Mistrust in Medicine: The Legacy of Colonial Medical Campaigns in West and Central Africa (preliminary draft)*

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Abstract: We examine the legacy of colonial medical campaigns on trust in modern medicine. We digitize 30 years of French colonial records that document the locations of colonial medical campaign visits and the intensity of treatment at a granular geographic level for Cameroon and former French Equatorial Africa (AEF). We use Demographic and Health Survey (DHS) data to examine how exposure to the campaigns affects trust in medicine today - measured by willingness to take a blood test. Initial results for Cameroon suggest a significant negative correlation between historical exposure to campaigns and trust. We demonstrate that mistrust in medicine is linked with worse health outcomes. We are currently extending the analysis to the rest of AEF.

Keywords: Trust, medicine, colonialism, health.

JEL Classification: N47, O1.

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1. Introduction

There have been significant advances in the efficacy of modern medicine over the last century. However, to benefit from these advances requires, among other things, that individuals have trust in medicine to allow treatment and to follow recommended therapies. There are many examples of mistrust in medicine leading to its underutilization. For example, during the recent Ebola outbreak in West Africa, some communities rejected health workers and did not follow recommended practices to avoid transmission of the virus (Blair et al., 2015). In northern Nigeria, communities boycotted the polio vaccination leading to a large outbreak in a nearly eradicated disease (Grossman et al., 2015). In the United States, anti-vaccination movements have lead to outbreaks of childhood diseases such as measles. It is critical to understand the origins of mistrust in medicine for the success of public health campaigns and to improve individual health outcomes.

This project focuses on the origins of mistrust in medicine in West and Central Africa. Between the 1920s and 1950s, French colonial regimes undertook extensive medical campaigns aimed at managing tropical diseases. In Cameroon and former French Equatorial Africa (modern day Chad, Central African Republic, Republic of Congo and Gabon), the colonial government organized campaigns against a variety of diseases, including sleeping sickness, leprosy, yaws, syphilis and malaria. These campaigns were generally well-intentioned and potentially effective at reducing the prevalence of some of the targeted diseases. However, the campaigns may have also had a series of unintended effects on both beliefs about the efficacy of modern medicine and on the spread of contagious diseases (Pepin, 2011; Lachenal, 2014).

We measure how historical exposure to colonial medical campaigns affects trust in modern medicine today. The initial analysis is for Cameroon, but will be extended to AEF. We find that increased exposure to colonial medical campaigns is correlated with lower levels of trust in medicine today. Trust in medicine is measured as willingness to submit to a blood test for anemia or HIV. After presenting the correlations between medical campaign exposure and trust in medicine, we address concerns of omitted variable bias by demonstrating that the results are robust to a variety of geographic, colonial and individual level controls. Finally, we show that lower trust in medicine is correlated with worse health outcomes.

This project is related to the growing body of empirical evidence has found that historical

events are important determinants of economic development today (Nunn, 2009). In particular, many papers have focused on exploring the long-term impacts of colonial policies in Africa on modern development outcomes. For example, Nunn (2008) looks at the effect of the slave trade on economic development. As well, Huillery (2009) examines the long-term impacts of colonial investments in the AEF and finds lasting impacts of colonial investments in education. (Nunn, 2010) looks at how missionary campaigns affected religious conversion in Africa. Our work hopes to provide additional detailed empirical evidence on how colonial policies can have long-lasting effects on development.

Our project is also related to a broader literature on the historical origins of trust. Nunn and Wantchekon (2011) show that ethnic groups more affected by the slave trade have lower levels of trust today. Our paper is also very related to recent work by Alsan and Wanamaker (2016), who examine the effect of the Tuskegee experiments on black men with syphilis in the US in 1972 on subsequent trust in medicine. They find that black men became suspicious of medicine in the years after 1972, when the experiment was uncovered and publicized. This work contributes similarly to understanding the origins of trust in medicine.[1]

The paper is structured as follows: Section 2 provides background on the colonial medical campaigns, their motivations and organization, and explains the various unintended consequences of these campaigns. Section 3 describes the data used in the empirical analysis, both the archival data and modern data sources. Section 4 specifies the empirical approach, presents OLS results on the association between the medical campaigns and trust in modern medicine. Section 5 provides our next steps and concludes.

2. Colonial Medical Campaigns

French, British and Belgian colonial governments implemented a wide variety of medical campaigns beginning in the early 20th century. The introduction of these efforts coincided with greater European penetration in to rural areas and to large outbreaks of Human African try-

[1]Our work is also somewhat related to the literature on the economic impacts of health interventions. The most prominent paper in this literature is Acemoglu and Johnson (2007), who exploit the major health improvements in the 1940s to see whether changes in life expectancy lead to high income levels. They find very small/negligible effects of health improvements on economic growth. However, micro evidence on specific health campaigns finds very different results. For example, Bleakley (2007) finds significant effects on development from the hookworm eradication campaign in the US South, and Bleakley (2010) finds large effects from the eradication of Malaria in Latin America. For Africa in particular, Osafo-Kwaako (2012) finds large effects from a WHO campaign to eliminate yaws in the late 1950s in Ghana. Colonial medicine campaigns provide a unique setting to study this question, as the campaigns we wish to study were massive and covered multiple countries and diseases.

panosomiasis, also known as sleeping sickness. The largest and most pervasive medical campaigns focused on the treatment of sleeping sickness.

Sleeping sickness is a lethal a parasitic disease transmitted by the tsetse fly. An individual in the first stage of the disease experiences joint pain, headaches and fever. The disease can cause drowsiness and swelling the lymph nodes. Once the disease infects the nervous system, the individual experiences extreme lethargy and eventually dies (Headrick, 2014). The sleeping sickness epidemics motivated a large European response. This was partially due to humanitarian concerns, particularly in the sparsely populated equatorial zone. However, scientific and nationalistic motivations were also important.

In French colonies, campaigns were primarily organized through a system of mobile medical teams. In Cameroon the mobile medical teams were organized in 1921. The rest of AEF organized mobile teams starting in 1927. These teams generally consisted of one French military doctor, several African nurses, two white corporals, several African soldiers and a large number of porters to carry equipment. The teams were tasked with visiting villages at a time of minimal road infrastructure. During a village visit, villagers were often forced at gunpoint to submit to a physical examination. The examinations often included neck palpitations to check for swelling of the lymph nodes, blood tests to check for trypanosomes in the blood and spinal taps. Doctors would then administer treatments based on the results of the examination.

One of the earliest forms of treatment for sleeping sickness was the drug *atoxyl*, an arsenic based drug. While the name atoxyl literally means non-toxic, the drug had a chemotherapeutic index close to one. This means that the dose of treatment required to rid the body of the trypanosomes was almost equal to the dose that would be lethal to the patient. Additionally, the drug caused partial or total blindness in up to 20% of patients. Subsequent treatments for sleeping sickness were less toxic, but often had serious side effects.

Historians and anthropologists have linked the sleeping sickness campaigns to mistrust in modern medicine. Individuals were often forced to participate in the campaigns and the treatments often had harsh side effects. Furthermore, the efficacy of the drugs used in the campaigns was dubious. Feldman-Savage explains resistance to a tetanus campaign in Cameroon in 1990: "[The medical campaigns]...awakened negative collective memories of French colonial efforts to wipe out sleeping sickness" (Feldman-Savelsberg et al., 2000).

Additionally, epidemiologists have examined the effects of the unsanitary practices used dur-

ing the campaigns on the spread of contagious disease. While the campaigns followed standard contemporary medical procedures, they may have contributed to the proliferation of certain blood born diseases from the reuse of unsanitary needles. For example, Cameroon has one of the highest Hepatitis C infection rates in the world (Nerrienet et al., 2005). Medical researchers have documented a link between exposure to medical campaigns and Hepatitis C infection rates in Cameroon (Pépin et al., 2010). Similarly, campaigns against schistosomiasis in Egypt have been associated with the spread of Hepatitis C (Frank et al., 2000).

3. Description of Data

3.1. Historical Data

The historical data for this project comes primarily from the Service Historique de la Defense archives, military archives in France. The colonial governments of Cameroon, Gabon, Congo, Chad and Central African Republic submitted annual reports to France on the health activities undertaken that year within the colony. An aggregated report for the whole of AEF was also produced on annual basis. These records include administrative, medical, demographic, spatial and climactic information. Importantly for our purpose, the reports include the places visited by medical teams and the types of treatments administered at a granular geographic level.

We digitize these records to construct a panel data set for Cameroon and former AEF countries. For Cameroon, the data is at an ethnicity-district level for the years 1921 to 1958. See Figure 1 for an example of the archival data. For the AEF countries we digitize data for 1927 to1957. This information is at a sub-district level.

Many of the reports also include maps of prospection and of incidence of various diseases. Figure 2 is an example of a map documenting areas visited in 1941 and Figure 3 is an example of a map documenting incidence of sleeping sickness by ethnic group in 1934.

3.2. Modern Data

We combine the historical data with Demographic and Health Survey data for Cameroon from 2004 and 2011. We also combine GIS data on climate and geography, disease suitability, colonial data, and pre-colonial data to control for potential covariates that affect both exposure to campaigns and trust in medicine today (see Appendix X for more information on data sources).

The DHS does not include questions on trust in medicine. However, survey participants are asked whether they are willing to take a blood test for anemia and/or HIV. We use blood test refusal as a proxy for mistrust in modern medicine. This has the benefit of being a revealed preference measure of trust, rather than a self-reported measure.

4. Data Analysis

We can examine the correlation between exposure to colonial medical campaigns and trust in modern medicine by estimating the following equations:

$$y_{ie} = \alpha + \gamma_1 TimesVisited_e + X_i^{'} B + X_e^{'} \Gamma + \epsilon_{ie} \tag{1}$$

$$y_{ie} = \alpha + \gamma_2 TotalTreatment_e / Population_e + X_i^{'} B + X_e^{'} \Gamma + \epsilon_{ie} \tag{2}$$

where y_{iv} is the outcome of interest for individual i residing in ethnicity e, $TimesVisited_e$ is the share of years an ethnicity e was visited between 1921-1950, $TotalTreatment_e / Population_e$ is the total treatment between 1921-1950 for sleeping sickness received by ethnicity e as share of population at the time of treatment, $X_i^{'}$ is a vector of individual-level covariates; $X_e^{'}$ is a vector of ethnicity-level covariates.

4.1. OLS Estimates

We present the OLS estimates for the effects $TimesVisited_e$ on refusal to do blood test in Table 1. The share of years visited is the number of years an ethnic group was visited between 1921 and 1950 divided by 30. Blood test refused is an indicator variable equal to 1 if the individual refused to consent to a blood test. The standard errors are clustered at the ethnic group level. Column (1) indicates that increasing the share of visits from no visits to visited every year increases the probability of refusing the blood test by 13.6 percentage points. This is relative to a baseline refusal of 6.54% for the sample as a whole. This suggests a large and significant correlation between historical exposure to medical campaigns and trust in medicine today. Column (1) includes controls for geography and climate. Columns (2) to (5) add additional controls for disease suitability, colonial presence, pre-colonial ethnic group features, and contemporary demo-

graphics.[2] The point estimate remains consistent across the various specifications. These results are robust to examining the refusal of hemoglobin test only or the HIV test only, suggesting the results aren't driven by aversion to knowing HIV status.[3]

Table 2 estimates equation (2), which uses an alternative measure of exposure to colonial medical campaigns. $TotalTreatment_e/Population_e$ is the share of the population of an ethnic group visited in each year between 1921 and 1950. Column (1) indicates that increasing the share of the population exposed to the medical campaigns from 0 to 1 increases the likelihood of refusing the blood test by 9.95 percentage points.

4.2. Health Results

One crucial question from the results presented so far is whether lower trust in medicine due to the colonial medicine campaigns is also associated with worse health outcomes as well. Worse health outcomes today due to the campaign could arise through two channels: (i) directly due to the campaigns, as they have been linked with the spread of contagious diseases as highlighted in Section 2; (ii) indirectly through lower trust leading to lower utilization of health care and avoidance of preventative measures. While it is difficult to distinguish between these two channels, we first establish that the colonial medicine campaigns are associated with worse health outcomes for the two main outcomes measures through the blood test.[4][5] Table 3 presents estimates between the colonial medicine campaigns and health outcomes today. The evidence suggest that areas more exposed to the campaign have significantly lower hemoglobin levels (a marker for anemia) and have higher HIV rates.[6] This suggest that the health campaigns have led to worse health outcomes today. Future work will attempt to distinguish between the direct and indirect effects of the campaigns on health behavior today.

[2]These controls are explained in detail in the notes of the table.

[3]See Appendix Tables 4-7.

[4]Demonstrating worse outcomes for these two measures is also key as one reason individuals in areas exposed to the campaigns could be refusing the test is that they have much better health levels and don't need the information. This is unlikely to be the case, as most respondents have low income and education levels and have poor access to health care. However, the table below demonstrates that these areas are not healthier on these outcomes.

[5]In the future, we will examine many more health outcomes. However, we will use Bayesian Latent Class models to avoid multiple hypothesis testing concerns.

[6]Interestingly, the HIV results are only statistically significant when examining the intensive margin of the campaigns. This could be some very suggestive preliminary evidence that the campaigns, if they did spread HIV and HIV rates at the time are very persistent, spread it more in areas where they treated more people.

5. Conclusion

This paper examines the effects of history on one understudied social norm: trust in medicine. We examine granular annual data from archival sources on colonial medical campaigns in Cameroon. The results provide strong evidence that the colonial medical campaigns have caused lower levels of trust in medicine in areas more exposed to the colonial medical campaigns. Additionally, we demonstrate that individuals in those areas more exposed to the campaigns have worse health outcomes today. These results highlight the significant cost of the legacy of medical campaigns.

In the future, we will incorporate archival data from former AEF countries to examine how campaigns in those countries shaped norms of medical use.[7] We will also examine how historical events can have lasting effects on policy responses by examining the success rates of vaccination campaigns within these countries. These next steps will allow us to create a fuller picture of the lasting impacts of colonial medical campaigns and provide an understanding for the low levels of trust in medicine observed in Africa.

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[7] Unfortunately, this data is a bit more aggregated.

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6. Tables and Figures

Figure 1: Example of archival data from Cameroon - 1934

PROSPECTION EN 1934

CIRCONS-CRIPTIONS	SUBDIVISIONS	TRIBUS	INDIGÈNES		Nouveaux malades	Anciens malades positifs	Total des porteurs de germes	Anciens malades contrôlés par ponction lombaire	Anciens malades guéris
			Recensés	Visités					
Yaoundé . . .	Yaoundé . . .	Mbida-Mbanés	8.367	7.337	17	1	18	231	162
		Tsingas	4.117	3.716	9	2	11	371	290
		Mvélés-Est.	6.040	5.514	20	8	28	1.586	1.412
		Mvélés-Ouest.	19.209	17.737	35	26	61	3.877	2.499
		Étons-Ouest	45.020	40.982	56	5	61	1.388	1.233
		Étons-Est..	81.815	73.490	43	2	45	3.129	2.818
		Banés	35.885	31.839	247	78	325	809	503
		Environs de Yaoundé — Banés. . .	19.490	17.442	208	75	283	701	445
		Environs de Yaoundé — Est. . . .	16.357	14.916	121	79	200	2.028	1.599
		Environs de Yaoundé — Ouest . . .	32.067	30.124	152	29	181	334	161
		Environs de Yaoundé — Ville . . .							
	Nanga-Eboko. .	Yessoums et Yekabas.	11.534	9.019	18	6	24	810	711
	Akonolinga. . .	Yebekolo	21.142	16.339	36	12	48	2.282	1.774
		Omvang.	4.388	3.874	6	11	17	607	507
		Yembama	5.638	4.888	10	12	22	890	720

Figure 2: Sleeping sickness campaign map - Areas visited in 1941

Figure 3: Sleeping sickness by ethnic group in Cameroon - 1934

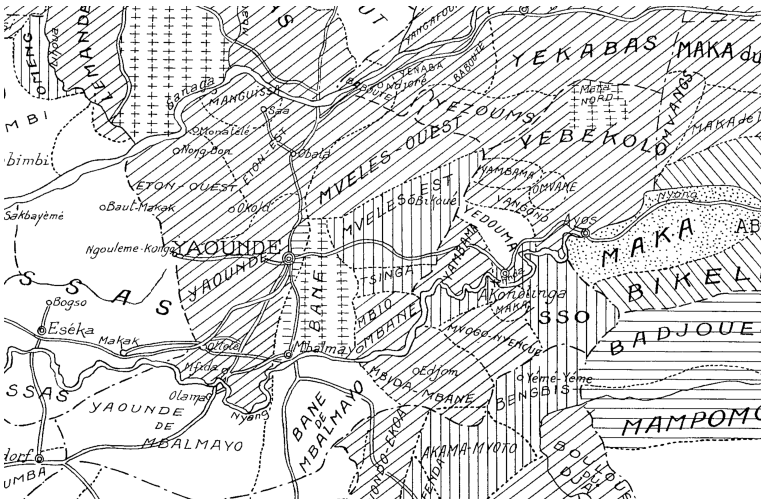

Table 1: OLS Estimates - Times Visited

	Blood Test Refused				
	(1)	(2)	(3)	(4)	(5)
Share of Years Visited (1921-1950)	0.136***	0.136***	0.135***	0.172***	0.0906***
	(0.0375)	(0.0356)	(0.0353)	(0.0305)	(0.0239)
Geography and Climate Controls	Y	Y	Y	Y	Y
Disease Suitability Controls	N	Y	Y	Y	Y
Colonial Controls	N	N	Y	Y	Y
Pre-Colonial Controls	N	N	N	Y	N
Contemporaneous Controls	N	N	N	N	Y
Observations	29,184	29,184	29,184	18,779	29,184
Clusters	99	99	99	68	99
Mean Dep. Var.	0.0654	0.0654	0.0654	0.0747	0.0654
R-squared	0.032	0.033	0.033	0.038	0.043

Note: Data is from the 2004 and 2011 Cameroon DHS surveys. Standard errors are clustered at the ethnic group level. All regressions control for age, age squared and gender and include survey round fixed effects. *Blood Test Refused* is an indicator variable for refusing consent to taking a blood test (either for HIV testing or hemoglobin levels testing). *Share of Years Visited* measures the share of years the mobile medical teams visited an ethnic group for sleeping sickness treatment between 1921 and 1950. *Geography and Climate Controls* includes mean temperature, mean precipitation, mean land suitability, the mean surface area, centroid latitude, centered longitude and mean altitude of each ethnic group. *Disease Suitability Controls* includes mean malaria ecology index and tse tse fly suitability. *Colonial Controls* includes total number of slaves taken from each ethnic group during the atlantic slave trade and number of missions in each ethnic group. *Pre-Colonial Controls* includes level of centralization, use of plow, whether indigenous slavery was practiced, and whether agriculture was practiced for each ethnic group. *Contemporaneous Controls* includes whether a place of residence is urban or rural, educational attainment fixed effects and wealth index fixed effects. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table 2: OLS Estimates - Total Treatment/Population

	Blood Test Refused				
	(1)	(2)	(3)	(4)	(5)
Total Treated / Population	0.0995***	0.0993***	0.105***	0.0983***	0.0639***
	(0.0202)	(0.0204)	(0.0206)	(0.0167)	(0.0140)
Geography and Climate Controls	Y	Y	Y	Y	Y
Disease Suitability Controls	N	Y	Y	Y	Y
Colonial Controls	N	N	Y	Y	Y
Pre-Colonial Controls	N	N	N	Y	N
Contemporaneous Controls	N	N	N	N	Y
Observations	29,184	29,184	29,184	18,779	29,184
Clusters	99	99	99	68	99
Mean Dep. Var.	0.0654	0.0654	0.0654	0.0747	0.0654
R-squared	0.034	0.034	0.034	0.039	0.043

Note: Data is from the 2004 and 2011 Cameroon DHS surveys. Standard errors are clustered at the ethnic group level. All regressions control for age, age squared and gender and include survey round fixed effects. *Blood Test Refused* is an indicator variable for refusing consent to taking a blood test (either for HIV testing or hemoglobin levels testing). *Total Treated / Population* measures the reported number of total share of individuals treated in an ethnic group (as a share of the reported population for that group in each year prospected) for sleeping sickness treatment between 1921 and 1950. *Geography and Climate Controls* includes mean temperature, mean precipitation, mean land suitability, the mean surface area, centroid latitude, centered longitude and mean altitude of each ethnic group. *Disease Suitability Controls* includes mean malaria ecology index and tse tse fly suitability. *Colonial Controls* includes total number of slaves taken from each ethnic group during the atlantic slave trade and number of missions in each ethnic group. *Pre-Colonial Controls* includes level of centralization, use of plow, whether indigenous slavery was practiced, and whether agriculture was practiced for each ethnic group.*Contemporaneous Controls* includes whether a place of residence is urban or rural, educational attainment fixed effects and wealth index fixed effects. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table 3: OLS Estimates - Hemoglobin Levels and HIV Incidence

	Hemoglobin Levels (g/cl)		HIV Positive	
	(1)	(2)	(3)	(4)
Share of Years Visited (1921-1950)	-5.585***	–	0.0126	–
	(1.632)		(0.0159)	
Total Treated / Population	–	-3.697**	–	0.0196**
		(1.839)		(0.00981)
Geography and Climate Controls	Y	Y	Y	Y
Disease Suitability Controls	Y	Y	Y	Y
Colonial Controls	Y	Y	Y	Y
Pre-Colonial Controls	N	N	N	N
Contemporaneous Controls	Y	Y	Y	Y
Observations	15,230	15,230	20,058	20,058
Clusters	99	99	99	99
Mean Dep. Var.	127.1	127.1	0.0458	0.0458

Note: Data is from the 2004 and 2011 Cameroon DHS surveys. Standard errors are clustered at the dhs cluster level. All regressions control for age, age squared and gender and include survey round fixed effects. *Hemoglobin Levels (g/cl)* is the reported hemoglobin level in grams per centi-liters. *HIV Positive* is an indicator variable for whether or not the HIV blood test was positive. *Geography and Climate Controls* includes mean temperature, mean precipitation, mean land suitability, the mean surface area, centroid latitude, centered longitude and mean altitude of each ethnic group. *Disease Suitability Controls* includes mean malaria ecology index and tse tse fly suitability. *Colonial Controls* includes total number of slaves taken from each ethnic group during the atlantic slave trade and number of missions in each ethnic group. *Pre-Colonial Controls* includes level of centralization, use of plow, whether indigenous slavery was practiced, and whether agriculture was practiced for each ethnic group. *Contemporaneous Controls* includes whether a place of residence is urban or rural, educational attainment fixed effects and wealth index fixed effects. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Appendix A. Additional Tables

Table 4: OLS Estimates - Hemoglobin Test Only - Blood Test Refusal

	Hemoglobin Blood Test Refused				
	(1)	(2)	(3)	(4)	(5)
Share of Years Visited (1921-1950)	0.155***	0.155***	0.153***	0.173***	0.116***
	(0.0280)	(0.0268)	(0.0259)	(0.0268)	(0.0195)
Geography and Climate Controls	Y	Y	Y	Y	Y
Disease Suitability Controls	N	Y	Y	Y	Y
Colonial Controls	N	N	Y	Y	Y
Pre-Colonial Controls	N	N	N	Y	N
Contemporaneous Controls	N	N	N	N	Y
Observations	16,393	16,393	16,393	10,744	16,393
Clusters	99	99	99	68	99
Mean Dep. Var.	0.0680	0.0680	0.0680	0.0764	0.0680
R-squared	0.036	0.036	0.036	0.041	0.043

Note: Data is from the 2004 and 2011 Cameroon DHS surveys. Standard errors are clustered at the ethnic group level. All regressions control for age, age squared and gender and include survey round fixed effects. *Hemoglobin Blood Test Refused* is an indicator variable for refusing consent to taking a blood test for hemoglobin levels testing. *Share of Years Visited* measures the share of years the mobile medical teams visited an ethnic group for sleeping sickness treatment between 1921 and 1950. *Geography and Climate Controls* includes mean temperature, mean precipitation, mean land suitability, the mean surface area, centroid latitude, centered longitude and mean altitude of each ethnic group. *Disease Suitability Controls* includes mean malaria ecology index and tse tse fly suitability. *Colonial Controls* includes total number of slaves taken from each ethnic group during the atlantic slave trade and number of missions in each ethnic group. *Pre-Colonial Controls* includes level of centralization, use of plow, whether indigenous slavery was practiced, and whether agriculture was practiced for each ethnic group. *Contemporaneous Controls* includes whether a place of residence is urban or rural, and the total years of education and wealth factor score for each individual. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table 5: OLS Estimates - HIV Test Only - Blood Test Refusal

	HIV Blood Test Refused				
	(1)	(2)	(3)	(4)	(5)
Share of Years Visited (1921-1950)	0.122**	0.121**	0.121**	0.167***	0.0649**
	(0.0502)	(0.0478)	(0.0476)	(0.0427)	(0.0319)
Geography and Climate Controls	Y	Y	Y	Y	Y
Disease Suitability Controls	N	Y	Y	Y	Y
Colonial Controls	N	N	Y	Y	Y
Pre-Colonial Controls	N	N	N	Y	N
Contemporaneous Controls	N	N	N	N	Y
Observations	22,018	22,018	22,018	14,245	22,018
Clusters	99	99	99	68	99
Mean Dep. Var.	0.0573	0.0573	0.0573	0.0661	0.0573
R-squared	0.016	0.017	0.017	0.023	0.033

Note: Data is from the 2004 and 2011 Cameroon DHS surveys. Standard errors are clustered at the ethnic group level. All regressions control for age, age squared and gender and include survey round fixed effects. *HIV Blood Test Refused* is an indicator variable for refusing consent to taking a blood test for HIV testing. *Share of Years Visited* measures the share of years the mobile medical teams visited an ethnic group for sleeping sickness treatment between 1921 and 1950. *Geography and Climate Controls* includes mean temperature, mean precipitation, mean land suitability, the mean surface area, centroid latitude, centered longitude and mean altitude of each ethnic group. *Disease Suitability Controls* includes mean malaria ecology index and tse tse fly suitability. *Colonial Controls* includes total number of slaves taken from each ethnic group during the atlantic slave trade and number of missions in each ethnic group. *Pre-Colonial Controls* includes level of centralization, use of plow, whether indigenous slavery was practiced, and whether agriculture was practiced for each ethnic group. *Contemporaneous Controls* includes whether a place of residence is urban or rural, and the total years of education and wealth factor score for each individual. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table 6: OLS Estimates - Hemoglobin Test Only - Blood Test Refusal

	Hemoglobin Blood Test Refused				
	(1)	(2)	(3)	(4)	(5)
Total Treated/Population	0.0956***	0.0955***	0.0975***	0.0929***	0.0597***
	(0.0180)	(0.0184)	(0.0196)	(0.0162)	(0.0157)
Geography and Climate Controls	Y	Y	Y	Y	Y
Disease Suitability Controls	N	Y	Y	Y	Y
Colonial Controls	N	N	Y	Y	Y
Pre-Colonial Controls	N	N	N	Y	N
Contemporaneous Controls	N	N	N	N	Y
Observations	16,393	16,393	16,393	10,744	16,393
Clusters	99	99	99	68	99
Mean Dep. Var.	0.0680	0.0680	0.0680	0.0764	0.0680
R-squared	0.035	0.035	0.035	0.040	0.042

Note: Data is from the 2004 and 2011 Cameroon DHS surveys. Standard errors are clustered at the ethnic group level. All regressions control for age, age squared and gender and include survey round fixed effects. *Blood Test Refused* is an indicator variable for refusing consent to taking a blood test (either for HIV testing or hemoglobin levels testing). *Times Prospected* measures the total number of years an ethnic group was prospected for sleeping sickness treatment between 1921 and 1950. *Geography and Climate Controls* includes mean temperature, mean precipitation, mean land suitability, the mean surface area, centroid latitude, centered longitude and mean altitude of each ethnic group. *Disease Suitability Controls* includes mean malaria ecology index and tse tse fly suitability. *Colonial Controls* includes total number of slaves taken from each ethnic group during the atlantic slave trade and number of missions in each ethnic group. *Pre-Colonial Controls* includes level of centralization, use of plow, whether indigenous slavery was practiced, and whether agriculture was practiced for each ethnic group. *Contemporaneous Controls* includes whether a place of residence is urban or rural, and the total years of education and wealth factor score for each individual. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table 7: OLS Estimates - HIV Test Only - Blood Test Refusal

	HIV Blood Test Refused				
	(1)	(2)	(3)	(4)	(5)
Total Treated / Population	0.114***	0.113***	0.114***	0.120***	0.0651***
	(0.0253)	(0.0255)	(0.0254)	(0.0193)	(0.0183)
Geography and Climate Controls	Y	Y	Y	Y	Y
Disease Suitability Controls	N	Y	Y	Y	Y
Colonial Controls	N	N	Y	Y	Y
Pre-Colonial Controls	N	N	N	Y	N
Contemporaneous Controls	N	N	N	N	Y
Observations	22,018	22,018	22,018	14,245	22,018
Clusters	99	99	99	68	99
Mean Dep. Var.	0.0573	0.0573	0.0573	0.0661	0.0573
R-squared	0.021	0.021	0.021	0.028	0.034

Note: Data is from the 2004 and 2011 Cameroon DHS surveys. Standard errors are clustered at the ethnic group level. All regressions control for age, age squared and gender and include survey round fixed effects. *Blood Test Refused* is an indicator variable for refusing consent to taking a blood test (either for HIV testing or hemoglobin levels testing). *Total Treated / Population* measures the reported number of total share of individuals treated in an ethnic group (as a share of the reported population for that group in each year prospected) for sleeping sickness treatment between 1921 and 1950. *Geography and Climate Controls* includes mean temperature, mean precipitation, mean land suitability, the mean surface area, centroid latitude, centered longitude and mean altitude of each ethnic group. *Disease Suitability Controls* includes mean malaria ecology index and tse tse fly suitability. *Colonial Controls* includes total number of slaves taken from each ethnic group during the atlantic slave trade and number of missions in each ethnic group. *Pre-Colonial Controls* includes level of centralization, use of plow, whether indigenous slavery was practiced, and whether agriculture was practiced for each ethnic group.*Contemporaneous Controls* includes whether a place of residence is urban or rural, educational attainment fixed effects and wealth index fixed effects. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$