signed between a Performance Purchasing Agency (PPA) and public and non-profit private sector health facilities in each region. These performance contracts

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<sup>1</sup> The four regions for the PBF pilot were identified in consultation with the Government of Cameroon as the Health Sector Support and Investment Project (HSSIP) was being finalized in 2008. The opportunity for building an impact evaluation into the pilot was identified subsequently by the HSSIP team. The three regions selected for the impact evaluation do not necessarily provide a representative sample of Cameroon. This may limit the external validity of impact evaluation findings.

will govern results-based payments to facilities, and performance bonuses from facilities to their health workers.

- The pricing for each output to be purchased from health facilities will take into account both public health priorities and the need to incentivize the delivery of good quality services. The outputs to be purchased from health facilities will include service output indicators for priority MCH services adjusted for quality and facility-level indicators of quality. These outputs will be verified by one or more third parties (typically the PPA). The final list of services to be purchased will be decided shortly as the Ministry of Health is currently in the process of negotiating PPA contracts (as of May 2011). PPA contracts – including the list of services – will be uniform across regions.
- Facilities will have the management autonomy to use PBF payments based on priorities identified in their business plans, including to offer health worker performance or retention bonuses or to purchase inputs. Facilities will have the management autonomy to decide the level of performance bonuses to their health workers within limits defined by the contracts between the PPA and health facilities. Facilities will also have the management autonomy to hire and fire staff hired with PBF revenues.
- Facilities will have the autonomy to procure medicines from government-approved distributors and retail outlets, and will not be obliged to procure their medicines from any single source.
- Caps on user charges that are in keeping with national policy guidelines will be specified and enforced for indicators to be purchased in order to ensure financial access to priority health services and side-step the problems experienced in the PBF pilot in the East region of Cameroon.
- Facilities will have to adhere to some guidelines on the use of PBF revenue.

The details of PBF design will be finalized at a later stage. However, it is important to point out that PBF will be designed such that it is as uniform as possible across regions. The services to be purchased will be uniform as will unit prices for outputs to be purchased with a similar equity adjustment formula to adjust for remoteness or other disadvantage. PPA NGO overheads will be negotiated to similar levels so that the amounts allocated for PBF implementation are similar across regions. Monitoring and supervision processes and frequency will also be the same across regions. Finally, the frequency of payments will also be uniform across regions.

**Table 1: Regions and districts to be covered by the PBF pilot in Cameroon**

	Region	District	Population (2011 est.)	Impact evaluation ?
1	Nord-Ouest	Fundong	122,160	Yes
2	Nord-Ouest	Kumbo East	166,979	Yes
3	Nord-Ouest	Ndop	198,356	Yes
4	Nord-Ouest	Nkambe	117,541	Yes
5	Sud-Ouest	Buea	133,089	Yes
6	Sud-Ouest	Kumba	250,048	Yes
7	Sud-Ouest	Limbe	141,466	Yes
8	Sud-Ouest	Mamfe	63,365	Yes
9	Est	Doume	41,177	Yes
10	Est	Abong-Mbang	65,392	Yes
11	Est	Lomie	36,260	Yes
12	Est	Messamena	32,554	Yes
13	Est	Nguelemendouka	30,628	Yes
14	Est	Kette	40,677	Yes
15	Est	Batouri*	81,157	No
16	Est	Mbang*	26,840	No
17	Est	Moloundou*	37,124	No

18	Est	Ndelele*	44,318	No
19	Est	Yokadouma*	83,802	No
20	Est	Garoua-Boulai*	43,008	No
21	Est	Betare-Oya*	78,624	No
22	Est	Bertoua*	164,948	No
23	Littoral	Cité des Palmiers**	403,174	No
24	Littoral	Edea**	130,955	No
25	Littoral	Loum**	81,625	No
26	Littoral	Yabassi**	17,447	No

\*Note- 19 districts in the East, North-West and South-West will participate in the second phase of the PBF pilot. However, 5 of these districts – Batouri, Yokadouma, Mbang, Mouloundou, Ndelele – have already begun implementing PBF in FBO facilities. The impact evaluation will therefore exclude these districts, although implementation of PBF in facilities will be financed in these districts through the larger project. A remaining 14 districts will be included in the Impact Evaluation.

\*\*The project began implementing PBF in 4 health districts (Cité des Palmiers, Edea, Loum and Yabassi) in Littoral Region as of January 2011. These four districts will also be excluded from the PBF Impact Evaluation due to the introduction of PBF prior to the IE Baseline Survey.

## Research Questions and Policy Relevance

### Research questions

Over time, PBF has been implemented in a growing number of countries. Many studies have shown a positive association between PBF and health service coverage, and some with improvements in quality. An impact evaluation in Rwanda where districts were randomly assigned to treatment (PBF) and comparison (input financing with matched financial resources) found large and statistically significant positive impacts on institutional deliveries and preventive care visits from young children and also on quality of prenatal care<sup>iv</sup>. However, a lack of controls and confounders in most studies that have been published on PBF initiatives<sup>v</sup> means that the *impact* of PBF initiatives on service coverage, quality and health outcomes remains open to question. Moreover, few studies have examined the factors that influence the impact of PBF– an area of considerable operational significance since PBF often involves a package of constituent interventions: linking payment and results, independent verification of results, managerial autonomy to facilities and enhanced systematic supervision of facilities<sup>vi</sup>.

As PBF has never been implemented in Cameroon on any meaningful scale and has never been systematically evaluated, our larger policy objectives are to (a) Identify the impact of PBF on maternal and child health (MCH) service coverage and quality, (b) Identify key factors responsible for this impact, and (c) Assess cost-effectiveness of PBF as a strategy to improve coverage and quality. In doing so, we expect that the results from the impact evaluation will be useful to designing national PBF policy in Cameroon and will also contribute to the larger body of knowledge on PBF.

The impact evaluation will focus on the following research questions:

1. Does the PBF program increase the coverage of MCH services?
2. Does the PBF program increase the quality of MCH services delivered?
3. Is it the enhanced monitoring & evaluation and supervision or the link between payments and results that leads to improvements observed in quality or coverage?

We hypothesize that it is link between payments and results – and not increased supervision and monitoring that is responsible for the improvements in MCH service coverage and quality.

4. What is the contribution of enhanced supervision and monitoring to improving MCH service coverage and quality in the absence of increased autonomy or additional financial resources?

The hypothesis to be tested is that enhanced supervision and monitoring in itself – even in the absence of other interventions such as enhanced managerial autonomy, additional resources or performance-linked payments – will result in improved MCH service coverage and quality.

In addition, the impact evaluation will also examine the following research questions that relate to intermediate outcomes in the hypothesized causal pathway (see figure 1 for more details):

1. Does the PBF program lower informal charges for health services?
2. Does the PBF program lower formal user charges?
3. Does the PBF program increase funds available at the operational (i.e., facility) level?
4. Does the PBF program improve physical and social accessibility of health services? Accessibility of health services will be examined in terms of the convenience of facility opening hours, availability of services through outreach, client perceptions of convenience of accessing health services and client perceptions of health providers' attitudes towards clients
5. Does the PBF program lower staff absenteeism?
6. Does the PBF program increase demand generation activities by health facilities?

#### **What are the targeted outcomes?**

The main targeted outcomes fall into two main groups: (a) Maternal and Child Health Service coverage indicators and (b) Quality of care indicators. Tables 2 and 3 below describe these indicators in more detail. In addition to the technical quality of care indicators described in table 3, the impact evaluation will also measure client perceived quality with a scale developed for the Cameroonian context.

For the purposes of PBF implementation, the service coverage indicators will be expressed as outputs (rather than coverage indicators with population denominators) and collected routinely by health facilities. These data will then be verified by the PPA or a third party entity designated by the PPA to carry out this function. Quality indicators will be monitored by a PPA or other third party for each facility using a supervision checklist. These routinely collected data will not be used for the purposes of the impact evaluation. The impact evaluation will collect data on service coverage and health behaviors using household surveys, while facility surveys will be implemented for the quality indicators. Both household and facility surveys will be conducted by a third party research firm that is not involved in any aspect of RBF implementation.

**Table 2: MCH service coverage indicators**

	<b>Indicator</b>	<b>Coverage</b>
1	Children aged 12-23 months who are fully immunized*	49%
2	Contraceptive Prevalence Rate (modern methods)*	13%
3	Unmet need for Family Planning*	20%
4	Children under 5 years who slept under a bednet the night before the survey*	12%
5	Children under 3 years who have received Vitamin A*	38%
6	Skilled birth attendance*	62%
7	Women who have had 2 or more antenatal care visits in most recent pregnancy*	80%

	Indicator	Coverage
8	Children aged between 11 and 59 months who have participated in growth monitoring in the previous month	Not available
9	Women who received a tetanus toxoid vaccination in most recent pregnancy	19%
10	Women who received any postnatal care in most recent pregnancy	65%
11	Children aged under 6 months who are exclusively breastfed	23%

\*Source: DHS 2004

**Table 3: Facility-level quality indicators\*\***

	Indicator
1	Proportion of full complement of clinical staff present on the day of survey
2	At least one female clinical staff present on the day of survey
3	Proportion of health facilities with water for hand washing, soap and clean towel in patient examination area
4	Proportion of health facilities with at least one clean and functioning latrine
5	Proportion of health facilities with basic EPI equipment
6	Proportion of health facilities with EPI vaccines in stock on the day of the survey
7	Proportion of health facilities with basic delivery equipment
8	Proportion of health facilities with basic ANC equipment
7	Proportion of health facilities with basic clinical equipment
9	Number of essential drugs available on the day of the survey
10	Average number of contraceptive methods in stock on the day of survey
11	Proportion of health facilities with bednets in stock on the day of the survey
12	Proportion of facilities with an up-to-date EPI register
13	Proportion of facilities with an up-to-date ANC and delivery register
14	Proportion of facilities with completed HMIS monthly report
15	Proportion of facilities that have a working waste disposal system (bin, pit or incinerator) in use and safety box for sharps
16	Proportion of facilities that can perform lab tests for malaria, TB, HIV and full blood count on the day of the survey
17	Proportion of facilities with working means of communication (radio, mobile phone, landline)
18	Proportion of facilities with a working vehicle to transport patients for referral
19	Proportion of health workers who report receiving their full salary on time
20	Average health worker clinical knowledge score***
21	Under-five examination quality score (based on IMCI protocols)
22	ANC examination quality score (based on national ANC protocols)
23	Average client satisfaction score
24	Proportion of health facilities that conduct outreach for key MCH services
25	Proportion of clients who report that facility opening hours are convenient

\*\*No data are available on these indicators

\*\*\* Health worker knowledge will be measured using case vignettes, which are to be finalized. The vignettes will be focused on services to be purchased under PBF, tailored to the epidemiological profile of Cameroon and will keep in mind national protocols.

The impact evaluation will also measure indicators that could potentially mediate improvements in service coverage and quality (primary outcomes of interest). These include:

1. Informal charges and formal user charges



2. Funds available at the operational (i.e., facility) level
3. Factors that determine physical and social accessibility of health services, including facility opening hours, outreach for health services and staff behaviours
4. Staff absenteeism
5. Demand generation activities such as Behavior Change Communication by facility staff

In addition, the impact evaluation will also measure the following health status indicators through rapid blood tests and anthropometry:

- Prevalence of malaria among children aged under 5 and currently pregnant women
- Prevalence of anemia among children aged under 5 and non-pregnant women who have delivered a baby in the preceding 2 years
- Weight and height of children aged under 5 years

These health status measures are not the primary target outcomes of the impact evaluation, however, and the study may not have adequate power to detect statistically significant changes over a two year time frame. These data are being collected in anticipation of further rounds of data collection after the two-year impact evaluation.

#### **How will RBF improve these targeted outcomes?**

Figure 1 describes the hypothesized manner in which PBF will trigger changes that can improve MCH service coverage. The PBF interventions envisaged will be focused primarily on the supply side. We expect PBF to improve MCH service coverage and quality primarily by incentivizing facility managers and health workers:

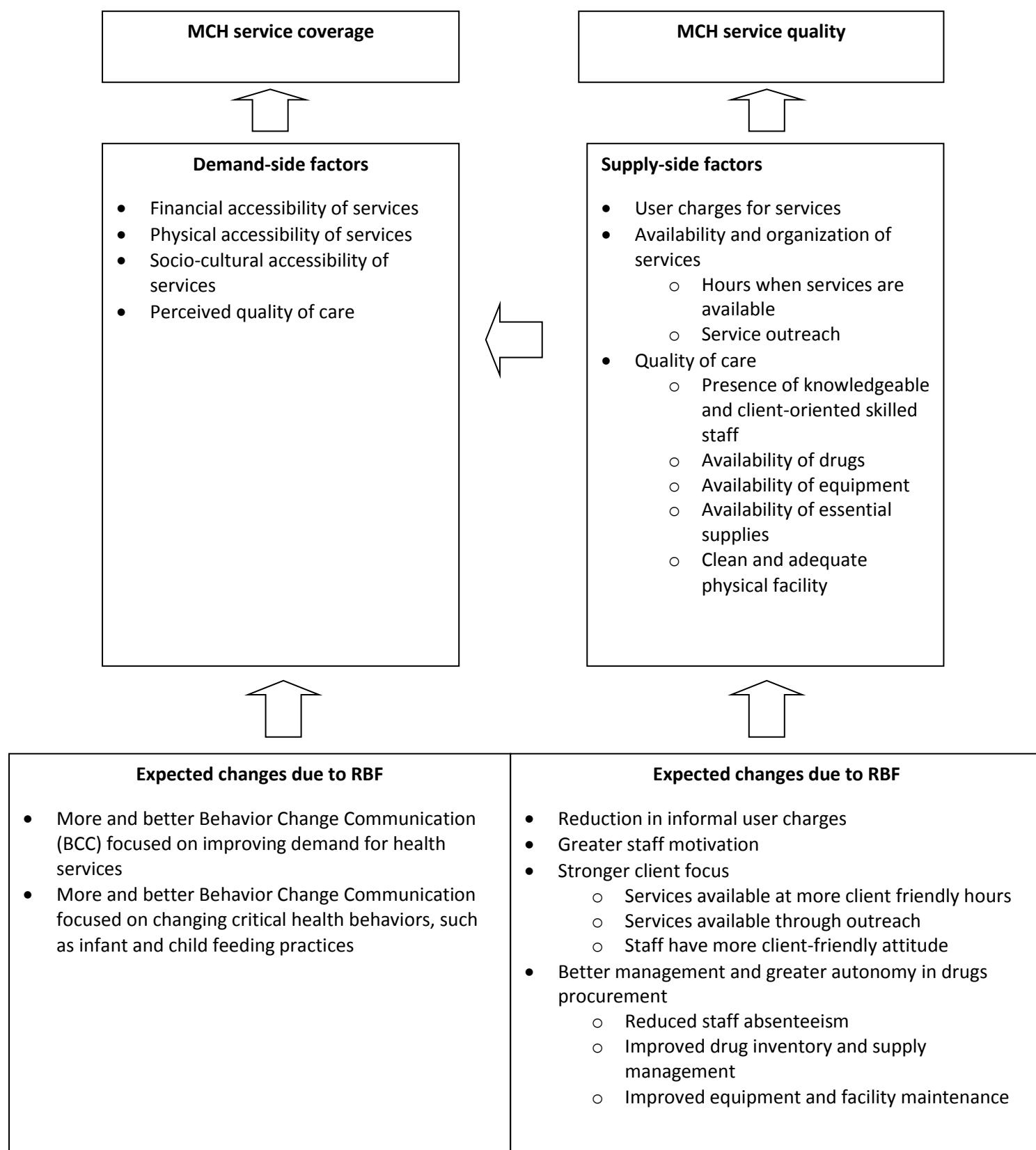
1. Purchasing priority quality-adjusted service outputs can incentivize facility managers and health workers to expand the delivery of priority and high quality MCH service outputs in a client-focused manner and to increase demand for health services
2. Independent monitoring can also encourage managers to manage for results while managerial autonomy and supervisory support can enable them to respond to these incentives
3. Performance bonuses to health workers can incentivize health workers to adopt a client-friendly attitude, reduce absenteeism and reduce informal charges to patients

We expect that this will, in turn, result in important changes at the health facility level such as:

1. Lower user charges
2. More accessible health services
3. Better facility functioning and improved quality of care, and
4. An increased focus on generating demand for health services

Better technical quality of care is one of the intended outcomes. In addition, we expect that the facility-level changes that are triggered by PBF can influence care-seeking and health behaviors and ultimately lead to improved MCH service coverage. Lower user charges can improve financial access to health services, more client friendly hours can improve physical access to health services, while demand generation activities and improved technical quality of care can lower socio-cultural barriers to service use and encourage greater service uptake.

**Figure 1: How does PBF affect MCH service coverage and quality?**



## Identification Strategy

The study will have a pre-post with comparison design. We will rely primarily on experimental control to answer the main research questions for this study. Individual health facilities in each region will be randomized to one of the 4 study groups. Individual public and private primary care health facilities in 14 districts<sup>2</sup> from the 3 pilot regions will be randomly assigned to each study group to create a factorial study design. This process of random allocation seeks to ensure that the four study groups are comparable in terms of observed and unobserved characteristics that could affect treatment outcomes so that average differences in outcome can be causally attributed.

All district hospitals in these 14 districts will be included in the full PBF (i.e., treatment) arm. This is because district hospitals play a critical role in supervising and acting as source of referral services for all facilities in the district. District hospitals will supervise and support treatment and comparison group CMAs and CSIs differently based on the group they are assigned to. Household and facility-based surveys will be implemented in district hospitals and households associated exclusively with their catchment areas<sup>3</sup> in the 14 pilot districts to gain insights into the role that district hospitals are playing in the 4 study groups. However, these data will not be used for making inferences about the impact of PBF.

Table 4 below describes the 4 study groups formed by randomizing CMAs and CSIs. We hope to answer the main research questions identified by making comparisons between these groups.

For the purposes of our study, the ‘full’ PBF package of interventions will include the following elements:

- Linking payment and results, including performance bonuses for health workers
- Independent monitoring of results
- Systematic supervision of health facilities defined as regular supervision by an external supervisor from the district hospital team using a structured checklist and providing immediate feedback to facility staff on problems identified and potential solutions to improve service delivery. Systematic supervision will include monitoring whether the facility is complying with national user fee guidelines
- Managerial autonomy to facilities defined as autonomy over use of resources combined with the autonomy to hire and fire staff

Facilities in group T1 will implement this full PBF package. Facilities assigned to group C1 will receive a fixed per capita budgetary supplement that matches the per capita budgetary allocation for T1 facilities. However, this supplement will not be linked to performance. C1 facilities will receive the same supervision and monitoring and managerial autonomy over the budgetary supplement received. Both T1 and C1 facility managers will have the autonomy to hire staff with their PBF revenues or budgetary supplement received, and also to fire these staff if necessary. T1 and C1 facility managers will also have the autonomy over how to use these revenues. C2 facilities will receive no additional resources but the same supervision and monitoring as T1 and C1 facilities. District-level supervisors responsible for supervising T1, C1 and C2 facilities will use the same tools and receive the same supplementary payments for visits to facilities in these three groups. However, quality scores will be linked to facility payments only in the case of T1 facilities. C3 facilities will be the ‘business as usual’ facilities and will not receive any additional resources or inputs. C2 and C3

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<sup>2</sup> As noted earlier, 22 districts in the East, North-West and South-West will participate in the second phase of the PBF pilot. However, 5 of these districts – Batouri, Yokadouma, Mbang, Mouloundou, Ndelele – have already begun implementing PBF in FBO facilities. The impact evaluation will therefore exclude these districts, although implementation of PBF in public sector facilities will be financed in these districts through the larger project. A remaining 14 districts will be included in the Impact Evaluation.

<sup>3</sup> Some villages will not fall within the catchment areas of other CSIs and CMAs in the district. Households in these villages will be excluded from the sample for the impact evaluation.

facility managers will not have the autonomy to hire/ fire staff or financial autonomy. National user fee caps, and facility user fee rates, will be published on a signboard placed in all study group health facilities. The IE team will also include monitoring of adherence to national guidelines as part of the monitoring and supervision intervention in T1, C1 and C2 facilities. As the status quo group, the C3 facilities will not receive this additional monitoring & supervision.

**Table 4: Study groups**

<b>T1:</b> PBF with health worker performance bonuses	<b>C1:</b> Same per capita financial resources as PBF but not linked to performance; Same supervision and monitoring and managerial autonomy as T1
<b>C2:</b> No additional resources but same supervision and monitoring as PBF arms and T 1 and C1	<b>C3:</b> Status quo

\*See Annex 1 for detailed description

The impact evaluation team is aware that individuals living in the catchment area of a facility assigned to a given study group (e.g. C3) may visit a health facility assigned to a different group (e.g. T1). The low density of health facilities in the predominantly rural study districts lowers these risks. Nonetheless, where this occurs it could bias our estimates of impact. The impact evaluation will therefore seek to (a) minimize, and (b) measure contamination and account for how this may have affected the estimates of impact. To minimize contamination, GIS mapping will be conducted before the baseline survey to define realistic catchment areas for health facilities. This GIS mapping will help to define ‘true’ catchment areas by taking into account physical features (like terrain or water bodies) and roads that influence travel time and thereby potentially affect health facility choice. Households will then be sampled from these catchment areas (see data section for more detail). During data collection, the survey team will ensure that the health facility actually used for each service of interest is accurately recorded so that any contamination can be measured. Each survey team will increase the likelihood of accurate identification of the health facilities used by obtaining and using local names for health facilities in a given area and showing respondents photographs of local health facilities when attributing service use to a health facility during the household survey.

In addition, we will use statistical methods (such as regression analysis) to examine the relationship between PBF and:

1. Key expected changes in the hypothesized causal pathway, including:
  - a. Funds available at the operational (i.e., facility) level
  - b. Informal charges for health services and formal user charges for health services
  - c. Degree of client orientation, including facility opening hours, outreach for health services and client perceptions of staff behaviors
  - d. Facility management, including reduced absenteeism, availability of drugs and functioning equipment
  - e. Demand generation activities such as Behavior Change Communication by facility staff
2. The cost-effectiveness of PBF, i.e., how much of an improvement in coverage and quality does each \$ of PBF buy? We will examine this issue by comparing incremental costs and results in the PBF treatment arm to the corresponding costs and results in each comparison arm. We will examine costs in terms of: (a) Total (public and private) costs; (b) Public costs; (c) Out-of-Pocket costs to households
3. Health worker retention
4. Coverage of key services that are not purchased as part of the PBF pilot

Finally, the study will also include a qualitative component at endline to probe deeper for explanations or explore specific issues that are relevant to PBF. The issues of interest to the qualitative component will be identified after PBF implementation has begun. Candidate topics include:

- How do top performing and low performing PBF facilities (in terms of results achieved) differ from each other? What factors enabled the success of top performers? What factors contributed to poor performance of low performing facilities? What is the role that management plays in high and low performing facilities?
- How do key stakeholders (health workers, facility managers, regional administrators, national policy makers and clients) perceive PBF? What are the key perceived benefits and disadvantages of RBF?

## Data

The evaluation will rely on two main sources of data to answer the impact evaluation research questions identified:

1. Household surveys: A household survey will be implemented at baseline (i.e., before implementation of PBF begins), and at endline (i.e., after PBF has been implemented for two years).
2. Facility-based surveys: A facility-based survey will be implemented at baseline and at endline.

The impact evaluation will use the HRITF survey instruments as a starting point and tailor them to the needs of this research and to the Cameroonian context. Table 5 below summarizes the data sources for the impact evaluation.

The same facilities included in the baseline facility sample will also be visited at endline. Households surveyed at baseline will also be visited at endline, and will be included in the endline sample if they continue to meet eligibility criteria. Additional households may be sampled at endline if necessary to meet sample size requirements.

## Household surveys

A household survey will be conducted in each of the 14 districts to be included in the impact evaluation. To select the households to be surveyed, a catchment area will first be established for each of the 245 primary care facilities<sup>4</sup>. No more than 16 households will be randomly selected for survey in the catchment area of each selected health facility. Only households with at least one pregnancy or birth in the 2 years preceding the survey are eligible for inclusion.

Since this is a cluster-randomized trial, the sample size estimation must take into account design effects and also the multiplicity of comparisons that are to be made in a four-arm study. In total, there are 245 clusters defined by CSIs and CMAs (i.e., each health facility constitutes a cluster) and we have at least 60 health facilities in each of the four study groups. This tally does not include the 20 district and private hospitals which are not to be randomly assigned.

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<sup>4</sup> All 14 district hospitals and their catchment area households will also be surveyed. However, they are not included in the discussion on sample sizes presented here as they will not be included in the sample for the impact evaluation estimates.

The parameters are therefore the following:

- number of clusters (i.e. EA) =	245
- number of observations by cluster =	16
- Total number of observations=	3,920
- Design effect assumed=	2
- alpha =	0.05

Assuming a baseline prevalence/ coverage of 60%, the minimum effect size we can detect with 80% power and an alpha of 0.05 is 0.10. Please refer to annex-2 for more details.

The instrument will be administered to women in sampled households who have delivered a baby within the two years preceding the survey. The main themes covered in the household survey include:

- Health behaviors for MCH services
- Health seeking behaviors, barriers to use and health service use
- Household health expenditures
- General perceptions of health service quality

In addition, the survey teams will:

- (1) Conduct rapid diagnostic tests for malaria for all children aged under 5 and currently pregnant women present in the household during the visit,
- (2) Conduct rapid diagnostic tests for anemia for all children aged under 5 and non-pregnant women who have delivered a baby in the preceding 2 years present in the household during the visit, and
- (3) Weigh and measure the height of all children aged under 5 years present in the household during the survey team's visit.

**Table 5: Summary of health facilities included in the Impact Evaluation, by type and district**

District	Number of official Health Areas	Number of health facilities						% <u>urban</u> health facilities*	% <u>private</u> health facilities
		CSI Public	CMA Public	District Hospital	Confessional CSI/ CMA/ Hospital	For-profit/ Para-public	Total		
Abong-Mbang	16	14	2	1	4	2	23	9%	27%
Doume	8	9	1	1	2	1	14	8%	23%
Lomie	8	7	2	1	2	0	12	0%	18%
Messamena	8	9	1	1	2	0	13	0%	17%
Nguelemendouka	4	5	0	1	1	0	7	0%	17%
Kette	9	9	0	1	0	0	10	0%	0%
<b>EAST Total</b>	<b>9</b>	<b>53</b>	<b>6</b>	<b>6</b>	<b>11</b>	<b>3</b>	<b>79</b>	<b>4%</b>	<b>19%</b>
Kumbo East	20	17	2	1	6	4	30	17%	34%
Nkambe	14	11	2	1	4	2	20	5%	32%
Ndop	15	12	2	1	8	4	27	0%	46%
Fundong	11	9	3	1	12	3	28	4%	56%
<b>NW Total</b>	<b>60</b>	<b>49</b>	<b>9</b>	<b>4</b>	<b>30</b>	<b>13</b>	<b>105</b>	<b>7%</b>	<b>43%</b>
Mamfe	8	11	1	1	1	0	14	31%	8%

Kumba	12	10	1	1	5	1	18	41%	35%
Buea	7	10	3	1	0	9	23	77%	41%
Limbe	8	10	1	1	1	7	20	32%	42%
<b>SW Total</b>	<b>35</b>	<b>41</b>	<b>6</b>	<b>4</b>	<b>7</b>	<b>17</b>	<b>75</b>	<b>48%</b>	<b>34%</b>
<b>Pilot Zone total</b>	<b>104</b>	<b>143</b>	<b>21</b>	<b>14</b>	<b>48</b>	<b>33</b>	<b>259</b>	<b>18%</b>	<b>33%</b>

\*Excluding district hospitals

## Facility-based survey

The facility survey will be conducted in all the CMAs, CSIs and District Hospitals in the 14 districts included in the impact evaluation. All facility team visits will be unannounced. The facility-based survey includes multiple components. The sample of health workers, patient-provider observations and client exit interviews will be selected to enable findings from these three components to be linked.

### *Facility assessment module*

The facility assessment module seeks to collect data on key aspects of facility functioning and structural aspects of quality of care. The respondent for this module will be the individual in charge of the health facility at the time when the survey team visits the health facility. The main themes to be covered by the facility assessment include:

- Facility staffing, including the staffing complement of the facility, staff on duty at the time of the survey team's visit and staff present at the time of the survey team's visit
- Facility infrastructure and equipment
- Availability of drugs, consumables and supplies at the health facility
- Supervision
- Record keeping and reporting to the Health Management Information System
- Facility management
- Official user charges at the facility
- Revenues obtained at the health facility, and how revenues have been used

In addition, a sample of essential drugs (list to be determined) will be taken at endline for laboratory testing. The purpose of doing so is to check if there is a difference in the quality of drugs between PBF (treatment) and non-PBF facilities as PBF facilities will have the autonomy to procure drugs themselves from a variety of sources. At the moment all facilities procure drugs exclusively from the parastatal drug supply organization CENEMA. Policy makers are concerned that permitting facilities to procure their drugs from other sources could result in the procurement of counterfeit or sub-standard drugs, and this component of the facility-based survey would provide some evidence on this issue.

### *Health worker interview module*

A stratified random sample of clinical health workers with maternal and child health service delivery responsibilities at sampled health facilities will be interviewed as part of this module. The main themes to be covered by this module include:

- Role and responsibilities of the interviewed health worker
- Compensation, including delays in salary payments
- Staff satisfaction and motivation

- Technical knowledge on Maternal and Child Health. The latter will be assessed through the use of vignettes. The vignettes will be focused on services to be purchased under PBF, tailored to the epidemiological profile of Cameroon and will keep in mind national protocols. The vignettes will be finalized at a later stage.

A stratified random sample of 5 health workers will be taken at each of the 245 health facilities resulting in a total number of 1225 health worker interview observations. For all health facilities with less than 5 health workers, all health workers present at the facility will be interviewed.

#### ***Observations of patient-provider interaction module***

While the health worker interview module collects information on what health workers know, the purpose of this module is to gather information on what health workers actually *do* with their patients.

A member of the survey team will therefore observe consultations with a systematic random sample of patients under five presenting with a new condition (i.e., not for follow-up visits or routine) and new ANC clients. The observer will use a structured format to note whether key desired actions are carried out. In the case of patients under five, the instruments will be focused on whether IMCI protocols are followed. For ANC clients the instruments will examine whether key desired actions (including counseling) are carried out. As primary care facilities do not offer ANC services on all days of the week – typically these are offered 2 days each week – we propose to implement the ANC observations module in a sub-sample of facilities. We expect that 2 facilities out of every 5 surveyed will offer ANC services on the day of the survey team’s visits. We anticipate therefore that the patient provider ANC observation module will be implemented in approximately 102 facilities. Under-five patient provider observations will likely be feasible at all the health facilities visited. 5 under-5 and 5 ANC observations will be undertaken at each facility where these modules are implemented. We therefore anticipate a total of 490 ANC observations and 1225 under-five observations. All health workers selected for patient-provider observations will be included in the health worker interview sample.

#### ***Patient exit interviews***

A systematic random sample of 10 patients visiting the facility (5 patients aged under-five and 5 patients aged over 5) for curative care with a new complaint will be interviewed to assess the patient’s perception of quality of care and satisfaction at all 245 primary care facilities surveyed. If the patient is a child, the child’s caregiver will be interviewed. The 5 under-fives included in the patient exit sample will be the same 5 children whose consultation with a provider was observed. In addition to this, exit interviews will be conducted with all ANC clients whose consultation with a provider was observed. In total we expect 2450 exit surveys with patients who visited the health facility for curative care consultations and 490 exit surveys with ANC clients.

***Table 6: Data sources for impact evaluation***

Data	Who	Level	Type	Source	Survey Instrument	Frequency	Description of Data
Household survey	Currently pregnant women; Women who have had a child in the 2 years preceding the survey n=3,920	Household	Quantitative	Primary	Adapted HRITF Household Survey Instrument	Twice: Baseline & endline	Health service use, health care seeking behaviors and barriers to use for MCH services, health expenditures, perceptions of health service quality



Data	Who	Level	Type	Source	Survey Instrument	Frequency	Description of Data
Household survey	Currently pregnant women, non-pregnant women who have had a child in the 2 years preceding the survey, children under five	Household survey	Anthropometry & biomarkers	Primary	Not applicable	Twice: Baseline & Endline	Rapid diagnostic tests for malaria & anemia; Height and weight measurements
Facility assessment	Facility in-charge n=245	Facility	Quantitative	Primary	Adapted HRITF health facility questionnaire	Twice: Baseline & Endline	Facility staffing, infrastructure, drugs supply, equipment, supervision, HMIS reporting and management, user charges, facility revenue
Facility assessment-Drugs sample for lab testing	Not applicable n=245 facilities	Facility	Laboratory testing	Primary	Not applicable	Once: Endline	Quality of selected drugs
Health worker interviews	Health care workers n=1225	Facility	Quantitative	Primary	Adapted HRITF Health Facility Questionnaire	Twice: Baseline & Endline	Staff work load, compensation, motivation, satisfaction and knowledge
Patient-provider observation (Under-five & ANC)	First time ANC clients n=490  New under-5 patients for curative care n=1225	Facility	Quantitative	Primary	Adapted HRITF Health Facility Questionnaire	Twice: Baseline & Endline	Treatment and counseling provided to patients.
Patient exit interviews	First time ANC clients n=490  New under-5 patients for curative care n=1225  New over-5 patients for curative care n=1225	Facility	Quantitative	Primary	Adapted HRITF Health Facility Questionnaire	Twice: Baseline & Endline	Patient's (or caretaker's) perception of quality of care and satisfaction
Incremental costs of implementing	Not applicable	Performance Purchasing Agency	Quantitative	Secondary	Administrative records and reporting	Periodic reporting as PBF	Costs incurred in implementing PBF or comparison

Data	Who	Level	Type	Source	Survey Instrument	Frequency	Description of Data
PBF or comparison group interventions						commences	group interventions

## Ethical review and clearance

Ethical clearance for the impact evaluation is to be obtained from an in-country (i.e., in Cameroon) Institutional Review Board. The IE team has incorporated obtaining the necessary ethical clearances in the terms of reference for the research agency that has been contracted to implement the baseline research. The clearance process will begin as soon as the research agency is contracted.

## Timeline

Table 6 below sets out the time line for the impact evaluation by fiscal year. The baseline survey will be initiated and completed before PBF implementation begins. Survey data collection will be conducted in March-June 2012. We anticipate that the PBF implementation will begin in June 2012, and endline data collection will be implemented after two years in March-June 2014. Prior to beginning PBF implementation health facilities (CMAs and CSIs) will be randomized to the study groups in a public ceremony (PBF Pilot Initiation Workshop). Since all health facilities will be sampled in the baseline random assignment to treatment or comparison groups does not need to be conducted before the baseline. Dissemination workshops are planned to disseminate both baseline and endline findings. In addition, impact evaluation findings will be disseminated to a wider international audience by publishing the final evaluation report as a working paper.

**Table 7: Timeline**

	FY 2011		FY 2012				FY 2013				FY 2014			
Phase	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Evaluation Preparation														
Baseline Data Collection														
Regional PBF Pilot Initiation Workshops														
Initiation of PBF pilot														
Exposure to PBF Treatment														
Baseline Analysis and Report														

	FY 2011		FY 2012				FY 2013				FY 2014			
Phase	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Baseline Dissemination Workshop														
Evaluation Preparation														
Endline Data Collection														
Impact Analysis and Report														
Endline Dissemination Workshop														

## Research team

The research team includes the following individuals:

- Damien de Walque, Senior Economist in DECHD. Damien de Walque will be the Principal Investigator for the impact evaluation.
- Gaston Sorgho, Sector Lead Specialist Human Development in AFTHE. Gaston Sorgho is TTL for the impact evaluation and for the larger Health Systems Support and Investment Project within which this pilot is nested.
- Aneesa Arur, Public Health Specialist, AFTHE. Aneesa Arur will be the Co-Principal Investigator.
- Paul Jacob Robyn, Consultant, AFTHE. Paul Jacob Robyn will be the impact evaluation field coordinator.
- Saifuddin Ahmed, Associate Professor, Johns Hopkins Bloomberg School of Public Health. Saifuddin Ahmed will assist the research team with power calculations, sampling and other statistical aspects.
- An M&E specialist, to be recruited by the Ministry of Health, will coordinate both the inputs from the central level of the MoH to the IE and will ensure the link with the regions and the districts involved in the IE.

In addition, strategic oversight for the impact evaluation will be provided by Benjamin Loevinsohn, Lead Public Health Specialist, AFTHE.

IFORD (Institute de Formation et de Recherche Démographiques), a Cameroonian research institution, will design and implement data collection and analysis for the baseline survey of the impact evaluation.



## Annex 1: Impact evaluation intervention groups

	<b>T1</b> <b>PBF with health worker performance bonuses</b>	<b>C1</b> <b>PBF with subsidies not linked to performance (*)</b>	<b>C2</b> <b>No additional resources but same supervision and monitoring as PBF arms and T 1 and C1</b>	<b>C3</b> <b>Status quo</b>
<b>Contract</b>	Classic PBF contract	Contract stipulating the conditions for PBF verification, supervision and monitoring	Contract stipulating technical assistance such as enhanced supervision	No contract
<b>Business plan</b>	Facilities develop business plans	Facilities develop business plans	Lite business plan, focusing on increased supervision	No business plan
<b>Quality assessment</b>	Quality assessment and feedback, payment takes into account quality assessment	Quality assessment and feedback as in T1, but payment does not take into account quality assessment	Quality assessment and feedback as in T1	Quality assessment with written feedback, twice per year
<b>Service quantity declaration and verification</b>	Facilities report service quantity monthly, quantity verification monthly	Facilities report service quantity monthly, quantity verification monthly	Facilities report quarterly, no quantity verification	Facilities report quarterly, no quantity verification
<b>Payment</b>	Payment linked to performance	Payment not linked to performance	No payment	No payment
<b>Managerial autonomy</b>	Managerial autonomy, health facilities retain all revenue	Managerial autonomy, health facilities retain all revenue	No managerial autonomy, traditional « quot-part » system remains	No managerial autonomy, traditional « quot-part » system remains
<b>Monthly activity report submitted to health district management team</b>	Yes	Yes	Yes	Yes

(\*) - Method of assessing the amount of subsidies for health facilities Group 2: Payment in Group C1 will be made a priori based on the population of the health area. In the particular case where the population is not a good reference, we will refer to "matching" the characteristics of health facilities: type of services provided, volume of services provided, staff available, etc..

## Annex 2: Power calculations

This impact evaluation seeks to identify the effects of PBF on MCH service coverage and quality and compare these effects to two other combinations of interventions. The study therefore has four groups:

Group T1: PBF with health worker bonuses

Group C1: Same per capita financial resources as PBF but not linked to performance; Same supervision and monitoring and managerial autonomy as T1

Group C2: No additional resources but same supervision and monitoring as PBF arms T1 and C1

Group C3 business as usual

We propose the following sample sizes of facilities and households across the four groups:

<p><b>T1: PBF with health worker performance bonuses</b></p> <p>61 facilities* 976 households (16 households per facility catchment area)</p>	<p><b>C1: Same per capita financial resources as PBF but not linked to performance; Same supervision and monitoring and managerial autonomy as T1</b></p> <p>61 facilities* 976 households (16 households per facility catchment area)</p>
<p><b>C2: No additional resources but same supervision and monitoring as PBF arms and T 1 and C1</b></p> <p>61 facilities* 976 households (16 households per facility catchment area)</p>	<p><b>C3: Status quo</b></p> <p>61 facilities* 976 households (16 households per facility catchment area)</p>

\*Eligible facilities are public and private sector primary care facilities; Eligible households are households with at least one pregnancy or birth in the two years preceding the survey. Since there are 245 eligible health facilities, each study group will include *at least* 61 health facilities and *at least* 976 households. The total household sample size will be approximately 3,920.

All eligible health facilities in the pilot district will be included in the sample for the baseline and endline surveys. The main target outcomes for the impact evaluation include Maternal and Child Health service coverage indicators. Since the coverage levels for different services vary, the power calculations were based on those for Skilled Birth Attendance (SBA) since these are likely to yield the most conservative sample size requirements. The Cameroon DHS 2004 estimated the SBA rate at 62%.

Since this is a cluster-randomized trial, the sample size estimation must take into account design effects and also the multiplicity of comparisons that are to be made in a four-arm study. In total, there are 255 clusters defined by CSIs and CMAs (i.e., each health facility constitutes a cluster) and we have at least 63 health facilities in each of the four study groups. This tally does not include the 15 district hospitals which are not to be randomly assigned.

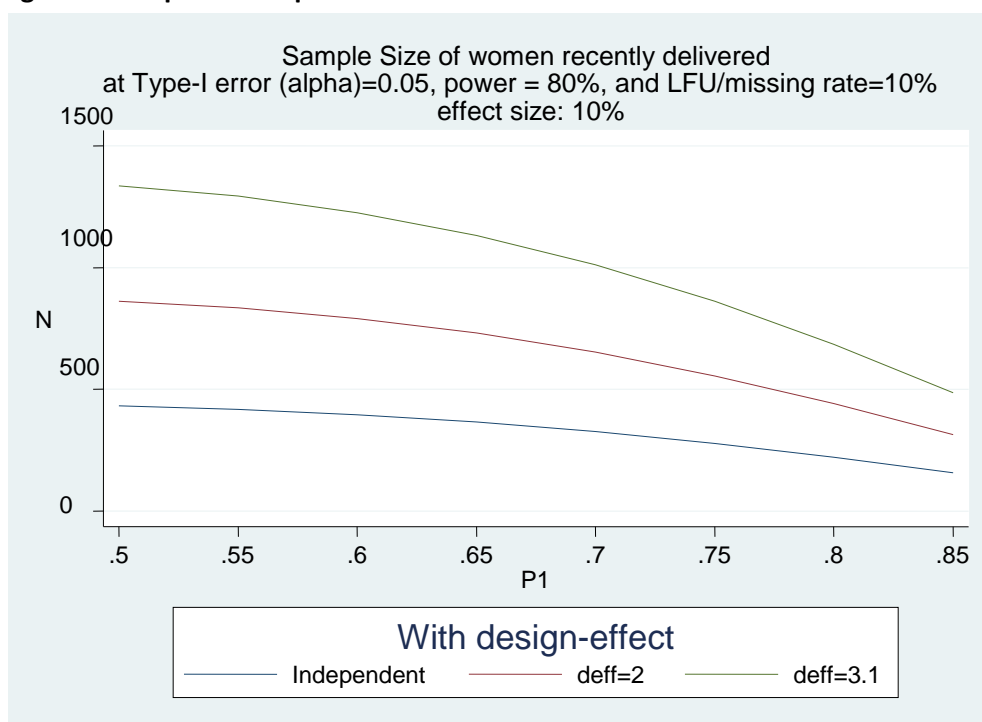
The parameters for this study are therefore the following:

number of clusters (i.e. EA) =	245
number of observations by cluster =	16
Total number of observations=	3,920
Design effect assumed=	2
alpha =	0.05

Assuming a baseline prevalence (coverage of 60%), the minimum effect size we can detect with 80% power and an alpha of 0.05 is 0.10.

Table 1 below describes the different sample size requirements for different levels of prevalence (service delivery coverage) assuming an effect size of 10% and a design effect of 2. Figure 1 below describes the different sample size requirements by level of prevalence and for different assumed design effects.

**Figure 1: Sample size requirements**



**Table 1: Sample size by prevalence and assumed design effect (Deff)**

	Effect size assumed: 10%	Effect size assumed: 15%
Prevalence (P)	deff=2.0	deff=2.0
.5	862	377
.55	835	362
.6	791	337
.65	731	306
.7	653	268
.75	555	222
.8	442	168
.85	313	106





## References

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<sup>i</sup> Performance-based financing in Rwanda. A presentation by Agnes Soucat`. Downloaded from <http://www.rbfhealth.org/rbfhealth/library> on January 18 2011

<sup>ii</sup> Presentation on PBF results in Burundi 2006-2010 by Longin Gashubije, Robert Soeters, Celestin Kamanuka, Godelieve van Heteren & Michael Bossuyt, Bujumbura, October 25 2010

<sup>iii</sup> Renaud, A. & Ndema, E. A. (2010), *Redynamisation des Soins de Santé à l'Est du Cameroun – Phase II : Rapport de la mission d'évaluation finale*. Juin 2010

<sup>iv</sup> Basinga, P., Gertler, P. J., Binagwaho, A., Soucat, A. L. B., Sturdy, J. R. & Vermeersch, C. M. J. 2010. 'Paying Primary Health Care Centers for Performance in Rwanda', *Policy Research Working Paper* 5190. The World Bank Group

<sup>v</sup> See, for instance Cambodia (Soeters et al. 2003), Haiti (Eicher et al. 2001), Afghanistan (Arur et al. 2010; Palmer et al, 2009), and Eldridge et al., 2009.

<sup>vi</sup> In fact, some authors would argue that it is inappropriate to view RBF primarily as a provider payment mechanism, and that RBF should be viewed as a larger health systems reform paradigm. See for instance, Meessen, B., Soucat, A. & Sekabaraga, C. 2010. 'Performance-based financing: just a donor fad or a catalyst towards comprehensive health-care reform?' *Bulletin of the World Health Organization*. November 2010