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Improving health worker performance: the patient-perspective from a PBF program in Rwanda

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1 Improving health worker performance: 2 the patient-perspective from a PBF 3 program in Rwanda

4 **Abstract**

5 The effect of performance-based financing (PBF) on patients' perception of primary health care services
6 in developing countries is not well documented. Data from a randomized impact evaluation in Rwanda
7 conducted between 2006 and 2008 in 157 primary level facilities is used to explore patients' satisfaction
8 with clinical and non-clinical services and quantify the contribution of individual and facility
9 characteristics to satisfaction including PBF. Improvements in productivity, availability and competences
10 of the health workforce following the implementation of PBF have a positive effect on patients'
11 satisfaction with clinical services even if patients' satisfaction is not tied to a reward. The positive effect
12 of PBF on non-clinical dimensions of satisfaction also suggests that PBF incentivizes providers to raise
13 patients' satisfaction with non-clinical services if it is associated with future financial gains. It is
14 recommended that low and middle income countries build on the experience from high income
15 countries to better listen to patients' voice in general and include an assessment of patients' satisfaction
16 in incentive mechanisms as a way to increase the benefits of the strategy.

17 **Keywords:** Rwanda, patients' satisfaction, incentives, health workforce performance, low and
18 middle income countries

19

20 **1. Introduction**

21 Over recent decades, paying healthcare providers against agreed performance targets has gained
22 momentum in high income countries and more recently in low and middle income countries (LMIC).
23 Financial incentives aim to provide extrinsic motivation so as to improve health workforce performance
24 and contribute to a health system's performance. Poor performance in health systems is a worldwide
25 concern and greater investment in the health sector do not necessarily translate to better health
26 outcomes (World Health Organization, 2000).

27 Performance incentives are increasingly promoted to enhance health workforce performance. While
28 many terms are being used for performance systems (performance-based incentives, performance-
29 based contracting, results-based financing, Pay-4-Performance) the term Performance-Based Financing
30 (PBF) is adopted in this paper as it is commonly used in LMIC countries. PBF can be defined as "a system
31 approach with an orientation on results defined as quantity and quality of service outputs and inclusion
32 of vulnerable persons (...)" (Cordaid-SINA Health, 2014).

33 PBF is increasingly adopted in LMIC although the reform approach has been criticized on several fronts.
34 Ireland et al. (2011) highlight the lack of rigorous evidence apart from Rwanda and a bias in publishing
35 only positive results on PBF. They claim that the strategy has important administrative costs and that it
36 can deter equity in access to services. They also argue that PBF may crowd out intrinsic motivation and
37 encourage gaming within the system. Nevertheless the consensus on the positive effect of the strategy
38 is growing as new evidence becomes available. For instance in Burundi, PBF was found to improve the
39 utilization and quality of most maternal and child health services (Bonfrer, Van de Poel, & Van
40 Doorslaer, 2014). The potential of performance-based financing to address structural problems of health
41 systems is more and more acknowledged. As argued by Meessen, Soucat, and Sekabaraga (2011), PBF
42 can be a reform catalyst. PBF is now recognized as a holistic reform approach comparable to the old

43 paradigms of primary healthcare and the Bamako initiative. The innovative provider payment
44 mechanism is only one dimension of PBF and that the approach is more comprehensive as it entails,
45 among others, health facility autonomy, integrated management of funds, autonomous human resource
46 management, more efficient management of drugs, better quality standards, strengthened governance
47 and accountability (Fritsche, Soeters, & Meessen, 2014).

48 As opposed to demand side interventions that incentivize the population to use health care services
49 (such as conditional cash transfers or vouchers), this article focuses on a supply side mechanism that
50 incentivizes healthcare providers' to achieve quantitative and qualitative targets in the delivery of
51 services. Such mechanisms usually rely on indicators related to providers' practice with the quality of
52 care traditionally being measured from a clinical viewpoint. Patients' view on their interaction with the
53 health system has often been overlooked in the past. Patients' satisfaction is however a desired
54 outcome of care and an indicator of process quality (Donabedian, 1988).

55 Satisfaction with health services is a multidimensional phenomenon and is categorized in various ways in
56 the literature. Patients' satisfaction results from their perception of service quality including:
57 *interpersonal quality*, which reflects the relationship between the service provider and the patient;
58 *technical quality*, which relates to the outcomes achieved and the technical competence of the service
59 provider; *environment quality*, which corresponds to environmental features that shape consumer
60 service perceptions; and *administrative quality*, which relates to facilitating (non-health related) services
61 for the delivery and consumption of the health service (Dagger, Sweeney, & Johnson, 2007). The
62 evidence suggests that patients' satisfaction is predominantly determined by the quality of medical care
63 (including competences, infrastructure, health services, diagnostic and therapeutic procedures);
64 information; equity in access; costs; waiting time; cleanliness; and participative approach of care
65 (Mpinga & Chastonay, 2011).

66 The patient-oriented perspective of this paper is justified on three grounds. First, one cannot ignore the
67 impact a strategy has on users' satisfaction as it stands for a critical component of service quality
68 evaluation. Second, patients' satisfaction affects compliance with treatment and is therefore important
69 from a public health perspective. Third, satisfied patients will continue using services and recommend
70 services to others. As PBF in LMIC primarily aims to increase utilization of health services, it is critical to
71 ascertain that poor satisfaction with services is not hampering overall utilization. PBF focuses on
72 providers and sets clinical targets: thus, the hypothesis is that PBF will result in improved satisfaction
73 from clinical aspects but will have no effect on satisfaction with non-clinical dimensions. This hypothesis
74 is tested with data from a randomized control trial of the national PBF scheme in Rwanda. In this
75 scheme targeting primary healthcare facilities, incentives were based on the quantity of outputs
76 achieved conditional on the quality of services delivered using 14 maternal and child health output
77 indicators and 13 quality indicators (Basinga et al., 2011). Patients' satisfaction was not measured.

78 This paper will also aim to verify the reform potential of PBF with a particular focus on patients'
79 satisfaction in quality assurance. The analysis covers satisfaction with prenatal care and with curative
80 care for children and adults. In the subsequent sections, a brief literature review on patients'
81 satisfaction and PBF is presented, followed by methods, results and a discussion with policy
82 recommendations.

83 **2. Background**

84 Performance incentives across the world were designed to address agency issues resulting from the
85 agent (provider) having different goals and motivations than those of the principal (patient or purchaser
86 of health services). Performance incentives aim to align the objectives of the agent with those of the
87 principal by tying the reward to the achievement of the principals' objectives. The downside, if PBF does
88 not include a complete set of outputs to ensure the full health package is delivered, is that providers

89 may focus on rewarded services and overlook other parts of their activity. One direct implication is that
90 providers will have no incentive to raise patients' satisfaction if they are not rewarded for it. However,
91 as unsatisfied patients' may decide not to visit the facility again, providers may perceive the need to
92 satisfy patients, even in the absence of a reward, in particular for dimensions that determine the most
93 satisfaction and that they can influence.

94 In HIC, patients' satisfaction surveys are regularly used to collect their judgment on the quality of care
95 and P4P schemes include measures of patients' satisfaction (Peterson, Woodard, Urech, Daw, &
96 Sookanan, 2006). This stands for a major difference with traditional LMIC health systems where
97 patients' perception about health services is largely ignored. In LMIC, PBF schemes have tended to
98 adopt a narrow clinical focus with the risk that providers would focus on clinical indicators at the
99 expense of patients' satisfaction. More recent PBF schemes however measure patients' satisfaction
100 (Cordaid-SINA Health, 2014) but the results are not yet reported in the literature. This article thus takes
101 an unusual viewpoint (the patients' one) to assess the effect of PBF on the quality of health services.

102 In most P4P schemes in HIC, a measure of patients' satisfaction is used, along with process (content of
103 care), outcome (effect of care on patients) and structure measures (facility, personnel, equipment) to
104 calculate the financial incentive (Peterson et al., 2006). The measure generally assesses patients'
105 perception of the quality of care (such as information, cleanliness or privacy) (Rosenthal, Fernandopulle,
106 Song, & Landon, 2004). However, published studies on the effect of P4P focus on a narrow definition of
107 quality (clinical) and do not present the patients' perspective (Campbell et al., 2007; Peterson et al.,
108 2006; Young, Meterko, & Desai, 2000).

109 Evidence from LMIC is scant. In the Democratic Republic of Congo, Soeters, Peerenboom, Mushagalusa,
110 and Kimanuka (2011) found that patients were more satisfied with the availability of drugs, perceived
111 quality and respect for patients in districts participating in the PBF program. Waiting time was judged

112 more acceptable in control districts, but the difference with PBF districts was not significant. Other
113 evaluations of PBF schemes do not report the impact on patients' satisfaction. Patients' satisfaction in
114 LMIC is studied in relation to the status of health facilities (public or private) with authors arguing that
115 what differs between those facilities is the available financial incentive. In a comparative analysis of
116 patients' satisfaction with family planning services in Tanzania, Kenya and Ghana, Hutchinson, Do, and
117 Agha (2011) found that patients were more satisfied with the process quality in private facility but found
118 less difference on technical quality. Greater satisfaction with family planning services in private facilities
119 was associated with process and structural factors such as reduced waiting time and less stock outs. A
120 systematic review using 80 studies on LMIC also found that drug supply, waiting time, privacy,
121 confidentiality, staff friendliness, communication, dignity and efforts were better in the private sector
122 but that patient satisfaction with care did not differ between public and private providers (Berendes,
123 Heywood, Oliver, & Garner, 2011).

124 **3. Methods**

125 **Study design**

126 The empirical study relies on data from the impact evaluation of the national PBF for primary level
127 facilities in Rwanda. It was the first randomized experiment used to rigorously assess the impact of PBF
128 in Africa. It took advantage of the phased PBF implementation over a 23-month period between 2006
129 and 2008. The 19 rural districts that did not implement a PBF pilot before 2006 were paired and
130 randomly assigned to treatment (12 districts) or control groups (7 districts). The remaining 11 districts
131 that already piloted PBF were excluded from the impact evaluation. The three urban districts of the
132 country were not included; therefore the study focuses on rural districts only.

133 **Data**

134 The study relies on secondary data analysis. The author was not involved in data collection but
135 performed all data analysis. The research protocol for this study was approved by the Rwanda National
136 Ethics Committee. Data was collected from 157 primary level facilities, including 77 treatment facilities
137 and 80 control facilities in 2008, after two years of PBF implementation in treatment facilities. Patient
138 exit interviews were conducted with patients visiting the health center on the day of the interview for
139 prenatal care, child curative care and adult curative care. In the case of children, respondents were the
140 accompanying adult. Eight to twelve patients were interviewed for each service in each facility.
141 Information collected from the patients included: patient characteristics, provider effort and patient
142 satisfaction with services. Patients were asked to rank their satisfaction with medical and non-medical
143 services according to five categories: very unsatisfied, unsatisfied, no opinion, satisfied and very satisfied
144 for a list of ten satisfaction indicators.

145 **Variables**

146 To facilitate the interpretation of results as one could not present analyses for the ten dimensions and
147 some dimensions might measure similar patterns, an index was constructed from the various
148 dimensions of satisfaction as already done elsewhere (Gerber & Prince, 1999; Rao, Peters, & Bandeen-
149 Roche, 2006) The traditional principal component analysis (PCA) method that creates indexes from
150 dummy variables (Filmer & Pritchett, 2001) was not appropriate as satisfaction variables are ordinal.
151 Using dummy indicators in PCA would have introduced fake correlations as there were more than two
152 categories for a variable. Following Kolenikov and Angeles (2009), polychoric correlation, an alternative
153 approach for the analysis of ordinal data using PCA, was used. It assumes that ordinal variables were
154 obtained by categorizing normally distributed underlying variables, and that those unobserved variables

155 follow a bivariate normal distribution. Polychoric correlation corresponds to the maximum likelihood
 156 estimate of that correlation.

157 The first factor structure derived from polychoric correlation resulted in only one factor having an
 158 Eigenvalue over 1 and explaining 88% of the variation. However, waiting time, time with provider and
 159 cleanliness were not well captured by the first factor as their uniqueness exceeded their contribution to
 160 factor 1 (Table 3-1 and Table 3-2). These variables were thus removed from factor 1 and factor 1 was
 161 normalized to facilitate interpretation. As further analysis showed that they could not be combined in an
 162 index, they were kept as single measures of satisfaction.

Table 3-1: Output of initial factor analysis

Factor	Eigenvalue	Diff.	Prop. (% of variation explained)	Cum. (cumulative variation explained)
1	4.28670	3.52473	0.8823	0.882
2	0.76197	0.53421	0.1568	1.039
3	0.22776	0.08069	0.0469	1.086
4	0.14707	0.0455	0.0303	1.116
5	0.10157	0.13436	0.0209	1.137
6	-0.03279	0.03236	-0.0067	1.130
7	-0.06515	0.08863	-0.0134	1.117
8	-0.15378	0.04091	-0.0317	1.085
9	-0.19469	0.02532	-0.0401	1.045
10	-0.22001	0	-0.0453	1

Table 3-2: Contribution of variables to factor 1

Variables	Factor 1	Uniqueness
Waiting time	0.4164	0.8266
Time w/ provider	0.5824	0.6608
Cleanliness	0.596	0.6448
Privacy	0.684	0.5321
Staff attitude	0.7362	0.458
Cost of service	0.6606	0.5636
Cost of drug	0.6611	0.5629
Avail. of drugs	0.6659	0.5565
Explanation	0.6855	0.5301
Overall service	0.7888	0.3778

163
 164 Four satisfaction measures were retained, including one index corresponding to satisfaction with clinical
 165 services and three measures of satisfaction corresponding to non-clinical services (Table 3-3).

166 **Table 3-3: Satisfaction measures retained for analysis**

Area	Satisfaction measure	Satisfaction indicators included in the measure
Clinical services	Clinical services index	Privacy during examination, staff attitude, explanation, cost of drugs, cost of the service, availability of drugs, overall

		satisfaction
Non-clinical services	Waiting time	Waiting time
	Time with provider	Time with provider
	Cleanliness	Cleanliness

167 **Statistical methods**

168 Ordinary least squares (OLS) were used for the regression on the clinical satisfaction index for each
169 sample. OLS were compared to a censored model (Tobit) assuming no negative values. Regression
170 outcomes from OLS and Tobit were comparable revealing the robustness of OLS outputs presented in
171 this paper. Independent variables aimed to control for facility characteristics (public or faith-based, PBF
172 treatment or control); individual characteristics (primary education, sex when relevant, age, health
173 insurance); and characteristics of the health service (whether the patient was given a prescription to buy
174 drugs outside or to perform laboratory tests from another health facility). In the sample of pregnant
175 women, controls also included the months of pregnancy and whether it was their first prenatal care
176 visit. In the sample of children, their age was controlled for. For all models, all independent variables
177 were included in the models based on variables' availability and variables that proved to influence
178 satisfaction in the literature. A review of the literature indeed revealed that sicker patients tend to be
179 less satisfied, while older and less educated patients are more satisfied. Evidence on gender, ethnicity
180 and socio-economic status remains unclear (Crow et al., 2002; Hall & Dornan, 1990; Hekkert, Cihangir,
181 Kleefstra, van den Berg, & Kool, 2009; Sitzia & Wood, 1997).

182 The ordinal measures of satisfaction with non-clinical services (waiting time, time with provider and
183 cleanliness) were modeled with ordered probit regressions. Independent variables included facility
184 characteristics (public or faith-based, PBF treatment or control) and individual characteristics (primary
185 education, sex, age and health insurance). Time spent waiting in the facility was added as a control in
186 the regression on satisfaction with waiting time. As only the sign of coefficients of ordered probit

187 regressions can be interpreted, marginal effects were computed. They measure the impact of change in
188 an independent variable on the expected change in the dependent variable.

189 **Robustness checks**

190 Data drawn from the household surveys, which provide information on the utilization of health services
191 collected from 2,145 households in the catchment areas of the 157 primary level facilities of the impact
192 evaluation, was used to control for district level utilization of child curative care and prenatal care
193 services. Following evidence of large regional disparities in utilization of basic health services in Rwanda,
194 robustness checks verify whether the observed effect of PBF on satisfaction varies with a district level
195 utilization of services.

196 **4. Results**

197 **Descriptive analysis**

198 The majority of respondents were satisfied with prenatal care and curative care for children and adults.
199 Overall satisfaction (respondent satisfied or very satisfied) with service reached 86% for adult curative
200 care, 90% for child curative care and 95% for prenatal care. Satisfaction with the cost of drugs and
201 services, which occurs in about 90% of cases, is probably due to the fact that most patients benefit from
202 health insurance. Drugs delivered at the facility and medical services are thus free of charge, except for a
203 small financial contribution. Dissatisfaction with waiting time is the largest of the three categories of
204 care as close to half of respondents were not satisfied (Figure 1 to Figure 3). On average, patients
205 waited for two and half hours before seeing a healthcare provider and 20% to 25% had to wait for more
206 than three hours (and some up to eight hours). Descriptive statistics of independent variables included
207 in the models are presented in Annex 1. T-tests reveal overall balance between the treatment and
208 control groups.

Figure 1: Satisfaction with curative care for adults

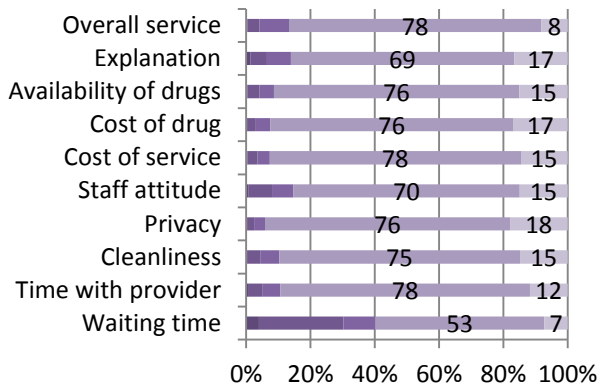


Figure 2: Satisfaction with prenatal care

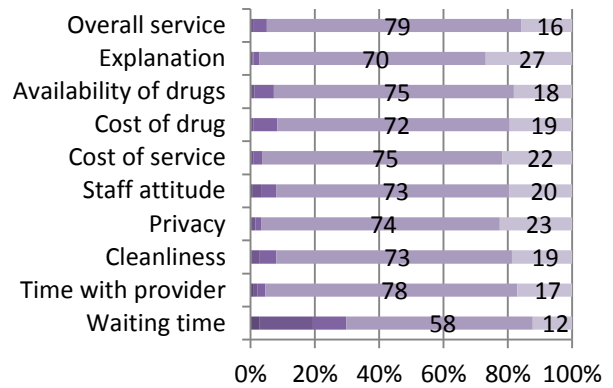
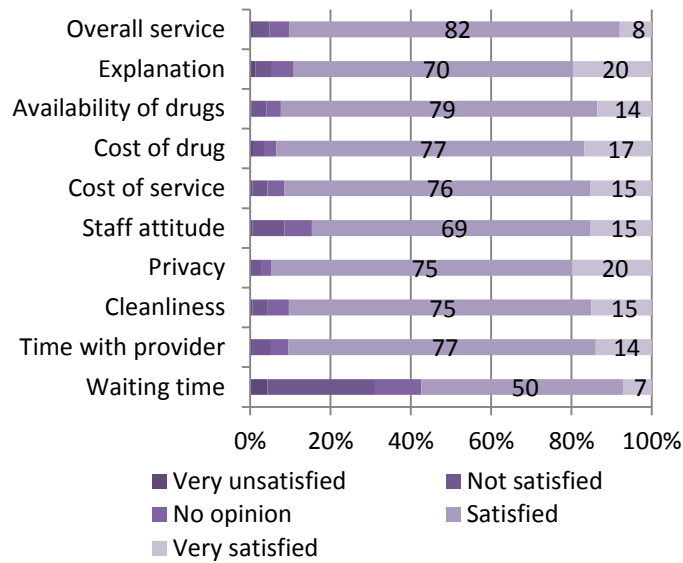


Figure 3: Satisfaction with curative care for children



209 **Regression analyses**

210 **Adult curative care**

211 Adults seeking care from a facility implementing PBF are more satisfied with clinical services (+2.5%),
 212 time spent with provider and cleanliness of the facility compared to patients in control facilities. PBF has
 213 no effect on satisfaction with waiting time. Health insurance is the only other determinant of
 214 satisfaction with clinical services: insured patients were 6.7% more satisfied with clinical services than

215 non-insured ones. This may reflect that patients' that are more satisfied with services of the health
 216 facility are those with health insurance. Patients' characteristics such as age, education or sex have no
 217 effect. Similarly, prescribing practices (for drugs or laboratory tests) did not influence adults' satisfaction
 218 with clinical services (Table 4-1).

219 **Table 4-1: Satisfaction with clinical and non-clinical services for adult curative care**

VARIABLES	Clinical services index	Waiting time	Time with provider	Cleanliness
	OLS	OP	OP	OP
Public (=1)	-0.014 (0.009)	-0.025 (0.064)	0.002 (0.071)	-0.170** (0.070)
PBF (=1)	0.025*** (0.008)	-0.016 (0.061)	0.119* (0.068)	0.169** (0.067)
Drug prescription (=1)	-0.003 (0.008)			
Laboratory tests (=1)	0.024 (0.030)			
Has primary education (=1)	0.013 (0.008)	0.044 (0.065)	0.005 (0.072)	-0.013 (0.072)
Male (=1)	-0.006 (0.008)	-0.180*** (0.063)	0.052 (0.070)	-0.033 (0.069)
Age	0.000 (0.000)	0.006*** (0.002)	0.002 (0.002)	0.003 (0.002)
Has health insurance (=1)	0.067*** (0.025)	0.012 (0.164)	0.130 (0.180)	0.304* (0.177)
Waiting time (hours)		-0.257*** (0.020)		
Observations	1,088	1,324	1,326	1,314

220 *Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

221 *OLS= Ordinary Least Squares; OP = Ordered Probit*

222 Marginal effects computed in Table 4-2 show that men were 7% more likely to be unsatisfied or very
 223 unsatisfied with waiting time compared to women. A possible explanation could be that the opportunity
 224 cost of waiting is higher for men. Adults were also 7% less likely to be satisfied with an additional waiting
 225 hour and 3% less likely to be very satisfied. Age is positively associated with satisfaction with waiting
 226 time as older patients tend to be more satisfied. PBF has no effect on satisfaction with waiting time but

227 a positive effect on satisfaction with time spent with provider as patients were 2% more likely to be very
 228 satisfied in treatment facilities. Patients in PBF facilities were also 4% more likely to be very satisfied
 229 with cleanliness. Contrary to waiting time, patients' characteristics did not influence satisfaction with
 230 time spent with the provider and the cleanliness of the facility (Table 4-2).

231 **Table 4-2: Satisfaction with non-clinical services related to adult curative care (marginal effects)**

	Very unsatisfied		Unsatisfied		No opinion		Satisfied		Very satisfied	
	Marginal effect	SE	Marginal effect	SE	Marginal effect	SE	Marginal effect	SE	Marginal effect	SE
WAITING TIME										
Public = 1	0.002	0.004	0.007	0.018	0.001	0.003	-0.007	0.017	-0.003	0.008
PBF = 1	0.001	0.004	0.004	0.017	0.001	0.003	-0.004	0.016	-0.002	0.007
Primary education = 1	-0.003	0.004	-0.012	0.018	-0.002	0.003	0.012	0.017	0.005	0.008
Male = 1	0.012***	0.004	0.051***	0.018	0.007***	0.003	-0.049***	0.018	-0.020***	0.007
Age	-0.000***	0.000	-0.002***	0.001	-0.000***	0.000	0.002***	0.001	0.001***	0.000
Health insurance = 1	-0.001	0.010	-0.003	0.046	-0.001	0.007	0.003	0.045	0.001	0.019
Waiting time (hours)	0.016***	0.002	0.072***	0.006	0.011***	0.002	-0.069***	0.007	-0.030***	0.003
TIME WITH PROVIDER										
Public = 1	-0.000	0.001	-0.000	0.006	-0.000	0.006	-0.000	0.001	0.000	0.014
PBF = 1	-0.002	0.001	-0.010*	0.006	-0.009*	0.005	-0.002	0.002	0.023*	0.013
Primary education = 1	-0.000	0.001	-0.000	0.006	-0.000	0.006	-0.000	0.001	0.001	0.014
Male = 1	-0.001	0.001	-0.005	0.006	-0.004	0.005	-0.001	0.002	0.010	0.014
Age	-0.000	0.000	-0.000	0.000	-0.000	0.000	-0.000	0.000	0.000	0.000
Health insurance = 1	-0.003	0.004	-0.012	0.019	-0.011	0.015	0.002	0.008	0.024	0.030
CLEANLINESS										
Public = 1	0.001*	0.001	0.013**	0.005	0.014**	0.006	0.011*	0.006	-0.040**	0.017
PBF = 1	-0.001	0.001	-0.014**	0.006	-0.015**	0.006	-0.009**	0.004	0.039**	0.015
Primary education = 1	0.000	0.001	0.001	0.006	0.001	0.006	0.001	0.004	-0.003	0.016
Male = 1	0.000	0.001	0.003	0.006	0.003	0.006	0.002	0.003	-0.007	0.016
Age	-0.000	0.000	-0.000	0.000	-0.000	0.000	-0.000	0.000	0.001	0.000
Health insurance = 1	-0.004	0.004	-0.031	0.022	-0.029	0.018	0.004	0.015	0.059**	0.029

232 *Note: *** p<0.01, ** p<0.05, * p<0.1*

233 **Prenatal care**

234 Results on satisfaction with prenatal care present some differences when compared to satisfaction
 235 levels with curative care for adults. As for adults, pregnant women seeking care from PBF facilities were
 236 more likely to be satisfied with clinical services (+1%). However, PBF also positively influenced

237 satisfaction with waiting time which was not the case for adults. Finally, PBF showed no effect on
 238 satisfaction with time spent with provider and cleanliness. Satisfaction with clinical services decreased in
 239 public facilities but increased when women were asked to perform laboratory tests from another facility
 240 (+1%). Satisfaction with care also slightly rose with months of pregnancy (Table 4-3).

241 **Table 4-3: Satisfaction with clinical and non-clinical services for prenatal care**

	Clinical services index	Waiting time	Time with provider	Cleanliness
	OLS	OP	OP	OP
Public (=1)	-0.004* (0.002)	-0.153** (0.068)	-0.170** (0.080)	-0.210*** (0.075)
PBF (=1)	0.006** (0.003)	0.199*** (0.064)	-0.029 (0.074)	0.089 (0.070)
Drug prescription (=1)	-0.001 (0.002)			
Laboratory tests (=1)	0.011** (0.005)			
Has primary education (=1)	-0.004 (0.003)	-0.128** (0.065)	-0.174** (0.076)	-0.104 (0.071)
Age	0.000 (0.000)	0.005 (0.008)	-0.012 (0.009)	0.006 (0.008)
Has health insurance (=1)	0.002 (0.002)	-0.041 (0.121)	0.180 (0.141)	-0.034 (0.134)
Waiting time (hours)	0.000 (0.000)	-0.174*** (0.018)		
Months pregnant	0.001*** (0.000)	0.052*** (0.019)	0.019 (0.022)	0.023 (0.021)
First prenatal visit (=1)	0.006 (0.004)			
Number of children		-0.032 (0.028)	0.005 (0.033)	-0.032 (0.031)
Observations	683	1,197	1,196	1,192

242 *Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

243 *OLS= Ordinary Least Squares; OP = Ordered Probit*

244 Marginal effects associated with the three non-clinical dimensions of satisfaction showed that women
 245 were 3% more likely to be satisfied and 4% more likely to be very satisfied with waiting time in PBF
 246 facilities compared to the control group. Satisfaction with waiting time decreased by 4% among more

247 educated women and with time spent waiting (-6% per hour) but this improved with months of
 248 pregnancy. Satisfaction with time spent with providers decreases with primary education (Table 4-4).
 249 Satisfaction with waiting time, time with provider and cleanliness of the facility was consistently greater
 250 in faith-based facilities compared to public facilities, with the probability of women being very satisfied
 251 increasing from 3% to 6% in faith-based facilities (Table 4-4). As for adults, most individual
 252 characteristics did not influence satisfaction with time spent with provider and cleanliness of the facility.

253 **Table 4-4: Satisfaction with non-clinical services related to prenatal care (marginal effects)**

	Very unsatisfied		Unsatisfied		No opinion		Satisfied		Very satisfied	
	Marginal effect	SE	Marginal effect	SE	Marginal effect	SE	Marginal effect	SE	Marginal effect	SE
WAITING TIME										
Public = 1	0.007**	0.003	0.032**	0.014	0.012**	0.006	-0.021**	0.009	-0.031**	0.014
PBF = 1	-0.010***	0.004	-0.043***	0.014	-0.016***	0.005	0.030***	0.010	0.038***	0.012
Primary education = 1	0.006*	0.003	0.027*	0.014	0.010*	0.005	-0.020*	0.010	-0.024**	0.012
Age	-0.000	0.000	-0.001	0.002	-0.000	0.001	0.001	0.001	0.001	0.001
Health insurance = 1	0.002	0.006	0.009	0.025	0.003	0.010	-0.006	0.016	-0.008	0.024
Waiting time (hours)	0.009***	0.002	0.037***	0.004	0.014***	0.002	-0.026***	0.004	-0.034***	0.004
Months pregnant	-0.003***	0.001	-0.011***	0.004	-0.004***	0.002	0.008***	0.003	0.010***	0.004
Number of children	0.002	0.001	0.007	0.006	0.003	0.002	-0.005	0.004	-0.006	0.005
TIME WITH PROVIDER										
Public = 1	0.003*	0.002	0.004**	0.002	0.008**	0.004	0.029**	0.015	-0.044**	0.021
PBF = 1	0.001	0.001	0.001	0.002	0.001	0.004	0.005	0.012	-0.007	0.019
Primary education = 1	0.003*	0.002	0.005**	0.002	0.008**	0.004	0.027**	0.012	-0.043**	0.019
Age	0.000	0.000	0.000	0.000	0.001	0.000	0.002	0.001	-0.003	0.002
Health insurance = 1	-0.004	0.004	-0.006	0.005	-0.009	0.008	-0.023*	0.014	0.042	0.031
Months pregnant	-0.000	0.000	-0.001	0.001	-0.001	0.001	-0.003	0.004	0.005	0.006
Number of children	-0.000	0.001	-0.000	0.001	-0.000	0.002	-0.001	0.005	0.001	0.008
CLEANLINESS										
Public = 1	0.002*	0.001	0.011***	0.004	0.016***	0.006	0.030**	0.012	-0.059***	0.022
PBF = 1	-0.001	0.001	-0.005	0.004	-0.007	0.006	-0.011	0.009	0.024	0.019
Primary education = 1	0.001	0.001	0.006	0.004	0.008	0.006	0.013	0.009	-0.028	0.019
Age	-0.000	0.000	-0.000	0.000	-0.001	0.001	-0.001	0.001	0.002	0.002
Health insurance = 1	0.000	0.001	0.002	0.007	0.003	0.010	0.005	0.019	-0.009	0.038
Months pregnant	-0.000	0.000	-0.001	0.001	-0.002	0.002	-0.003	0.003	0.006	0.006
Number of children	0.000	0.000	0.002	0.002	0.003	0.002	0.004	0.004	-0.009	0.008

254 *Note: *** p<0.01, ** p<0.05, * p<0.1*

255 **Child curative care**

256 PBF showed to have the smallest effect on child curative care, as the strategy only influenced
 257 satisfaction with clinical services with respondents (accompanying adult) being 2% more satisfied in
 258 treatment facilities. PBF had no effect on satisfaction with waiting time, time with provider or
 259 cleanliness. As for adult curative care, satisfaction with clinical services improved by 5% among insured
 260 respondents and no other individual or service-related factor influenced satisfaction with clinical
 261 services (Table 4-5).

262 **Table 4-5: Satisfaction with clinical and non-clinical services for child curative care**

VARIABLES	Clinical services index	Waiting time	Time with provider	Cleanliness
	OLS	OP	OP	OP
Public (=1)	-0.005 (0.010)	0.043 (0.075)	-0.084 (0.085)	-0.189** (0.084)
PBF (=1)	0.020** (0.010)	-0.007 (0.072)	-0.027 (0.080)	0.099 (0.080)
Drug prescription (=1)	0.001 (0.010)			
Laboratory tests (=1)	0.030 (0.030)			
Has primary education (=1)	-0.007 (0.010)	-0.172** (0.072)	-0.018 (0.081)	-0.040 (0.080)
Male (=1)	-0.005 (0.013)	0.000 (0.126)	0.039 (0.141)	0.001 (0.140)
Age	0.001 (0.001)	0.003 (0.005)	0.007 (0.005)	-0.002 (0.005)
Has health insurance (=1)	0.053** (0.024)	-0.291** (0.125)	0.195 (0.140)	-0.052 (0.139)
Age of the child	-0.006 (0.004)	-0.052* (0.028)	-0.122*** (0.032)	-0.038 (0.031)
Waiting time (hours)		-0.206*** (0.021)		
Observations	750	947	945	940

263 *Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

264 *OLS= Ordinary Least Squares; OP = Ordered Probit*

265 As for other groups of patients, waiting time was the satisfaction dimension most influenced by
 266 individual characteristics. Insured respondents and those with primary education were less likely to be
 267 satisfied or very satisfied with waiting time. Their satisfaction also decreased as they spent more time

268 waiting. Satisfaction with time spent with the provider was higher for younger children. Finally, patients
 269 were 4.5% more likely to be very satisfied with cleanliness in faith-based facilities (Table 4-6).

270 **Table 4-6: Satisfaction with non-clinical services related to child curative care (marginal effects)**

	Very unsatisfied		Unsatisfied		No opinion		Satisfied		Very satisfied	
	Marginal effect	SE	Marginal effect	SE	Marginal effect	SE	Marginal effect	SE	Marginal effect	SE
WAITING TIME										
Public = 1	-0.003	0.005	-0.012	0.021	-0.002	0.003	0.012	0.021	0.005	0.009
PBF = 1	0.000	0.005	0.002	0.020	0.000	0.003	-0.002	0.020	-0.001	0.008
Primary education = 1	0.012**	0.006	0.048**	0.020	0.007**	0.003	-0.048**	0.020	-0.020**	0.008
Male =1	-0.000	0.009	-0.000	0.035	-0.000	0.006	0.000	0.035	0.000	0.015
Age	-0.000	0.000	-0.001	0.001	-0.000	0.000	0.001	0.001	0.000	0.001
Health insurance = 1	0.016***	0.006	0.078**	0.032	0.016*	0.008	-0.069***	0.025	-0.041*	0.021
Age of the child	0.004*	0.002	0.014*	0.008	0.002*	0.001	-0.014*	0.008	-0.006*	0.003
Waiting time (hours)	0.014***	0.002	0.057***	0.007	0.009***	0.002	-0.056***	0.007	-0.024***	0.003
TIME WITH PROVIDER										
Public = 1	0.001	0.001	0.008	0.007	0.005	0.005	0.005	0.006	-0.019	0.019
PBF = 1	0.000	0.001	0.002	0.007	0.002	0.005	0.001	0.004	-0.006	0.017
Primary education = 1	0.000	0.001	0.002	0.007	0.001	0.005	0.001	0.004	-0.004	0.018
Male =1	-0.000	0.002	-0.003	0.012	-0.002	0.009	-0.002	0.009	0.009	0.032
Age	-0.000	0.000	-0.001	0.000	-0.000	0.000	-0.000	0.000	0.001	0.001
Health insurance = 1	-0.003	0.003	-0.020	0.016	-0.013	0.010	-0.003	0.005	0.039	0.025
Age of the child	0.001*	0.001	0.011***	0.003	0.008***	0.002	0.006**	0.003	-0.027***	0.007
CLEANLINESS										
Public = 1	0.003*	0.001	0.013**	0.006	0.015**	0.007	0.015*	0.008	-0.045**	0.021
PBF = 1	-0.001	0.001	-0.007	0.006	-0.008	0.007	-0.006	0.006	0.023	0.019
Primary education = 1	0.001	0.001	0.003	0.006	0.003	0.007	0.002	0.005	-0.009	0.018
Male =1	-0.000	0.002	-0.000	0.010	-0.000	0.011	-0.000	0.009	0.000	0.032
Age	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.000	0.001
Health insurance = 1	0.001	0.002	0.004	0.009	0.004	0.011	0.004	0.011	-0.012	0.033
Age of the child	0.001	0.000	0.003	0.002	0.003	0.003	0.002	0.002	-0.009	0.007

271 *Note: *** p<0.01, ** p<0.05, * p<0.1*

272

273 **Robustness check**

274 Robustness checks were run to see whether satisfaction with clinical services (index) was influenced by
 275 regional disparities in the utilization of health services. Utilization of four or more prenatal care visits
 276 and of curative care for children in the event of an illness was aggregated at the district level to create

277 two groups of districts (lower and upper) according to their utilization level. This grouping revealed that
 278 the overall coverage of four or more antenatal care visits was larger than that of curative care for
 279 children in the event of an illness. Higher utilization of services was observed in almost the same districts
 280 for both services (Southern and Northern part of the country) and Eastern districts consistently
 281 registered with lower utilization rates (Figure 4 and Figure 5).

Figure 4: Coverage of 4 or more prenatal care visits (2 groups)

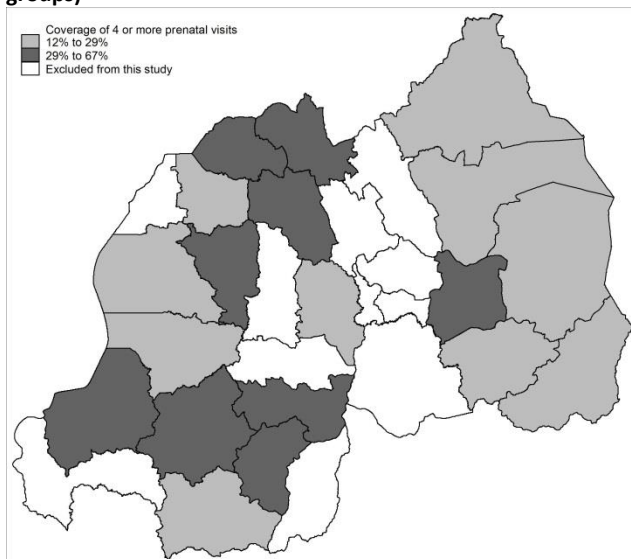
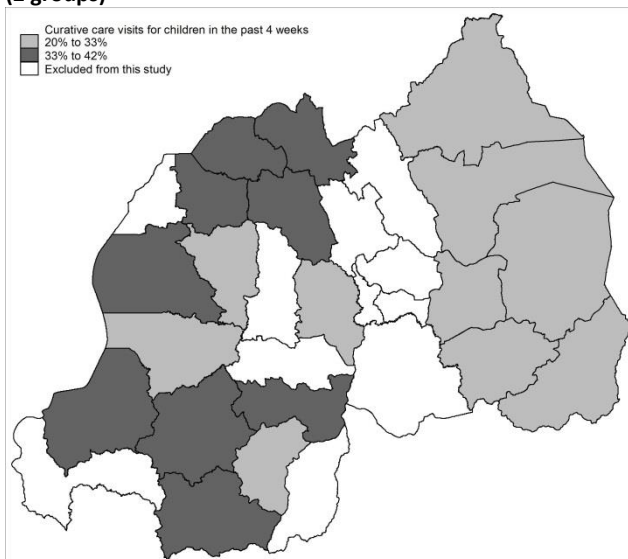


Figure 5: Curative care for children in the event of an illness (2 groups)



282
 283 The robustness checks confirm the positive effect of PBF on patients' satisfaction with clinical services
 284 among pregnant women and children under five. They reveal however that PBF has an effect on
 285 satisfaction of pregnant women only in districts where utilization of prenatal care is the lowest (+0.5%)
 286 and an effect on satisfaction with child curative care in places where utilization is the highest (+3%)
 287 (Table 4-7).

288 **Table 4-7: Robustness check for prenatal care and child curative care distinguishing district level utilization**

	Clinical services index for prenatal care		Clinical services index for child curative care	
	Lower group	Upper group	Lower group	Upper group
Public (=1)	-0.004*** (0.001)	-0.006 (0.008)	0.003 (0.016)	-0.001 (0.014)

	Clinical services index for prenatal care		Clinical services index for child curative care	
	Lower group	Upper group	Lower group	Upper group
PBF (=1)	0.004*** (0.001)	0.007 (0.007)	0.009 (0.015)	0.026* (0.014)
Drug prescription (=1)	-0.001 (0.002)	-0.005 (0.004)	-0.015 (0.014)	0.022* (0.013)
Laboratory tests (=1)	0.007 (0.005)	0.014** (0.007)	0.059 (0.039)	-0.002 (0.027)
Has primary education (=1)	-0.001 (0.001)	-0.009 (0.009)	-0.016 (0.014)	0.008 (0.014)
Male (=1)			-0.000 (0.018)	-0.020 (0.019)
Age	-0.000 (0.000)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)
Has health insurance (=1)	0.001 (0.002)	0.003 (0.004)	0.047 (0.037)	0.070*** (0.023)
Waiting time (hours)	0.000 (0.000)	-0.000 (0.001)		
Months pregnant	0.001*** (0.000)	0.000 (0.000)		
First prenatal visit (=1)	0.004*** (0.001)	0.008 (0.009)		
Age of the child			-0.004 (0.006)	-0.008 (0.005)
Observations	386	297	452	298

289 *Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

290 **Limitations**

291 This paper has its own limitations, although it is one of the first papers to explore the effect of
292 performance incentives on patients' satisfaction in MLIC. As the instructions given to the survey firm on
293 the number of patients to interview in each facility were misunderstood in 2006, too few interviews
294 were conducted on satisfaction at baseline. Thus, only 2008 (follow-up) data is used in the analysis
295 which does not allow isolating the impact of PBF through difference-in-difference technique. Only causal
296 relationships can be drawn. Nevertheless, the analysis benefits from the randomized design of the study
297 and rigorous evaluation of households' perception of the quality of care in their health facility,
298 measured from the household surveys, showed balance at baseline between treatment and control

299 groups (Basinga, 2009). One can reasonably assume that satisfaction of patients exiting the same
300 facilities was also comparable at baseline and that any difference observed at follow-up can be
301 attributed to PBF.

302

303 **5. Discussion**

304 This paper adds to knowledge in at least three ways: first, it provides evidence on patients' satisfaction
305 with health services in rural Rwanda. Second, it provides evidence on determinants of patient
306 satisfaction and discusses differences between HIC and LMIC that can serve as policy recommendations.
307 Third, it confirms the PBF reform potential related to quality assurance and patients satisfaction.

308 As observed in other countries (Bernhart, Wiadnyana, Wihardjo, & Pohan, 1999; Sitzia & Wood, 1997),
309 patients interviewed in Rwanda reported high satisfaction levels for clinical and non-clinical services.
310 This contrasts with the suboptimal use of basic health services in the country and suggests a response
311 bias as patients tend to hold back negative views. Respondents show their lack of satisfaction only in the
312 case of waiting time probably because it is the most tangible measure and can be easily quantified. PBF
313 has a positive effect on satisfaction with clinical services, as observed in the Democratic Republic of
314 Congo (Soeters et al., 2011), but its effect on non-clinical services varies. This contrasts with Burundi
315 where Bonfrer, Soeters, et al. (2014) were not able to find an effect of PBF on the quality of care as
316 reported by patients although clinical quality significantly improved. Results from Rwanda suggest two
317 interesting patterns: first, PBF primarily influences satisfaction related to the clinical content of care:
318 satisfaction with clinical services improved by 2.5% for adult care, 1% for prenatal care and 2% for child
319 care in PBF facilities suggesting that productivity gains achieved through PBF did not hamper healthcare
320 service quality as perceived by patients. This is a key finding as service quality under pay-for-
321 performance schemes is a major concern in the literature (Greene & Nash, 2009; Peterson et al., 2006).

322 Second, PBF can influence non-clinical dimensions of satisfaction if health care providers find an
323 incentive to do so, that is to say if the dimension is somehow compatible with the existing incentives.
324 For instance, with PBF, the proportion of very satisfied adults increases by 2% for time spent with
325 provider and by 4% for cleanliness of the facility whereas those dimensions are not influenced by PBF
326 for pregnant women and children. This may reveal that contrary to pregnant women who primarily pay
327 attention to clinical services as they have no alternative but to visit the health facility, adults that are not
328 satisfied with non-clinical services could have chosen self-medication and thus not visited the facility. As
329 a consequence, health care providers have an incentive to satisfy adults with clinical but also non-clinical
330 dimensions so that they visit the facility again and advise other people to do so, which will have a
331 positive effect of providers' earnings. Interestingly, PBF has no effect on waiting time except for
332 pregnant women: pregnant women are 7% more likely to be satisfied or very satisfied with waiting time
333 in PBF facilities. This suggests that healthcare providers have adopted a coping strategy to raise
334 satisfaction among patients that represent the largest potential financial gain. If pregnant women are
335 very pleased, they may visit the facility again for prenatal care (rewarded service) and institutional
336 delivery (the service with the largest financial reward). This contradicts evidence from the Democratic
337 Republic of Congo where PBF had a negative (but not significant) effect on waiting time (Soeters et al.,
338 2011). In the case of adults and children, dissatisfaction with waiting time can reflect the lack of human
339 resources, space and equipment, but also poor responsiveness of healthcare providers which do not
340 have an incentive to reduce waiting times.

341 Satisfaction with clinical services is greater among insured patients (+7% for adults and +5% for
342 children). Prescribing laboratory tests also influences a pregnant woman's satisfaction as she may feel
343 that the provider is taking good care of her. Interestingly, individual characteristics do not influence
344 patients' satisfaction with clinical services but only satisfaction with non-clinical services. The study finds
345 that women, older patients and less educated patients tend to be more satisfied with non-clinical

346 services in Rwanda, which is in accordance with published evidence on the determinants of patients'
347 satisfaction (Crow et al., 2002; Hall & Dornan, 1990; Hekkert et al., 2009; Sitzia & Wood, 1997). The
348 results also confirm evidence on satisfaction according to the status of facilities (public or private) in
349 LMIC (Berendes et al., 2011) as differences between public and faith-based facilities were found only for
350 non-clinical services.

351 Contrary to HIC, the assessment of patients' satisfaction is not systematic in LMIC and only limited
352 evidence exists. Further, LMIC traditional health systems are not well organized to internalize patient
353 satisfaction. Until recently, performance-based financing schemes did not include a measure of
354 satisfaction. As satisfaction with health services determines future utilization, attention paid to patients'
355 satisfaction is however critical to raise the overall utilization of basic health services in LMIC. While HIC
356 intend to limit the number of contacts between patients and the healthcare system, some basic
357 maternal and child health services remain underutilized in LMIC, particularly by the most vulnerable.
358 Low utilization is a major impediment to patients' becoming a countervailing force because the most
359 unsatisfied patients rarely or never use the services. Results from the robustness check suggest that PBF
360 improves satisfaction with clinical services only from a certain threshold and up to a certain level. For
361 child curative care, where the utilization of services does not exceed one third of cases, PBF could make
362 a difference, but only in districts where utilization is higher. For prenatal care services which are more
363 commonly used, PBF can influence satisfaction, but only in districts with lower utilization. Contrary to
364 high income countries where patients represent a countervailing force and can influence healthcare
365 providers' attitudes, patients from LMIC are not empowered to oppose to healthcare providers.

366 Three policy recommendations can be drawn from the above analysis. First, health care managers and
367 decision makers in LMIC should consider service quality and patients' satisfaction as important strategic
368 objectives. Measurement of patients' satisfaction should be conducted alongside the traditional

369 monitoring of quality of care to give more weight to patients' voice and incentivize providers to be more
370 responsive. Patients' satisfaction with healthcare services is particularly critical in LMIC where the
371 population lacks trust in health services and where utilization of basic health services is low. Second,
372 designers of PBF schemes in LMIC should integrate satisfaction measures in the incentive mechanism.
373 LMIC should build on the experience from HIC to ensure satisfaction is a component of the quality of
374 care evaluation in general and of performance incentives in particular. In Rwanda for instance, PBF was
375 accompanied by strong reporting and supervision mechanisms (Basinga et al., 2011) that probably
376 contributed to the positive effect of PBF on patients' satisfaction with clinical services. Third, the
377 potential of performance-based financing in addressing structural problems of health systems should be
378 acknowledged. As argued by Meessen et al. (2011), PBF can be a reform catalyst. The Rwanda case
379 shows that although PBF focuses on suppliers of health care services and on the process of care, it can
380 improve patients' experience with health care services and improve their satisfaction with clinical and
381 some non-clinical services. This should further encourage policy makers to explore synergies between
382 PBF and other strategies aimed at improving fuller utilization and higher quality of health services.

383 **6. Conclusion**

384 This study provides evidence on patients' satisfaction with primary health care services in LMIC. It
385 contributes in filling a knowledge gap by looking at an unexplored aspect of performance-based
386 financing , taking a patient's perspective to see how PBF affects healthcare services.

387 This paper supports the hypothesis that PBF succeeds in improving patients' satisfaction levels with
388 health services, in particular for clinical related services. Improvements in staff availability , productivity
389 and competences can result in patients being more satisfied with both clinical and non-clinical services
390 provided. In other words, efficiency gains are not achieved at the expense of a perceived quality of care.

391 In some instances, PBF can also improve satisfaction with non-clinical dimensions if they can generate
392 future financial gains.

393 The positive effect of PBF on patient satisfaction confirms that PBF is more than a provider payment
394 mechanism because it can contribute in strengthening health systems. As satisfaction with services can
395 improve healthcare utilization and health outcomes, LMIC should build on the experience of high
396 income countries' to respond better to the voice of patients' and include their feedback in quality
397 assessments. As PBF is increasingly implemented in African countries, its reform catalyst potential
398 should further be explored.

399

	Control group			Treatment group			Total			T-test of difference in means
	Obs.	mean	SE	Obs.	mean	SE	Obs.	mean	SE	
Adult care										
Public	675	63%	0.018	664	66%	0.018	1339	65%	0.010	0.227
Prescription	675	50%	0.019	664	54%	0.019	1339	52%	0.013	0.143
Laboratory test	675	4%	0.007	664	5%	0.008	1339	4%	0.005	0.553
Has primary education	675	39%	0.018	664	35%	0.018	1339	37%	0.013	0.158
Male	675	40%	0.018	664	37%	0.018	1339	38%	0.013	0.035
Age	675	39	0.609	664	39	0.622	1339	39	0.435	0.935
Has health insurance	675	95%	0.008	664	97%	0.005	1339	96%	0.005	0.007
Prenatal care										
Public	666	64%	0.018	693	68%	0.017	1359	66%	0.013	0.107
Drug prescription	666	6%	0.009	693	5%	0.008	1359	5%	0.006	0.594
Laboratory tests	666	1%	0.004	693	2%	0.005	1359	1%	0.003	0.121
Has primary education	666	43%	0.019	693	40%	0.018	1359	41%	0.013	0.222
Age	666	28	0.248	693	28	0.231	1359	28	0.169	0.525
Has health insurance	666	91%	0.010	693	93%	0.009	1359	92%	0.007	0.304
Waiting time (hours)	666	2.25	0.065	693	2.43	0.072	1359	2.34	0.049	0.066
Months pregnant	666	6.04	0.659	693	5.88	0.069	1359	5.96	0.047	0.111
First prenatal visit	666	67%	0.018	693	67%	0.018	1359	67%	0.013	0.868
Number of children	666	2	0.070	693	2	0.067	1359	2	0.048	0.568
Child care										
Public	505	63%	0.021	459	69%	0.020	964	66%	0.010	0.046
Drug prescription	505	39%	0.021	459	52%	0.023	964	45%	0.016	0.000
Laboratory tests	505	3%	0.007	459	7%	0.012	964	5%	0.006	0.001
Has primary education	505	44%	0.022	459	44%	0.023	964	44%	0.160	0.957
Male	505	9%	0.125	459	10%	0.014	964	10%	0.009	0.418
Age of respondent	505	30.2	0.334	459	30.1	0.385	964	30.1	0.253	0.842
Has health insurance	505	88%	0.014	459	91%	0.013	964	90%	0.009	0.102
Age of the child	505	2	0.060	459	2	0.057	964	2	0.042	0.769

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