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## Health insurance for the poor decreases access to HIV testing in antenatal care: evidence of an unintended effect of health insurance reform in Colombia

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# Health insurance for the poor decreases access to HIV testing in antenatal care: evidence of an unintended effect of health insurance reform in Colombia

Allison Ettenger,<sup>1\*</sup> Till Bärnighausen<sup>2,3</sup> and Arachu Castro<sup>4</sup>

<sup>1</sup>Jacaranda Health, Nairobi, Kenya, <sup>2</sup>Department of Global Health and Population, Harvard School of Public Health, 665 Huntington Avenue, Boston, MA 02115, <sup>3</sup>Africa Centre for Health and Population Studies, 3935 Mtubatuba, South Africa and <sup>4</sup>Department of Global Health Systems and Development, Tulane School of Public Health and Tropical Medicine, 1440 Canal Street, suite 1900, New Orleans, LA 70112

\*Corresponding author. Jacaranda Health, Nairobi, Kenya. E-mail: [allison.ettenger@post.harvard.edu](mailto:allison.ettenger@post.harvard.edu)

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Prevention of mother-to-child transmission of HIV was added to standard antenatal care (ANC) in 2000 for Colombians enrolled in the two national health insurance schemes, the ‘subsidized regime’ (covering poor citizens) and the ‘contributory regime’ (covering salaried citizens with incomes above the poverty threshold), which jointly covered 80% of the total Colombian population as of 2007. This article examines integration of HIV testing in ANC through the relationship between ordering an HIV test with the type of health insurance, including lack of health insurance, using data from the nationally representative 2005 Colombia Demographic and Health Survey. Overall, health-care providers ordered an HIV test for only 35% of the women attending ANC. We regressed the order of an HIV test during ANC on health systems characteristics (type of insurance and type of ANC provider), women’s characteristics (age, wealth, educational attainment, month of pregnancy at first antenatal visit, HIV knowledge, urban vs. rural residence and sub-region of residence) and children’s characteristics (birth order and birth year). Women enrolled in the subsidized regime were significantly less likely to be offered and receive an HIV test in ANC than women without any health insurance (adjusted odds ratio=0.820,  $P < 0.001$ ), when controlling for the other independent variables. Wealth, urban residence, birth year of the child and the type of health-care provider seen during the ANC visit were significantly associated with providers ordering an HIV test for a woman (all  $P < 0.05$ ). Our findings suggest that enrolment in the subsidized regime reduced access to HIV testing in ANC. Additional research is needed to elucidate the mechanisms through which the potential effect of health insurance coverage on HIV testing in ANC occurs and to examine whether enrolment in the subsidized regime has affected access to other essential health services.

**Keywords** Antenatal care, access to health care, HIV testing, Colombia

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## KEY MESSAGES

- In 2000, routine HIV testing was introduced in antenatal care (ANC) in Colombia as a means to increase coverage of prevention of mother-to-child transmission (PMTCT) of HIV.
- Health-care providers were less likely to order an HIV test in ANC for women who gained subsidized health insurance coverage as a result of Colombia's national health insurance reform compared with women of similar demographic, economic, social, behavioural and geographical characteristics who did not have any health insurance coverage.
- The creation of Colombia's national subsidized regime has increased health insurance coverage, yet, for one particular essential health service, there is evidence of decreased access.
- Future studies need to establish the mechanisms through which insurance in the subsidized regime has reduced HIV testing in ANC; possible mechanisms include administrative barriers and time-consuming procedures associated with enrolment in the subsidized regime.

## Introduction

In 2001, the UN 'General Assembly Special Session on HIV/AIDS' declared the prevention of mother-to-child transmission (PMTCT) of HIV an international priority (UNAIDS 2002). In addition, in 2009, the Pan American Health Organization (PAHO) and UNICEF launched the Regional Initiative for the Elimination of Mother-to-Child Transmission of HIV and Syphilis in Latin America and the Caribbean, aimed at reducing mother-to-child transmission (MTCT) of HIV to 2% or less per 1000 births by 2015 (PAHO and UNICEF 2009). The first step in PMTCT is to provide HIV counselling and testing (HCT), which has been integrated into routine antenatal care (ANC) (McIntyre 2007; Castro 2009).

In 2000, with the passing of Resolution 412 in Colombia, legal action added voluntary HIV testing for pregnant women to the standard ANC for women enrolled in Colombia's nationalized health insurance schemes (Ministerio de Protección Social (MPS) 2000; Grisales and Giraldo 2008). This legislation created clear PMTCT guidelines, prescribing health-care activities during the first ANC visit, including HIV testing. Some evidence suggests that despite such legislation, requisite HIV tests were not offered due to constrained financial resources, lack of provider awareness of the guidelines and negative attitudes of health-care providers about the legislation (Gómez 2008).

HIV testing during ANC and PMTCT coverage in Colombia is low. According to the nationally representative 'Encuesta Nacional de Demografía y Salud' (Demographic and Health Survey) from 2005 (ENDS 2005), only 35% of women reported that an HIV test was ordered as a part of an ANC visit (Profamilia and Macro International 2005). According to a later report, an estimated 49% of pregnant women were tested for HIV during pregnancy, and of those who tested positive, an estimated 31% received antiretroviral drugs for PMTCT (PAHO 2011). PMTCT need and coverage varied widely across regions of Colombia (García *et al.* 2005; Castro 2009).

This article examines the relationship between insurance status and HIV testing during ANC visits using data from the ENDS 2005.

## Background

ANC coverage is high in Colombia; 94% of women received ANC provided by a physician or nurse (Profamilia and Macro International 2005). ANC provides a critical opportunity to refer pregnant women to other less utilized health services. Approximately 74% of the women attended their first antenatal visit within the first 3 months of their pregnancy, with urban women accessing ANC earlier in pregnancy (Profamilia and Macro International 2005). Although ANC is overall frequently utilized, particular sub-populations attend ANC substantially less frequently; e.g., only 69% of pregnant women who were internally displaced attended at least one ANC visit (Profamilia and Macro International 2005; Profamilia and USAID 2005).

The estimated prevalence of HIV in Colombia in 2005 among 15–49 year olds was 0.6% (UNAIDS 2006). Between 2003 and 2005, HIV prevalence among 106 189 pregnant women tested was found to be 0.19% (García *et al.* 2005). Variation of HIV prevalence across Colombian departments was high, ranging from 0 to 1.43% (García *et al.* 2005).

The 1993 Colombian health insurance reform (Law 100) entitled citizens to a basic health benefits package (Giedion and Villar-Urbe 2009). Two different types of health insurance regimes were created by the law: the 'Plan Obligatorio de Salud' or contributory regime and the 'Plan Obligatorio de Salud Subsidiado' or subsidized regime. The contributory regime covers those who are salaried, independent or retired and who make monthly contributions deducted from their formal income, whereas the subsidized regime covers those identified as poor by a welfare index developed by the Colombian government called 'Sistema de Identificación de Beneficiarios' (Gaviria Medina and Mejía 2006; World Bank 2007; Giedion and Villar-Urbe 2009). Both the subsidized regime and contributory regime provide health insurance coverage at public and private health-care facilities. The subsidized regime is less comprehensive than the contributory regime, but covers basic care and catastrophic illness, including treatment for HIV/AIDS and obstetric and ANC (Giedion and Villar-Urbe 2009). As of 2007, approximately 50% of the population was enrolled in the subsidized regime and 42% in the contributory regime (Giedion and Villar-Urbe 2009). Those not yet enrolled in either of the two health insurance regimes, referred to as the

uninsured or 'vinculados', can receive free care at public sector facilities (Abadía and Oviedo 2009).

Although the reform has increased health insurance coverage (from 24% prior to 1993 to 80% in 2007), the effects of this coverage increase on access to essential health care for different sub-populations remain contested (Giedion and Villar-Uribe 2009). A previous study suggests that the introduction of the two national health insurance regimes improved the utilization of basic health-care services, including ANC and child immunization (Giedion and Villar-Uribe 2009). However, Law 100 has faced criticism including: (1) it failed to achieve the promise of universal coverage due to the rapid increase of health expenditures and (2) those enrolled in the subsidized regime receive less coverage than those enrolled in the contributory regime (World Bank 2007; Londoño *et al.* 2010; Tsai 2010; Yamin 2010).

## Methods

We used the ENDS 2005 for our analyses. The nationally representative sample of the ENDS 2005 included 38 143 women in 37 211 households. The selected households were located in 3935 clusters in 208 municipalities of 33 Colombian departments. The ENDS 2005 was a stratified, two-stage cluster sample survey. The household response rate was 88%, and the individual response rate from the selected households was 92%.

Of the 38 143 women aged 13–49 years who were interviewed, 11 062 received ANC for a birth between the years 2000 and 2005. For this analysis, we analyzed data for only those women who responded to a survey question about whether an HIV test was ordered during their ANC visit. The selection process outlined in Figure 1 resulted in a final sample of 10 596 women. Statistical analysis was conducted using STATA version 11 (StataCorp, College Station, TX, USA).

Our outcome variable was a binary indicator capturing whether an HIV test was ordered during an ANC visit of a woman's most recent birth (for all births occurring between 2000 and 2005). In estimating the summary statistics (Tables 1–3), we used the standard Demographic and Health Survey sampling weights to account for the fact that the probabilities of being selected into the survey sample differed across different groups of women.

We conducted univariate and multivariate regression analysis. We included indicator variables for insurance type, capturing separately the two most common types of health insurance (contributive and subsidized, 26% and 34% of the sample, respectively), a category for all other forms of health insurance (8%), and the uninsured (31%). In the regression analysis, we controlled for potential confounders including types of health provider administering ANC visits (physician, nurse, midwife or other health provider) and the month of pregnancy where a woman attended her first antenatal visit. The analysis also controlled for other maternal characteristics including age, urban vs. rural residence, educational attainment, wealth (based on principal component analysis of data on household assets following the standard DHS protocol), knowledge of HIV, sub-region of residence, and child's characteristics including birth year and birth order. These health system, maternal, and child characteristics were included in the analysis to control for

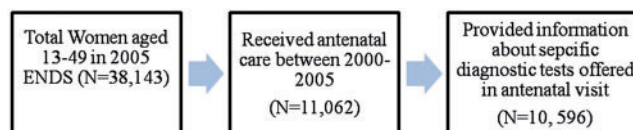


Figure 1 Sample selection.

Table 1 Characteristics of sample

	N	%
Region		
Urban	7784	73.46
Rural	2812	26.54
Education		
No Education	262	2.47
Primary	3093	29.19
Secondary	5632	53.15
Higher	1609	15.18
Month of pregnancy at first antenatal visit		
1–3	7977	75.28
4–6	2307	21.77
7–9	292	2.76
Unknown or missing	20	0.18
<i>Total</i>	10 596	

potential confounders of any relationship between health insurance and the outcome variable. All values, confidence intervals and *P* values are based on standard errors that are adjusted for clustering at the level of the DHS cluster. In the regression estimation, we followed the recommendation by Dumouchel and Duncan (1983) and Deaton (1997) and estimated regression coefficients both with and without using sampling weights in the estimation. The differences between the two sets of regression coefficient estimates were small (all unweighted coefficient estimates were within  $\pm 10\%$  of the weighted coefficient estimates), indicating that the regressions were homogenous across the groups of women with different probabilities to be included in the sample. In this case, both the weighted and the unweighted regression estimators are unbiased, but the unweighted estimator is more efficient. The regression results in Table 4 thus show the results of the unweighted regression estimations.

## Results

An HIV test was only ordered for 35% of women accessing ANC. The sample characteristics are described in Table 1. Table 2 shows the distribution of the order of an HIV test by location of ANC, women's education and the timing of the ANC visit.

In univariate analysis, insurance status is a significant predictor of health-care providers ordering an HIV test in an ANC visit. Those who were enrolled in the subsidized regime had significantly lower odds of receiving an HIV test during an antenatal visit compared with those without insurance

**Table 2** Characteristics of HIV test order

	Yes ( <i>n</i> = 3702)		No ( <i>n</i> = 6894)	
	<i>N</i>	%	<i>N</i>	%
Region				
Urban	3046	39.14	4738	60.86
Rural	656	23.33	2156	76.77
Level of education				
No education	75	28.63	187	71.37
Primary	837	27.06	2256	72.94
Secondary	2135	37.90	3498	62.10
Higher	655	40.70	954	59.29
Month of pregnancy at first antenatal visit				
1–3	2919	36.60	5058	63.40
4–6	700	30.36	1607	69.64
7–9	79	27.05	213	72.95
Unknown or missing	4	20.00	16	80.00

**Table 3** Characteristics of insurance types

Type of provider	Subsidized ( <i>n</i> = 4076)		Contributory ( <i>n</i> = 2643)		Uninsured ( <i>n</i> = 3165)	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Doctor	2418	59.32	1851	70.03	2005	63.35
Nurse	1554	38.13	734	27.77	1061	33.52
Other	104	2.55	58	2.19	99	3.13

(OR = 0.807,  $P < 0.001$ ), whereas those who were enrolled in the contributory regime had higher odds of receiving an HIV test compared with those without insurance (OR = 1.399,  $P < 0.001$ ). When we controlled for the other independent variables capturing the type of health provider and mother and child characteristics, the OR remained significant for the subsidized regime (adjusted OR = 0.820;  $P < 0.001$ ), whereas it was no longer significant for the contributory regime (adjusted OR = 1.081;  $P = 0.248$ ), as shown in Table 4.

Whether a doctor conducted the antenatal visit, compared with nurse, midwife or other auxiliary health professional, was also significantly associated with whether an HIV test was ordered (adjusted OR = 1.290,  $P = 0.005$ ). Wealth of the mother, urban residence, certain sub-regions of residence, knowledge of HIV, and birth year of the child were all found to have significant associations with HIV testing during the antenatal visit (see Table 4). Holding the other independent variables constant, a later birth year of the child was associated with increased odds of an HIV test. If the child was born in 2005, women had over seven times the odds of HIV testing compared with women whose child was born in 2000 ( $P < 0.001$ ). In addition, neither birth order of the child nor accessing antenatal visits in specific months of pregnancy were found to be significant predictors of receiving an HIV test.

As shown in Table 3, women who were enrolled in the subsidized regime were less likely to see a doctor during an ANC visit than either women who were enrolled in the contributory regime or women who were uninsured. In our regression analysis, we control for the type of provider, so that

**Table 4** Multiple logistic regression analysis of ordering an HIV test

	Adjusted OR	95% confidence interval	<i>P</i>
Health system characteristics			
Insurance category			
Uninsured	1.000		
Subsidized regime	0.820	0.734–0.917	<0.001
Contributory regime	1.081	0.947–1.234	0.248
Antenatal visit conducted by a physician	1.290	1.078–1.544	0.005
Individual characteristics			
Age	1.003	0.994–1.012	0.496
Urban residence	1.411	1.204–1.652	<0.001
Mother's education			
No education	1.000		
Primary	0.837	0.6099–1.149	0.271
Secondary	0.948	0.657–1.305	0.744
Higher	0.929	0.657–1.311	0.674
Birth order of child	0.970	0.931–1.012	0.152
Knowledge of HIV	1.303	1.130–1.501	<0.001
Birth year of child			
2000	1.000		
2001	1.120	0.925–1.355	0.246
2002	1.371	1.118–1.623	0.002
2003	2.165	1.808–2.591	<0.001
2004	4.770	3.990–5.713	<0.001
2005	6.601	5.175–8.420	<0.001
Month of pregnancy at first antenatal visit	0.971	0.933–1.011	0.153
Mother's wealth quintile			
Lowest	1.000		
Second	1.236	1.049–1.456	0.011
Middle	1.440	1.189–1.744	<0.001
Fourth	1.510	1.219–1.869	<0.001
Highest	1.503	1.175–1.923	0.001
Sub-region of country			
Guajira, Cesar, Magdalena	1.000		
Bolívar Sur, Sucre, Córdoba	0.723	0.578–0.903	0.004
Boyacá, Cundinamarca, Meta	0.652	0.516–0.825	<0.001
Tolima, Huila, Caquetá	0.700	0.570–0.859	0.001
Cauca, Nariño	0.541	0.418–0.699	<0.001
Litoral Pacífico	0.465	0.346–0.625	<0.001
Bogotá	0.751	0.596–0.946	0.015
Orinoquía, Amazonía	0.796	0.649–0.975	0.028
Barranquilla (Metropolitan area)	1.475	1.134–1.916	0.004
Cali	3.805	2.803–5.165	<0.001

the unequal distribution of provider type by health insurance could not have confounded the relationship between insurance type and the order of an HIV test revealed in the multiple regression analysis.

In addition to the independent variables described above and shown in Table 4, we also ran regressions with three additional independent variables: marital status, number of ANC visits and perception of risk of HIV. After addition of these variables to the right-hand side of the regression equation, the regression results remained essentially unchanged, demonstrating robustness of our findings to variations in regression model specification.

## Discussion

In our analysis, we find that enrolment in the subsidized regime is associated with reduced odds of receiving an HIV test during ANC when controlling for a range of potential confounders. Compared with the uninsured, those in the subsidized regime are substantially less likely to receive an HIV test as a part of their ANC visit. These findings suggest that those enrolled in the subsidized regime were disadvantaged in receiving an essential health service as required by Colombia's national PMTCT guidelines.

Although this finding may initially appear unlikely—the insurance reform introducing the subsidized regime was intended to increase access to essential health services (Giedion and Villar-Urbe 2009)—there is evidence to suggest that there are structural and institutional barriers to accessing health services by those in the subsidized regime, which could explain the result. Such barriers include (1) mechanisms to limit use of services, such as authorization of diagnostic testing by health insurance or capitation payments to providers; (2) fragmented contracting of services at different sites and (3) conflict regarding benefits included in the subsidized regime (Castro 2009; Vargas *et al.* 2010). Although health providers are mandated to offer an HIV test to all pregnant women regardless of type of health insurance, some health management organizations (HMOs) that enrol populations in the subsidized regime require a written authorization before the HIV test can be performed. In such cases, authorization needs to be requested in person by the pregnant woman in writing from the HMO, which oftentimes requires travel to different locations, impeding access by increasing ANC-related transport and time costs. By contrast, pregnant women who are uninsured do not need a written authorization. In addition to the required authorizations, contracting of services between HMOs administering subsidized insurance and service providers is geographically fragmented creating further barriers by increasing travel times to eligible providers (Abadía and Oviedo 2009; Vargas *et al.* 2010). Such barriers created by insurance companies may have contributed to disadvantages to accessing HIV testing for pregnant women enrolled in the subsidized regime.

Overall, doctors conducted the majority of ANC visits for uninsured women and those in the subsidized regime and the contributory regime, but women who were enrolled in the subsidized regime were less likely to see a doctor during an ANC visit than either women who were enrolled in the contributory regime or women who were uninsured.

Given that we control for type of provider conducting the ANC visit in our multiple regression analysis, the type of provider cannot have confounded the relationship between insurance type and the order of an HIV test that has been revealed by our analysis.

Evidence from court cases further supports the conclusion that the subsidized regime has reduced access to some essential health services, in particular studies examining the utilization of the 'tutela', court petitions for writs for the right to health, because insurers denied health care. A review of 458 court cases submitted between 2006 and 2007 revealed that 48% of the cases reviewed were claims submitted by those enrolled in the subsidized regime, 36% were submitted by those in the contributory regime and only 15% by uninsured individuals (Abadía and Oviedo 2009). The comparison of these submissions with the population distribution of the three insurance regimes (42% in the subsidized regime, 50% in the contributory regime and 8% without insurance) suggests that patients enrolled in the subsidized regime were more likely to submit a petition for writs for the right to health.

The Colombian health system and nationalized insurance schemes have struggled with rapidly rising health-care costs. Since the 1993 reform, national resources for health expenditures have increased significantly for both poor and wealthy municipalities, although regional heterogeneity regarding development and technical capacity has influenced the process of decentralization of the health-care sector (Bossert *et al.* 2003; PAHO 2007). In December 2009, the government declared a state of social emergency; at the time, approximately US \$450 million was owed by the government to private insurers (Londoño *et al.* 2010; Tsai 2010; Yamin 2010). PMTCT is a highly cost-effective intervention, because the costs of HIV testing, PMTCT, and timely treatment of HIV-infected women are small in comparison with the costs of treating women later in their disease process and treating children who would have become HIV infected had their mothers not received PMTCT. In the context of rising health-care expenditures, the findings from this article suggest that reducing the barriers in the provision of PMTCT faced by those enrolled in the subsidized regime may contribute to reducing long-term health-care expenditures in Colombia.

The passage of Law 1438 in 2011 presents several opportunities to address some of the issues facing the Colombian health system including: action towards universal insurance coverage, new monitoring and mechanisms to avoid loss of resources, and further prioritization of health-care for children and the 'right to portability' of insurance coverage (Hernández Álvarez and Torres-Tovar 2010). Law 1438 seeks to remove structural barriers to health-care access and to improve provider payment mechanisms for services rendered at institutions not formally affiliated with the individual's insurance company (Hernández Álvarez and Torres-Tovar 2010). In addition, Law 1438 specifically emphasizes comprehensive care for pregnant women suggesting that access and quality of maternal health care, including integration of HIV testing in ANC, is a prioritized element of the new legislation. Future research should examine health outcomes and access to services in the context of Law 1438 to ensure effective implementation in practice.

Because rates of patient refusal to test for HIV were not collected in the DHS, we cannot distinguish between two

reasons that a test was not ordered: either because a test was not offered or because it was offered but the patient refused the test. It is important to note that both reasons for failure to order an HIV test can be affected by a patient's insurance coverage. For instance, if a health-care provider is less motivated to conduct an HIV test in a woman who is enrolled in the subsidized regime, the provider might not offer the test or offer the test but downplay its importance for the health of the pregnant woman and her child and thus reduce the frequency of HIV testing in this group of patients. Although the effect of cultural beliefs, fear and stigma surrounding HIV testing may influence a woman's acceptance or refusal of an HIV test, the quality of the pre-test counselling can serve to reduce these barriers. Factors directly related to the type of health insurance, such as provider payment mechanisms or the administrative burden of providing health-care, may not only affect a provider's motivation to offer an HIV test but also affect a provider's motivation to provide high-quality counselling preceding a test offer. Overall, however, it seems unlikely that a large component of the effect of enrollment in the subsidized regime on whether an HIV test is ordered during ANC is due to patient refusal of a testing offer rather than the provider's failure to offer the test. For instance, research conducted by UNAIDS examining PMTCT in Colombia demonstrated that 97% of women accepted the HIV test when it was offered (García *et al.* 2005).

Future studies should investigate the relationships between insurance coverage and access to essential health care using quasi-experimental and experimental study designs. Further investigations and interventions regarding the authorization of health services and fragmented contracting of the subsidized regime with service providers could provide evidence for the relationship observed in our study and explore other relationships between the type of insurance coverage and access to essential health care.

## Conclusion

PMTCT was prioritized by the Colombian government with the passage of Resolution 412 in 2000 and with Acuerdo 396 in 2008, allocating additional resources to strengthen health infrastructure for essential sexual and reproductive health services. Multilateral health organizations throughout the Latin American and Caribbean region, such as UNICEF, PAHO and UNAIDS, continue to promote a comprehensive PMTCT strategy particularly through the integration of HIV testing and treatment in ANC. Through its participation in the PAHO and UNICEF Regional Initiative for the Elimination of Mother-to-Child Transmission of HIV and Congenital Syphilis in Latin America and the Caribbean, also known as the Elimination Initiative (PAHO and UNICEF 2009), and Resolution REMSAA XXIV/3, signed in 2010 by the Ministries of Health of the Andean countries (REMSAA 2010), Colombia has committed to reduce MTCT of HIV to less than 2% per 1000 births (including stillbirths) by year 2015.

Integration of HIV testing in ANC is essential in the overall PMTCT strategy; however, in Colombia, this integration has been imperfect in practice. The findings of this analysis suggest that women enrolled in a particular health insurance scheme intended

to increase access to essential health-care for the poor—the subsidized regime—are less likely to have an HIV test ordered compared with uninsured women. Future research should examine whether and how enrollment in the subsidized regime affects the provision of other essential primary and preventive health services. Such additional studies are all the more important because in Colombia political commitment to progressively enroll the uninsured into the subsidized regime remains high.

Given the Colombian government's limited resources for social programs, particularly after the 2009 social emergency declaration, our finding of a counterintuitive relationship between insurance status and access to health care is important to include in policy discussions. A more comprehensive understanding of mechanisms and structural barriers posed by the subsidized regime may suggest ways to both reduce costs and increase access to health care and prevention services, such as PMTCT. Further studies are needed to investigate this undesired effect of subsidized regime coverage so that it can be eliminated in the future through interventions. Our results do not necessarily suggest that a broad reform of the health insurance system is either the only or the best option to improve HIV testing uptake in ANC or access to essential health care in general. Narrower improvements to the model of health-care delivery for particular population groups in Colombia may be viable policy alternatives.

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## Conflict of interest

None declared.

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