

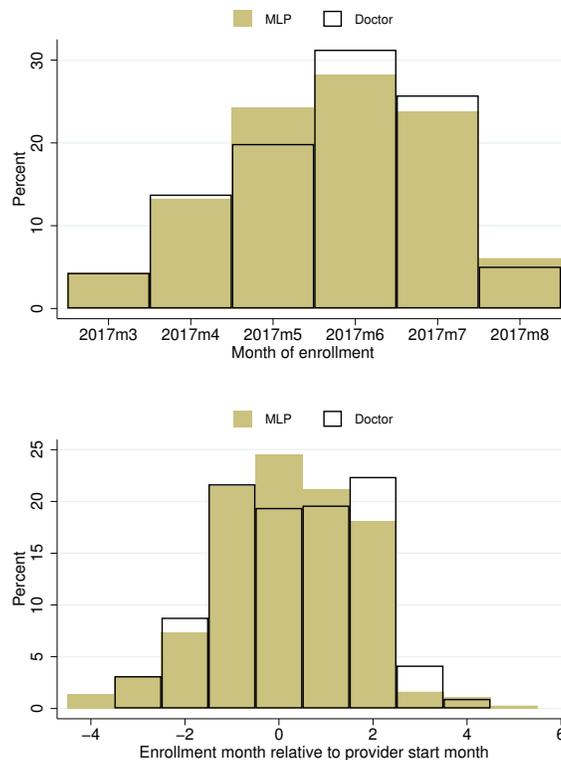
Online Appendix

When a Doctor Falls from the Sky: The Impact of Easing Doctor Supply Constraints on Mortality

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A Sampling and Enrollment

We enrolled approximately 60 expecting mothers in each Primary Health Service Area into the study. To draw the sample, enumerators visited randomly drawn census areas in each Service Area – the sampling frame was provided by the National Population Commission – and went house-to-house to identify all pregnant women.⁷¹ All pregnant women in a census area in their first or second trimester who gave consent were enrolled (only seven women, in total, declined to participate). We focused on first and second trimester pregnancies to maximize exposure. Enrollment took place between March and August 2017. We purposely enrolled women around the time when the new providers were expected to start in order to maximize pregnancy exposure. If we recruited too early, then too many women might deliver before the provider arrived; conversely, if we recruited too late, then women might be delivering after the provider had completed their posting. The figure below shows how enrollment overlapped with the arrival of the new provider posted to the site.



Top figure shows the period over which enrollment took place. MLP denotes sites randomly assigned an additional mid-level provider; Doctor denotes sites randomly assigned a new doctor. Bottom figure shows enrollment relative to the arrival month of the new provider. The month of arrival is month 0. $X < 0$ denotes enrollment X months prior to the arrival of the new provider. $X > 0$ denotes enrollment after the arrival of the new provider.

In total we enrolled 10,852 expecting mothers in the sample. 10,699 (98.6%) were successfully re-contacted at endline. Of these, 113 did not provide consent for the follow-up interview (41 in the control and doctor arms, and 31 in the MLP arm). The overall attrition rate was 2.45% (2.9% in control sites, 2% in MLP sites, and 2.4% in doctor sites; p-value from joint test = 0.39). Table A.2 examines determinants of attri-

⁷¹Pregnancy was self-reported. This means that women who were not aware of being pregnant at the time are not included in the sample.

tion. Educated women, women with more prior births, and women who were not offered the conditional incentive were more likely to have dropped out. Table A.3 compares baseline characteristics of women who dropped out in each arm to test whether there was a differential pattern of attrition by experimental arm. There is no evidence of this. The p-value from an omnibus test is 0.99.

9,126 children were born to these mothers. 8,606 of these children remained alive at follow-up. 1567 participants experienced an in utero death (including 19 participants who died while still pregnant and 43 that reported an induced termination). Table A.6 examines this outcome.

B Health Cards

Women at registration for prenatal care normally receive cards. They retain these cards and bring them along whenever they visit the health facility. Each woman enrolled in the study was provided with a card. The name and designation of the provider seen during a visit is recorded on the card. During the follow-up interview we asked to see these cards and recorded whether the woman saw a doctor during the pregnancy. Doctors in Nigeria always use their designation (Dr.) so this was easy enough to identify. The main limitation with these cards is that they are not available in all cases, as noted in the text.

Anecdotal reports by mothers who received care outside of the community health center suggested that providers in these facilities were less likely to complete the cards. There is some evidence of this in the data (see figure below). To the extent that those who received care in another health facility received care from a doctor, the cards will underestimate the actual prevalence of doctor-provided care. However, less than 10% of the sample received care in a government or private hospital where a doctor might be available. As long as this proportion is similar across experimental arms, which it is, I will undercount in the same way across groups, and estimates of between-group differences in means will be correct.

Women also sometimes forgot to take their cards with them to the facility, or the provider omitted to record the utilization. This can also be seen in the figure below. 1 in 10 women who gave birth in the community health center did not have this recorded on the card.⁷² This could also lead to an undercount. However, this is also not differential between arms, and so should not pose a threat to internal validity.

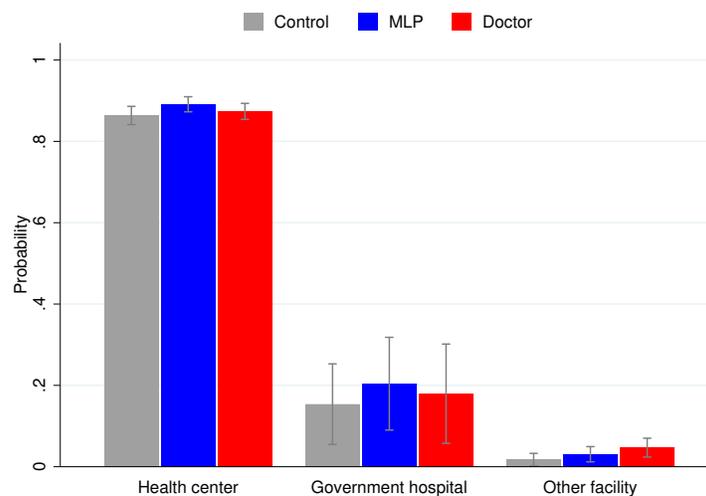


Figure shows the probability that a delivery was recorded on the card by delivery location. MLP denotes sites randomly assigned an additional mid-level provider; Doctor denotes sites randomly assigned a new doctor. Other facility denotes births in any other location outside of the home. For reference, 77% of non-home births took place in the health center serving the cluster, 6% took place in a government hospital, and 17% took place in some other location (3.6% in another public facility, 1.2% in a private hospital or clinic, 6.4% in a maternity home, 4.5% in a church, and 1.2% elsewhere).

⁷²In general, for women for whom we have a card, there is 89% agreement between what is reported in the survey and what is recorded on the card.

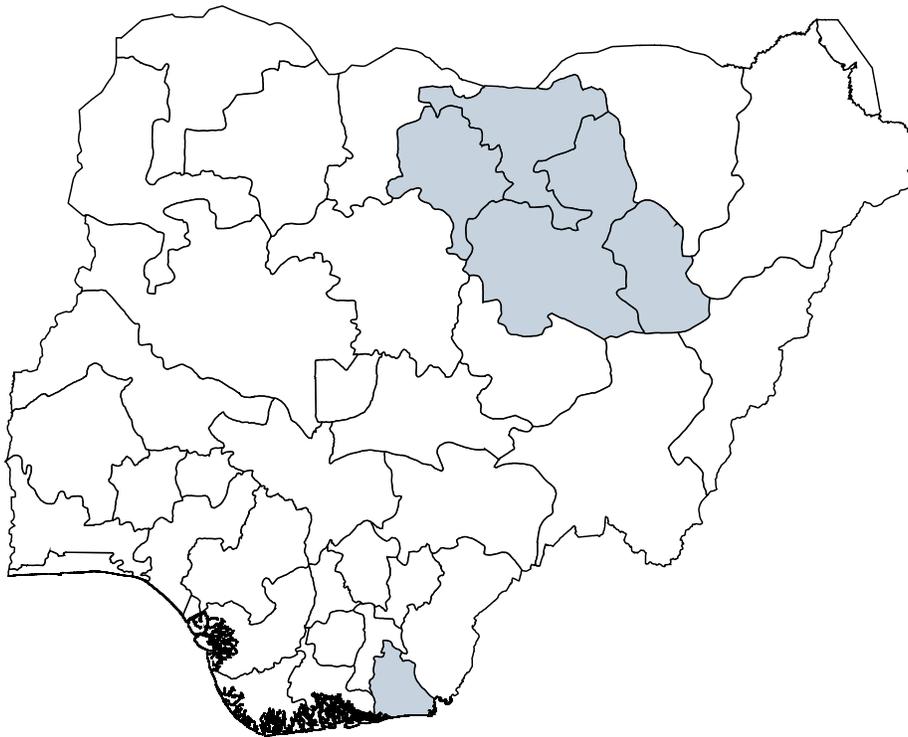
C Causes of early infant deaths and how to prevent them

Cause of death	Share of deaths	Interventions
Neonatal infections (e.g., sepsis, meningitis, pneumonia) ¹	23%	Treating maternal infections Clean/hygienic childbirth practices
Intrapartum-related deaths	30%	Antenatal care: identify/manage hypertension in pregnancy and pre-eclampsia Skilled attendance, including use of partograph Emergency obstetric care for complications (e.g., hemorrhage) Resuscitation
Complications of prematurity	32%	Treating maternal infections Early identification and treatment of complications, especially infections Antenatal care: malaria prevention, Iron/folic acid Resuscitation

Note: Table is adapted from Lawn et al. (2010a,b). Share of deaths is based on 2015 data for Nigeria from Liu et al. (2016a,b).

¹Sepsis and meningitis are the leading cause in the first week with the share due to pneumonia increasing towards the end of the first month. Other less common causes of newborn death include congenital abnormalities and tetanus.

Figure A.1: Map of Nigeria showing project states



The 180 project sites were drawn from five states (shaded areas) representing three of Nigeria's six geopolitical regions. Up top from left to right: Kano, Jigawa, Bauchi, and Gombe. At the bottom is Akwa Ibom. Geographic data used in constructing the map is from the Nigerian Demographic and Health Survey National Population Commission and ICF International (2014b).

Figure A.2: Health care worker deployment (start month)

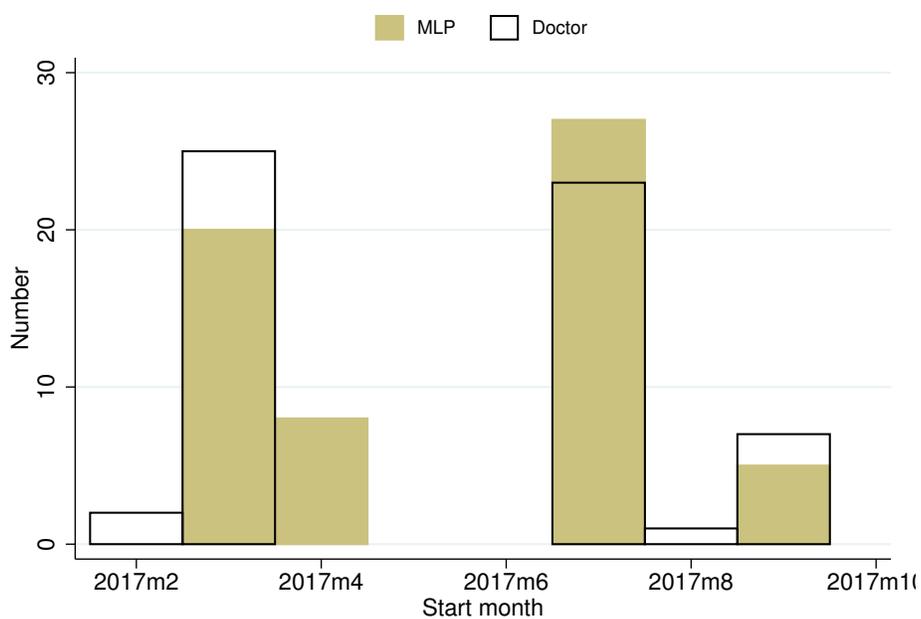


Figure A.2 shows the distribution of health provider start months in sites randomly assigned an additional health provider. 120 (out of 180) Primary Health Service Areas were randomly assigned an additional health provider: 60 were assigned a new doctor, and 60 were assigned a mid-level provider (MLP). 117 health providers were actually deployed: 57 doctors and 60 mid-level providers. Data are from administrative records.

Figure A.3: Probability that the new health provider was present in the health center during unannounced visits

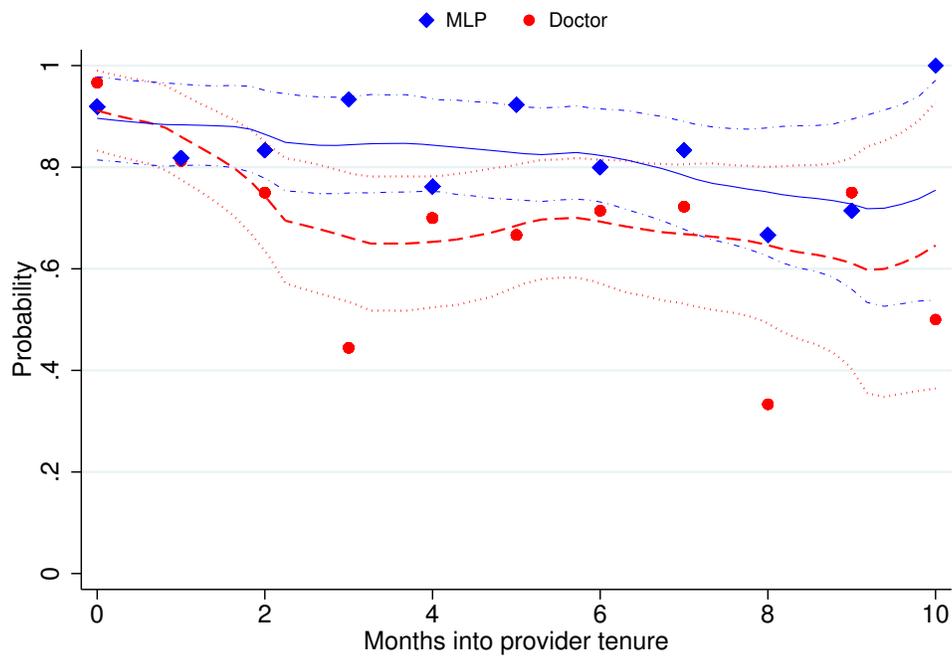


Figure A.3 is a scatterplot (with smoothed local polynomial regression lines and 95% confidence intervals) of the average probability that the new health provider was physically present in the health center in each month of their tenure. MLP denotes sites randomly assigned an additional mid-level health provider; Doctor denotes sites randomly assigned a new doctor. Month 10 was the departure month for most providers.

Figure A.4: Rates of correct diagnosis and treatment by provider type

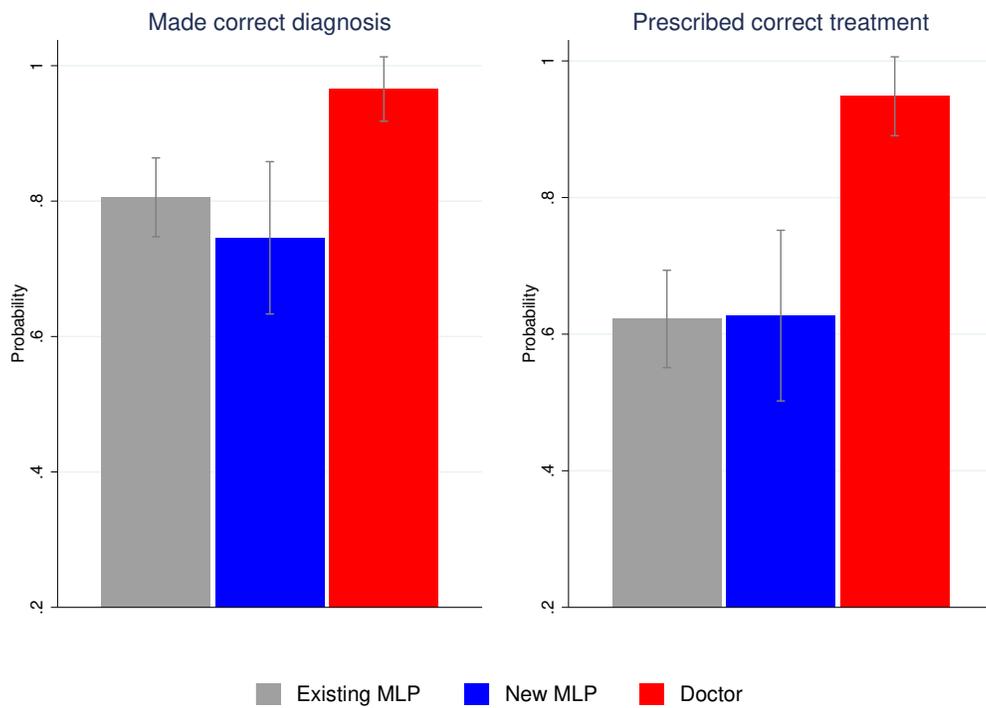


Figure A.4 examines mean rates of correct diagnosis and treatment (with 95% confidence intervals) for a case of tuberculosis presented using a patient vignette. I compare the new doctors to new and existing mid-level health providers (MLP).

Figure A.5: Dosage of treatment: Number of pregnancy months of exposure

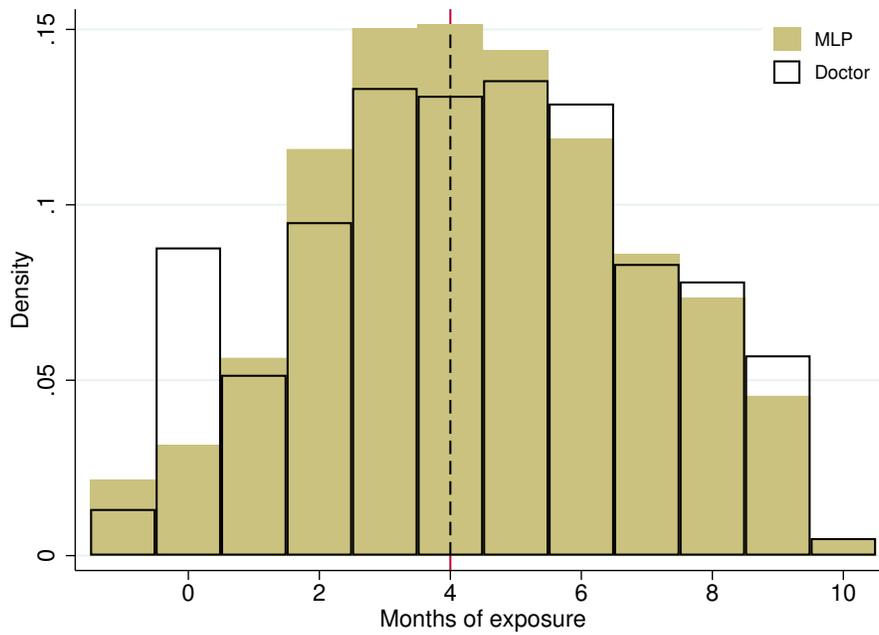


Figure A.5 shows the distribution of exposure duration in months. Exposure is defined as the number of pregnancy months exposed, based on the month when the pregnancy ended relative to the month of arrival of the health provider. MLP denotes sites where a new mid-level health provider was posted; Doctor denotes sites where a new doctor was posted. The peak at zero is because in clusters randomly assigned a doctor, where one was not deployed, the number of exposure months is zero. The dotted line represents the median.

Figure A.6: Probability that health care was received from a doctor by exposure duration

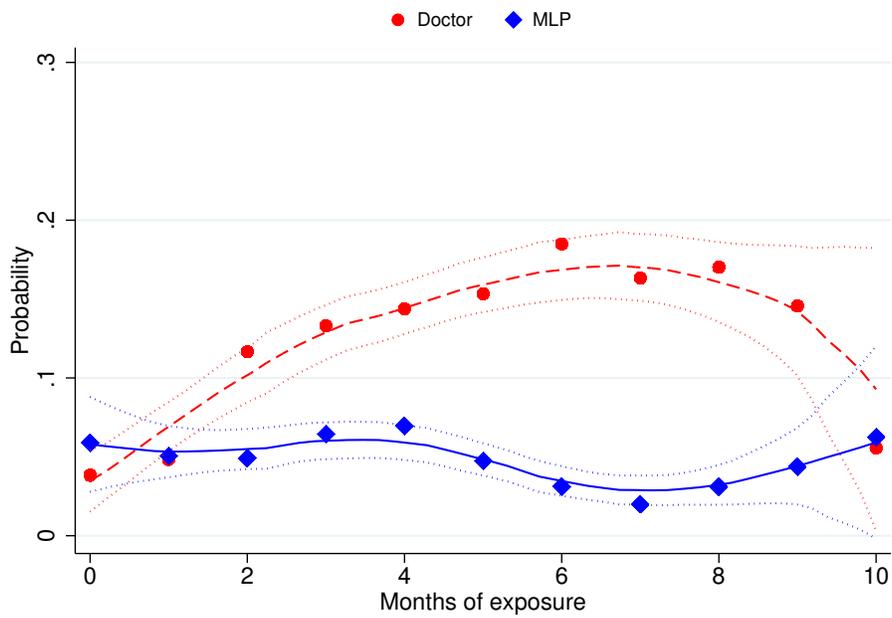


Figure 4 is a scatterplot of the mean probability that care was received from a doctor by exposure duration, with smoothed local polynomial regression lines and 95% confidence intervals. Data are from the follow-up survey. Exposure is the number of pregnancy months exposed to the intervention provider. The maximum possible length of exposure is 10 months – the length of the provider’s tenure. Mid-level provider denotes sites randomly assigned an additional mid-level health provider; Doctor denotes sites randomly assigned a new doctor.

Figure A.7: Differences in clinical ability by provider type (CHOs and CHEWs only)

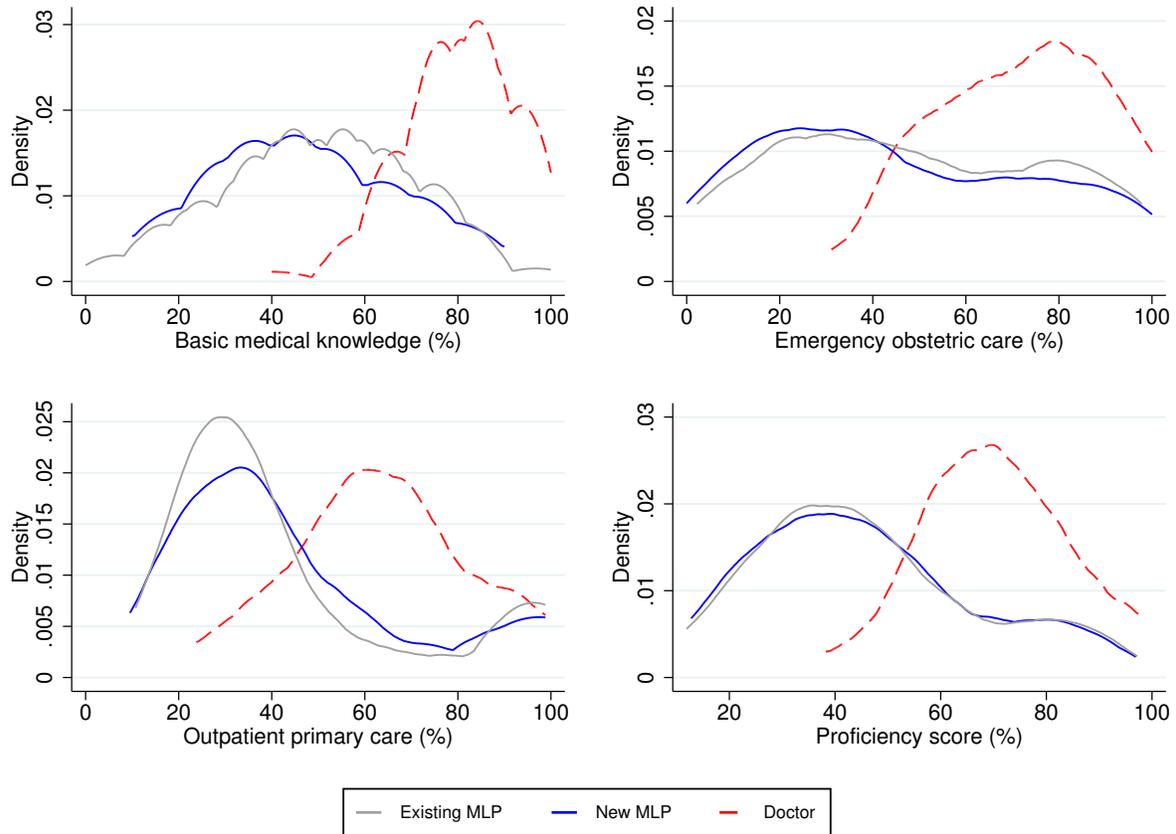


Figure A.7 shows kernel density plots of health provider scores (out of 100) on clinical modules testing basic medical knowledge (top left), emergency obstetric case management (top right), and management of outpatient primary care conditions (bottom left). The clinical modules were administered by medically trained professionals on the research team. Figure A.7 compares the new doctors to new and existing mid-level health providers (MLP). The sample of existing mid-level providers is restricted to include only Community Health Officers (CHOs) and Community Health Extension Workers (CHEWs) to allow for direct comparability to the newly posted mid-level providers.

Figure A.8: Was there differential monitoring by experimental arm?

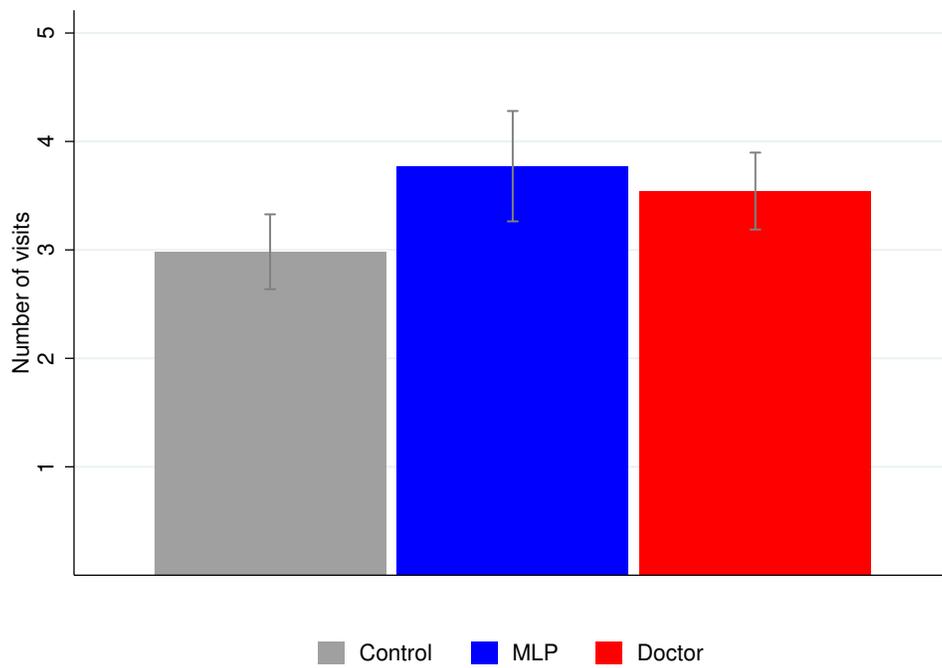
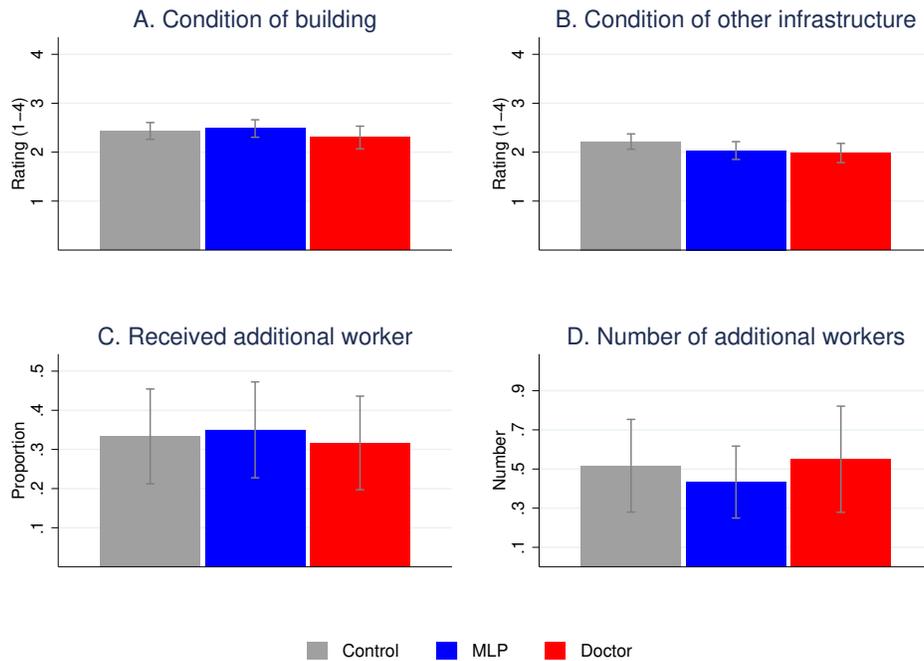


Figure A.8 shows the mean number of surprise visits by project staff to participating health centers, along with 95% confidence intervals. Control denotes status quo sites; MLP denotes sites where a new mid-level health provider was posted; Doctor denotes sites where a new doctor was posted.

Figure A.9: Was there differential provision of human or capital resources to health centers?



During the endline visit to participating health centers, project staff observed and separately rated the condition of the building, and other health center infrastructure such as tables, chairs, beds, and screens. Infrastructure upgrades or additional capital expenditure would potentially show up here. Condition was rated on a four-point scale from one (poor) to four (excellent). Means and 95% confidence intervals by arm are shown in Figure A.9a and Figure A.9b. In Figure A.9c, the dependent variable is the probability that the health center received any additional workers between baseline and endline (excluding the deployed provider). In Figure A.9d, I plot the mean number of new workers by experimental arm. Control denotes status quo sites; MLP denotes sites where a new mid-level health provider was posted; Doctor denotes sites where a new doctor was posted.

Figure A.10: Distribution of quality by health provider qualifications

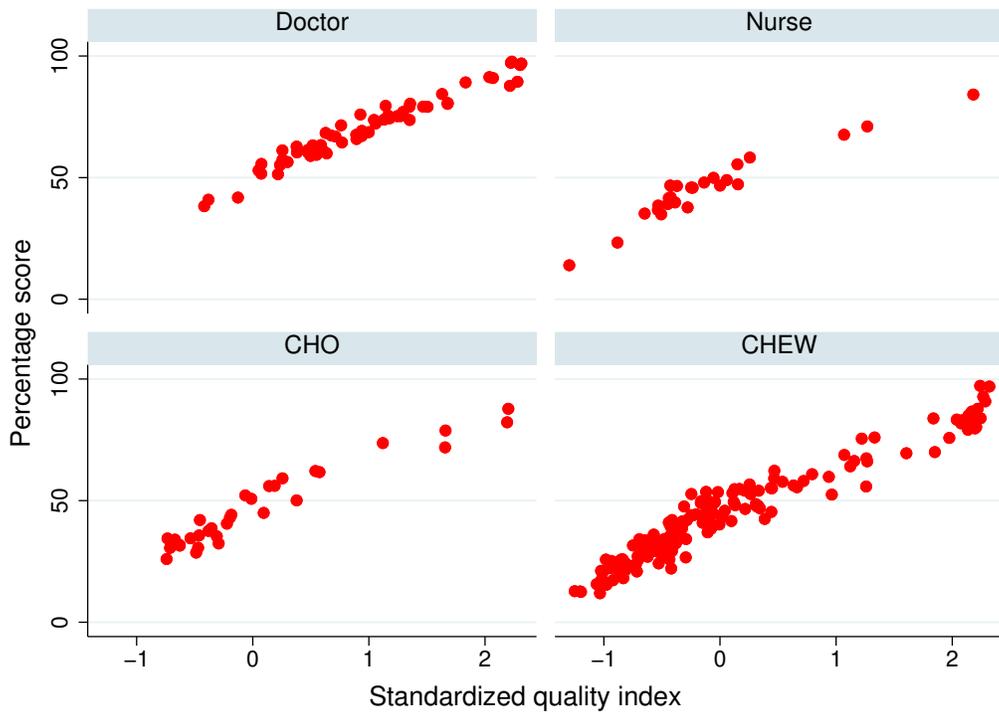


Figure A.10 plots each provider's percentage score on the baseline proficiency assessments against their standardized quality score. This is disaggregated by the type of medical qualification. Each solid circle denotes an individual provider. Doctor denotes providers with an MBBS qualification, Nurse denotes providers with a nursing or midwifery certificate, CHO denotes Community Health Officers, and CHEW denotes Community Health Extension Workers.

Table A.2: Were attriters different from non-attriters?

	Non-attriters	Attriters	p-value
Mother variables			
Age at enrollment	24.728	24.699	0.27
Hausa/Fulani ethnicity	0.736	0.485	0.30
Religion is Islam	0.818	0.530	0.85
No formal schooling	0.702	0.492	0.03
Cannot read	0.752	0.632	0.01
Husband makes health-care decisions	0.660	0.575	0.89
Number of prior births	1.900	2.233	0.00
Prior stillbirth or newborn death	0.063	0.053	0.43
Last birth in health facility	0.172	0.083	0.00
Offered conditional incentive	0.542	0.429	0.00
Household assets (out of 11)	2.028	2.504	0.27
Household size	5.714	4.996	0.71
Sample size	10586	266	
Omnibus test (p-value)			0.00

Table compares the baseline characteristics of women who dropped out between baseline and endline (attriters) to women who did not (non-attriters). I cannot compare child characteristics because these variables are only in the follow-up survey. p-values are from a test of difference in group means and are adjusted for clustering.

Table A.3: Was there differential attrition?

	Control	MLP	Doctor	MLP = C	D = C	D = MLP	Joint
Mother variables							
Age at enrollment	24.733	24.408	24.889	0.88	0.72	0.84	0.93
Hausa/Fulani ethnicity	0.438	0.535	0.500	0.64	0.79	0.30	0.57
Religion is Islam	0.486	0.563	0.556	0.53	0.71	0.91	0.82
No formal schooling	0.429	0.563	0.511	0.20	0.75	0.40	0.43
Cannot read	0.543	0.690	0.689	0.24	0.59	0.76	0.49
Husband makes health-care decisions	0.648	0.563	0.500	0.37	0.14	0.50	0.30
Number of prior births	2.171	1.887	2.578	0.11	0.53	0.05	0.10
Prior stillbirth or newborn death	0.057	0.028	0.067	0.47	0.76	0.41	0.58
Last birth in health facility	0.048	0.070	0.133	0.44	0.15	0.24	0.33
Offered conditional incentive	0.467	0.394	0.411	0.55	0.99	0.62	0.81
Household assets (out of 11)	2.771	2.239	2.400	0.32	0.97	0.28	0.47
Household size	4.943	4.915	5.122	0.67	0.60	0.44	0.74
Sample size	105	71	90				
Omnibus test (p-value)							0.95

Table compares the baseline characteristics of attriters by experimental arm. Control (C) denotes status quo sites; MLP denotes sites where a new mid-level health provider was posted; Doctor (D) denotes sites where a new doctor was posted. The figures in Columns 4-6 are p-values from a test of difference in group means. Column 7 is the p-value from a joint test of equality. p-values are adjusted for clustering.

Table A.4: 7-day mortality by whether medical care was received and from whom

		Received medical care		Received care from a doctor	
		No	Yes	No	Yes
Control	# children	974	2033	2027	6
	# deaths within 1st week	46	63	63	0
	Percent	4.7%	3.1%	3.1%	0.0%
MLP Village	# children	847	2178	2177	1
	# deaths within 1st week	39	65	65	0
	Percent	4.6%	3.0%	3.0%	0.0%
Doctor Village	# children	949	2145	1683	462
	# deaths within 1st week	43	52	45	7
	Percent	4.5%	2.4%	2.7%	1.5%

The first two columns examine mortality by whether medical care was received during pregnancy in each experimental arm. This is defined as a minimum of three prenatal visits or a birth in a health facility. The last two columns further subdivide by whether care was received from a doctor or not. Control denotes status quo sites; MLP denotes sites where a new mid-level health provider was posted; Doctor denotes sites where a new doctor was posted.

Table A.5: Effect on 30-day mortality

	(1) Full sample	(2) Low dose	(3) High dose
MLP Village	0.0007 (0.0049)		
Doctor Village	-0.0068 (0.0048)	0.0035 (0.0082)	-0.0209 (0.0062)
Observations	9124	2915	3200
Control group mean	0.0489	0.0489	0.0489

The dependent variable is an infant death within the first 30 days. MLP denotes sites where a new mid-level health provider was posted; Doctor denotes sites where a new doctor was posted. Low dosage denotes exposure duration less than the median. High dosage denotes exposure duration greater than the median. Exposure is defined as the number of pregnancy months exposed to the intervention provider. In Columns 2 and 3, Doctor sites are compared to MLP sites, both of which received a new provider. All models include the extended set of controls. Standard errors in parentheses are clustered at the level of the primary health service area. There are 180 sites.

Table A.6: Effect on deaths in utero

	(1) Full sample	(2) Low dose	(3) High dose
MLP Village	-0.0015 (0.0087)		
Doctor Village	-0.0001 (0.0090)	0.0181 (0.0190)	-0.0093 (0.0082)
Observations	10586	3700	3419
Control group mean	0.1428	0.1428	0.1428

The dependent variable is an indicator denoting whether an enrolled woman experienced an in utero death (a fetal loss or death). MLP denotes sites where a new mid-level health provider was posted; Doctor denotes sites where a new doctor was posted. Low dosage denotes exposure duration less than the median. High dosage denotes exposure duration greater than the median. Exposure is defined as the number of pregnancy months exposed to the intervention provider. In Columns 2 and 3, Doctor sites are compared to MLP sites, both of which received a new provider. All models include the extended set of controls. Standard errors in parentheses are clustered at the level of the primary health service area. There are 180 sites.

Table A.7: 7-day mortality (per 100 pregnancies)

	(1) Full sample	(2) Low dose	(3) High dose
MLP Village	-0.0009 (0.0032)		
Doctor Village	-0.0065 (0.0031)	0.0008 (0.0052)	-0.0123 (0.0048)
Observations	10586	3700	3419
Control group mean	0.0314	0.0314	0.0314

The dependent variable is an indicator denoting whether an enrolled woman experienced an early newborn death (an infant death within the first week of life). MLP denotes sites where a new mid-level health provider was posted; Doctor denotes sites where a new doctor was posted. Low dosage denotes exposure duration less than the median. High dosage denotes exposure duration greater than the median. Exposure is defined as the number of pregnancy months exposed to the intervention provider. In Columns 2 and 3, Doctor sites are compared to MLP sites, both of which received a new provider. All models include the extended set of controls. Standard errors in parentheses are clustered at the level of the primary health service area. There are 180 sites.

Table A.8: Effect on birthweight

	Birthweight (kg)			Birthweight <2.5kg		
	(1)	(2)	(3)	(4)	(5)	(6)
MLP Village	-0.013 (0.032)	-0.005 (0.032)	0.025 (0.031)	-0.009 (0.014)	-0.010 (0.014)	-0.013 (0.014)
Doctor Village	0.020 (0.032)	0.020 (0.032)	0.030 (0.033)	-0.021 (0.011)	-0.019 (0.012)	-0.024 (0.012)
Basic controls	No	Yes	Yes	No	Yes	Yes
Extended controls	No	No	Yes	No	No	Yes
Observations	2072	2070	2070	2072	2070	2070
Control group mean	3.135	3.135	3.135	0.078	0.079	0.079

The dependent variables are shown in the table header. Birthweight data are only available for a subset of infants. MLP denotes sites where a new mid-level health provider was posted; Doctor denotes sites where a new doctor was posted. The omitted comparison group is the status quo sites. Basic controls are the same as in Table 3 + an indicator for child's sex and quarter-of-birth fixed effects to flexibly control for time trends. Extended controls are basic controls + baseline site (health center) characteristics. I control for monthly number of deliveries in the health center, emergency obstetric capability (whether the health center can perform caesareans and blood transfusions), and the cleanliness of the health center as assessed by research staff on a four-point scale. Standard errors in parentheses are clustered at the level of the primary health service area. There are 180 sites.

Table A.9: Effect on child weight and length

	Ln (weight)			Ln (height)		
	(1)	(2)	(3)	(4)	(5)	(6)
MLP Village	-0.002 (0.020)	-0.003 (0.020)	-0.006 (0.019)	-0.024 (0.016)	-0.025 (0.016)	-0.027 (0.016)
Doctor Village	0.007 (0.018)	0.005 (0.017)	0.001 (0.017)	-0.017 (0.015)	-0.018 (0.015)	-0.021 (0.015)
Basic controls	No	Yes	Yes	No	Yes	Yes
Extended controls	No	No	Yes	No	No	Yes
Observations	8534	8534	8534	8521	8521	8521
Control group mean	1.704	1.704	1.704	4.005	4.005	4.005

The dependent variables are the natural logs of child weight (in kilograms) and recumbent child length (in centimeters) at follow-up. MLP denotes sites where a new mid-level health provider was posted; Doctor denotes sites where a new doctor was posted. The omitted comparison group is the status quo sites. Basic controls are the same as in Table 3 + an indicator for child's sex and quarter-of-birth fixed effects to flexibly control for time trends. Extended controls are basic controls + baseline site (health center) characteristics. I control for monthly number of deliveries in the health center, emergency obstetric capability (whether the health center can perform caesareans and blood transfusions), and the cleanliness of the health center as assessed by research staff on a four-point scale. Standard errors in parentheses are clustered at the level of the primary health service area. There are 180 sites.

Table A.10: Effect of being observed on consultation length

	Observer was absent	Observer was present
	(1)	(2)
New MLP	-0.002 (0.057)	0.092 (0.047)
Doctor	0.171 (0.067)	0.291 (0.050)
Observations	1216	2381
Dep. variable mean	1.930	2.096

This table examines the length of the consultation when a clinical observer was present vs. not. The dependent variable is the natural log of consultation duration in minutes. Each regression controls for provider age, sex, and years of experience, and the following patient characteristics: age, sex, number of presenting symptoms, illness severity, self-reported health, whether it was a new or follow-up visit, and mode of transportation to the health center. MLP denotes mid-level provider. The omitted comparison group are existing mid-level providers. Standard errors in parentheses are clustered at the level of the primary health service area. There are 180 sites.

Table A.11: Effect on quality of obstetric care

	Uterotonic administration			Cord traction		
	(1)	(2)	(3)	(4)	(5)	(6)
MLP Village	0.019 (0.017)	0.020 (0.017)	0.018 (0.017)	0.035 (0.023)	0.035 (0.023)	0.028 (0.024)
Doctor Village	0.039 (0.017)	0.040 (0.016)	0.041 (0.016)	0.048 (0.021)	0.049 (0.021)	0.047 (0.021)
Basic controls	No	Yes	Yes	No	Yes	Yes
Extended controls	No	No	Yes	No	No	Yes
Observations	9126	9124	9124	9126	9124	9124
Control group mean	0.329	0.329	0.329	0.365	0.365	0.365

Table examines two obstetric procedures recommended by guidelines. Uterotonics are drugs that cause the uterus to contract. Cord traction is a procedure used in delivering the placenta after birth. MLP denotes sites where a new mid-level health provider was posted; Doctor denotes sites where a new doctor was posted. The omitted comparison group is the status quo sites. Basic controls are the same as in Table 3 + an indicator for child's sex and quarter-of-birth fixed effects to flexibly control for time trends. Extended controls are basic controls + baseline site (health center) characteristics. I control for monthly number of deliveries in the health center, emergency obstetric capability (whether the health center can perform caesareans and blood transfusions), and the cleanliness of the health center as assessed by research staff on a four-point scale. Standard errors in parentheses are clustered at the level of the primary health service area. There are 180 sites.

Table A.12: Effect on postpartum fever

	(1)	(2)	(3)
MLP Village	0.019 (0.016)	0.020 (0.016)	
Doctor Village	-0.022 (0.014)	-0.021 (0.014)	-0.031 (0.012)
Controls	No	Yes	Yes
Observations	9126	9124	9124
Control group mean	0.176	0.176	0.176

Table examines incidence of high-grade fever postpartum, an indication of an underlying infection. MLP denotes sites where a new mid-level health provider was posted; Doctor denotes sites where a new doctor was posted. The omitted comparison group is the status quo sites. Column 3 pools observations in MLP and Control sites. Standard errors in parentheses are clustered at the level of the primary health service area. There are 180 sites.

Table A.13: Specific innovations introduced by new health care providers

Mid-level Provider	Doctor
Reintroduced use of standing orders	Brought a change in the handling of some cases e.g. incomplete abortion
Clerking clients	Brought in new ideas in management of convulsion and labour
He has provided mobility for easy access to the interiors	Carrying out some tests not done previously, and management of cases too e.g severe hypertension
Rearrange process of registration in maternity	Thoroughness in clerking of patients
Community mobilization	New line of treatment in some illness e.g fits
More health talks	Brought a new method of delivery and always encouraged on using antiseptic
Division of labour	Towards diagnosis and laboratory management
Division of labour	Improved post abortion care
Advice on general health maintenance	Improved health talks
Give general advice on any kind of issue or case that comes up	Blood transfusion techniques
Cleaning and sanit[ation] of health center environment	Case management
Advice on cleanliness and hygiene	Patients card
Advice on proper sanitation and cleanliness of the environment	Knowledge sharing with other staff
She provide services on overtime [...] at any time of the day	Proper coordination of the hospital and cleanliness
Advice and encourage to approach patients in good manner and behavior	He advised and adhering to clinical cleanness [...] requesting for urinalysis on any cases of high blood pressure, and also advice on use of normal saline in dressing
Advice on sanitation and cleanliness of the environment	He does give idea and information on how and what treatment to give to patients when any kind of case arise
He explained importance of adhering to clinical advice	Gives advice on general clinical procedures and maintenance
Gives advice on environmental sanitation of the health center	Advice on health environmental cleanliness
Advice on proper sanitation and cleanliness of the health center	She brought idea of patient treatment chart Advice on proper antenatal visit times [...] Washing or dressing of injuries with normal saline [...] Drafted procedures in ways of handling any antenatal cases Emphasis on urinalysis for any cases of high blood pressure Advice on using normal saline in [wound] dressing [...]

Table A.14: Effects on utilization of medical care

	(1)	(2)	(3)
MLP Village	0.025 (0.018)	0.027 (0.017)	0.022 (0.017)
Doctor Village	0.000 (0.018)	0.007 (0.018)	0.008 (0.018)
Basic controls	No	Yes	Yes
Extended controls	No	No	Yes
Observations	10586	10586	10586
Control group mean	0.603	0.603	0.603

The dependent variable is an indicator denoting use of medical care during pregnancy – three or more prenatal visits or a facility delivery. MLP denotes sites where a new mid-level health provider was posted; Doctor denotes sites where a new doctor was posted. The omitted comparison group is the status quo sites. Basic controls are the same as in Table 3 + an indicator for child’s sex and quarter-of-birth fixed effects to flexibly control for time trends. Extended controls are basic controls + baseline site (health center) characteristics. I control for monthly number of deliveries in the health center, emergency obstetric capability (whether the health center can perform caesareans and blood transfusions), and the cleanliness of the health center as assessed by research staff on a four-point scale. Standard errors in parentheses are clustered at the level of the primary health service area. There are 180 sites.

Table A.15: Is there evidence of changes in substitution patterns?

	(1) At home	(2) Public hospital	(3) Health center	(4) Other public	(5) Private facility	(6) Other location
MLP Village	-0.045 (0.018)	-0.000 (0.006)	0.030 (0.020)	0.009 (0.006)	-0.000 (0.003)	0.006 (0.007)
Doctor Village	-0.041 (0.019)	-0.009 (0.006)	0.045 (0.020)	0.001 (0.006)	-0.003 (0.002)	0.007 (0.006)
Observations	9124	9124	9124	9124	9124	9124
Control group mean	0.557	0.032	0.331	0.016	0.007	0.058

The table looks at where a study child was born. I define a set of indicators for the site of delivery: (1) at home (2) in a public hospital, (3) in the community health center, (4) in another public health facility, including another primary health center, (5) in a private hospital or clinic, and (6) in some other location (this includes churches and maternity homes). I regress each of these on the treatment assignment indicators. MLP denotes sites where a new mid-level health provider was posted; Doctor denotes sites where a new doctor was posted. The omitted comparison group is the status quo sites. All models include the extended set of controls. Standard errors in parentheses are clustered at the level of the primary health service area. There are 180 sites.

Table A.16: Mean characteristics of health care users by experimental arm

Variables	Control	MLP	Doctor	MLP = C	D = C	D = MLP	Joint
Age at enrollment	24.857	24.788	24.513	0.92	0.09	0.10	0.16
Hausa/Fulani ethnicity	0.708	0.689	0.754	0.30	0.20	0.01	0.03
Religion is Islam	0.824	0.809	0.819	0.01	0.35	0.21	0.03
No formal schooling	0.684	0.685	0.668	0.32	0.53	0.77	0.60
Cannot read	0.714	0.760	0.731	0.32	0.62	0.70	0.61
Husband makes health-care decisions	0.611	0.626	0.643	0.63	0.12	0.27	0.30
Number of prior births	1.900	1.850	1.901	0.33	0.76	0.57	0.61
Prior stillbirth or newborn death	0.066	0.057	0.057	0.29	0.36	0.98	0.52
Last birth in health facility	0.215	0.192	0.231	0.22	0.71	0.16	0.31
Offered conditional incentive	0.615	0.611	0.578	0.90	0.11	0.17	0.22
Household assets (out of 11)	2.118	2.042	2.055	0.85	0.82	0.64	0.90
Household size	5.848	5.779	5.525	0.36	0.20	0.67	0.43
Number of health problems during pregnancy	1.978	2.080	1.955	0.55	0.70	0.36	0.66
Health card available	0.720	0.742	0.746	0.90	0.70	0.81	0.93
Sample size	2091	2246	2223				

Table tests for differences in the characteristics of women who received health care during pregnancy in each arm. Control (C) denotes sites not assigned any new providers; MLP denotes sites randomly assigned an additional mid-level provider; Doctor denotes sites where a new doctor was posted. The figures in Columns 4-6 are p-values from a test of difference in group means. Column 7 is the p-value from a joint test of equality. P-values are adjusted for clustering.

Table A.17: Effect of the intervention on average provider quality (First stage)

	(1) Proficiency score %	(2) Standardized Proficiency
MLP Village	0.632 (2.268)	0.039 (0.101)
Doctor Village	13.703 (2.265)	0.488 (0.100)
Observations	180	180
Control group mean	43.600	0.000

The dependent variable is average provider proficiency as measured by the average overall percentage score on the clinical proficiency assessments (Column 1) and by a standardized quality index derived using Principal Component Analysis (Column 2). MLP denotes sites where a new mid-level health provider was posted; Doctor denotes sites where a new doctor was posted. The omitted comparison group is the status quo sites. Each observation is a Health Service Area. Standard errors in parentheses are adjusted for clustering.

Table A.18: (New) Provider quality and infant mortality

	(1)	(2)
Proficiency score (%)	-0.0018 (0.0008)	
Standardized proficiency		-0.0030 (0.0020)
<i>N</i>	9124	9124
Control group mean	0.0363	0.0363

The dependent variable is the probability of an infant death within the first week of life. The right-hand-side variable is average provider quality as measured by average overall performance on the clinical proficiency assessments (Column 1) and by an average standardized quality index derived using Principal Component Analysis (Column 2). The coefficient on the Proficiency score is multiplied by 10 so that a unit change represents a 10-point shift. All models include the extended set of controls. Standard errors in parentheses are clustered at the level of the primary health service area. There are 180 sites.