Online Appendix to Accompany "Building a shield together: Addressing low vaccine uptake against cancer through social norms"*

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Appendix A: Figures and Tables

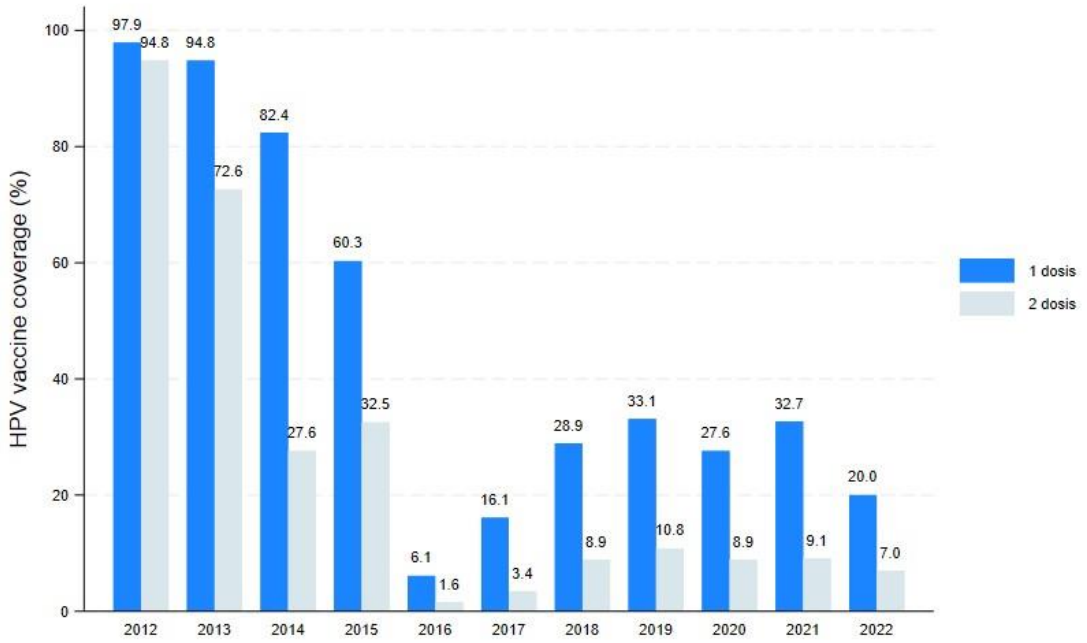


Figure A.1 HPV vaccination rates in Colombia since the introduction of the vaccine in 2012.

Note: Authors' elaboration based on data from the Information System of the Expanded Immunization Program (PAI) of the Ministry of Health and Social Protection of Colombia.

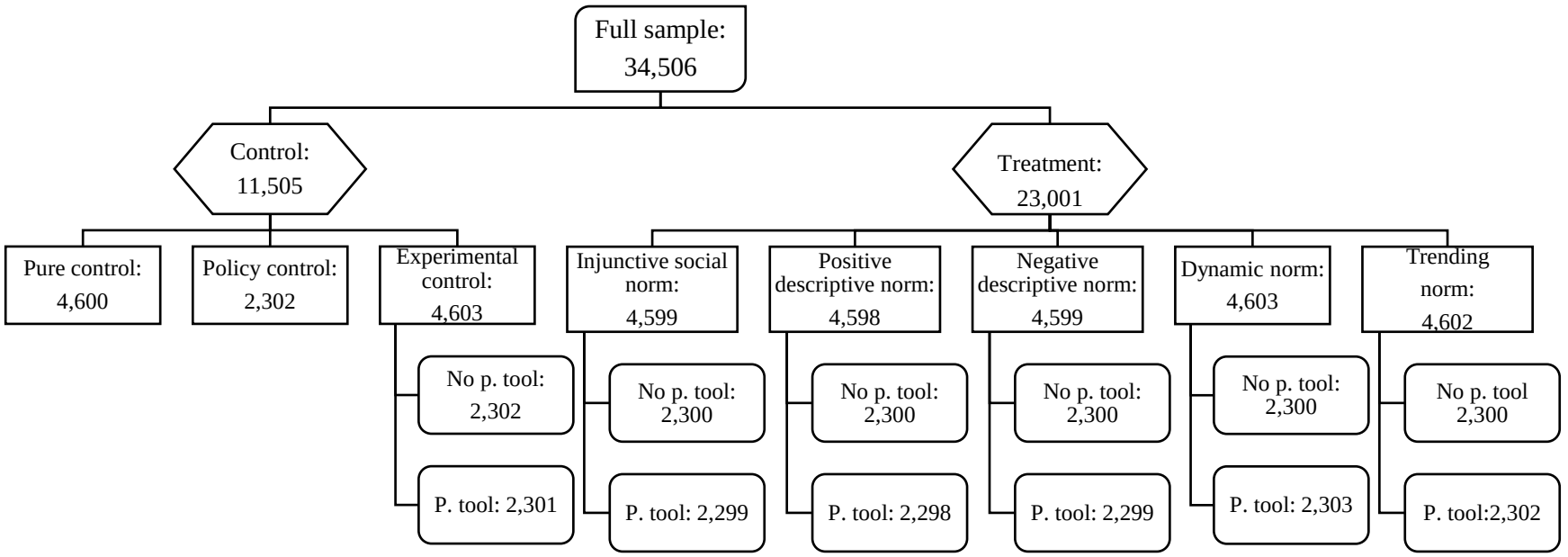


Figure A.2 Graphical representation of full factorial experimental design.

Note: Authors' elaboration.

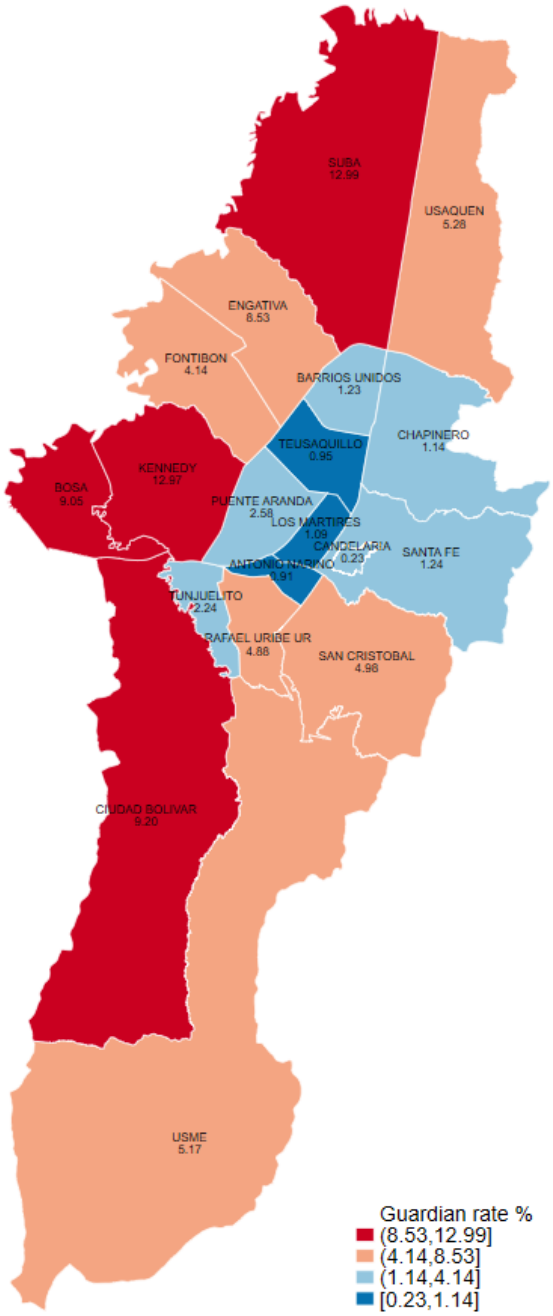
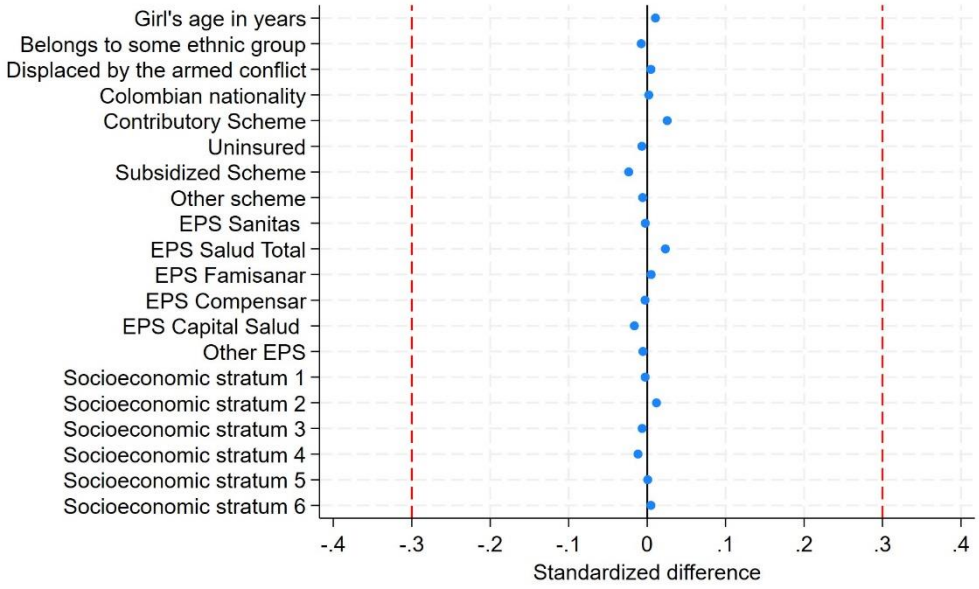


Figure A.3 Distribution of Bogota's target population by locality

Note: Authors' elaboration.

(a) Experimental control



(b) Policy control

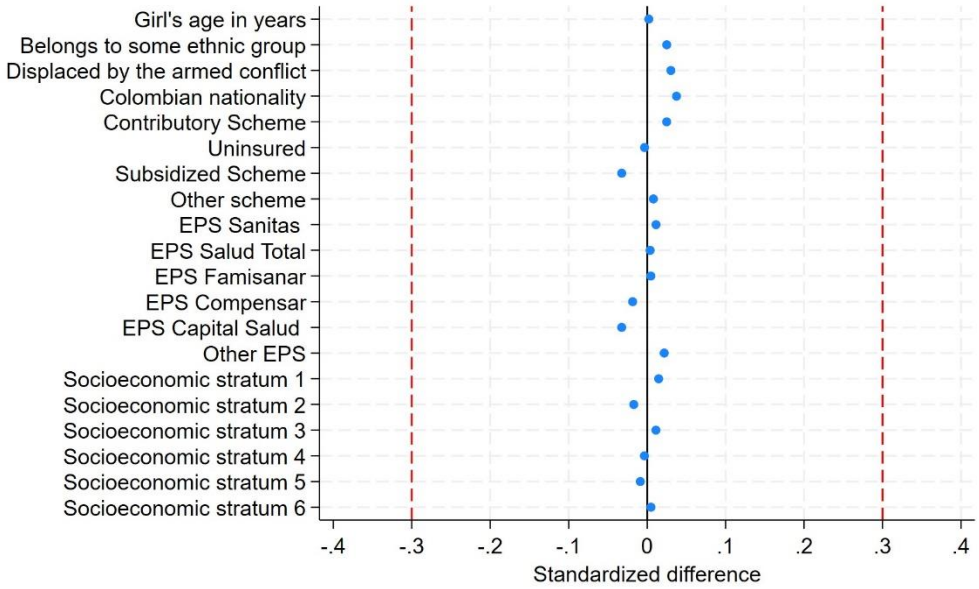
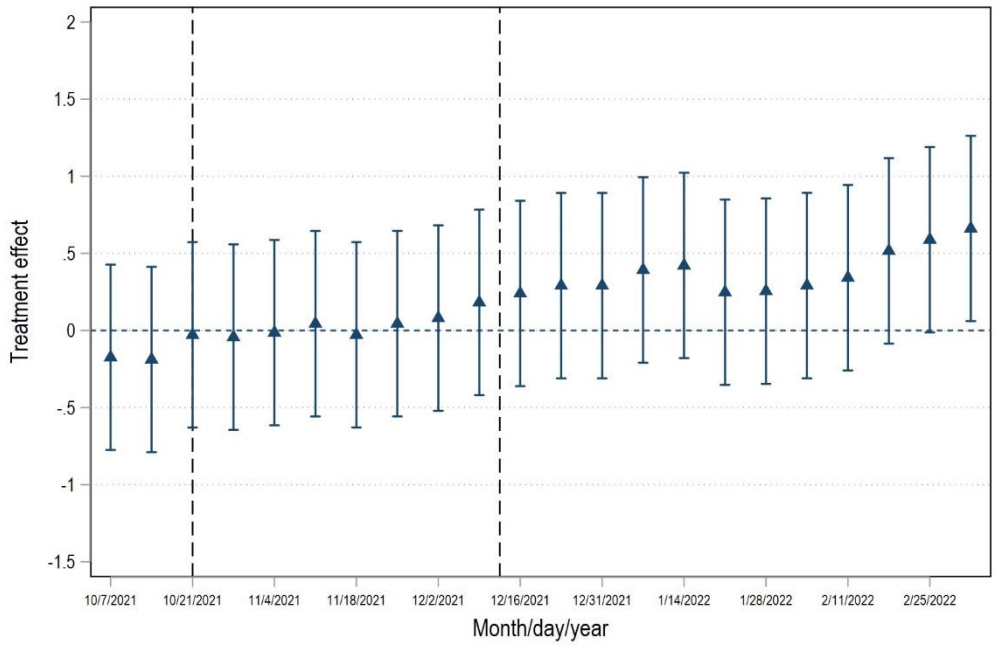


Figure A.4 Pre-treatment balance plot

Note: Authors' elaboration. This figure reports the standardized differences between the average social norm treatment and the experimental control group (a) and policy control group (b). Each dot represents a value of the standardized difference for a given covariate. Dashed red lines at the |0.3| of a standardized difference delineate the threshold at which a difference between the means between the treatment and the control group is considered statistically significant. This value was proposed by Imbens (2015).

(a) Static design



(b) Dynamic design

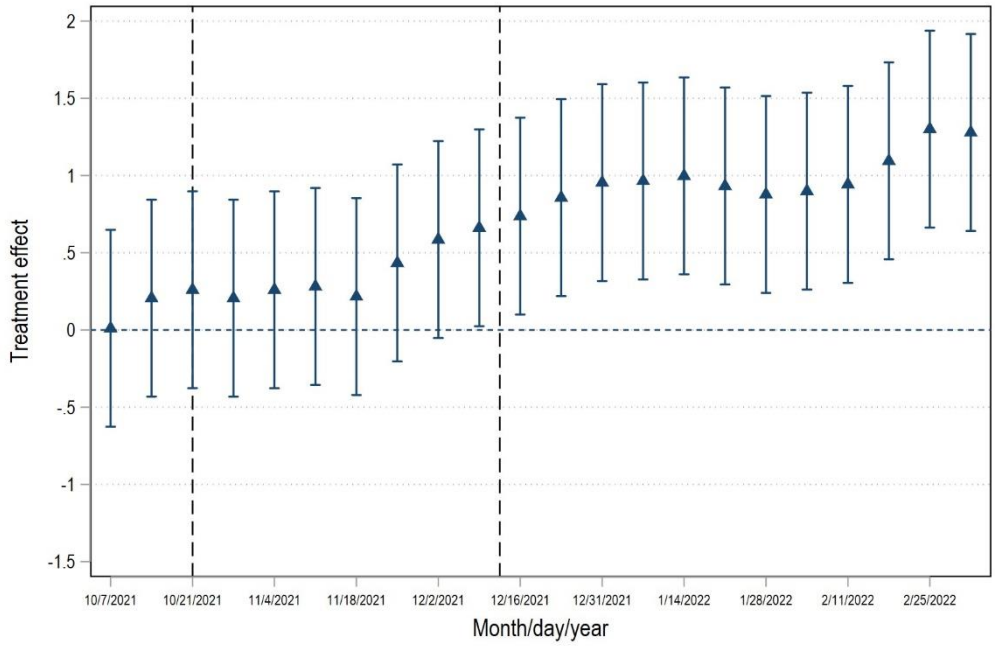
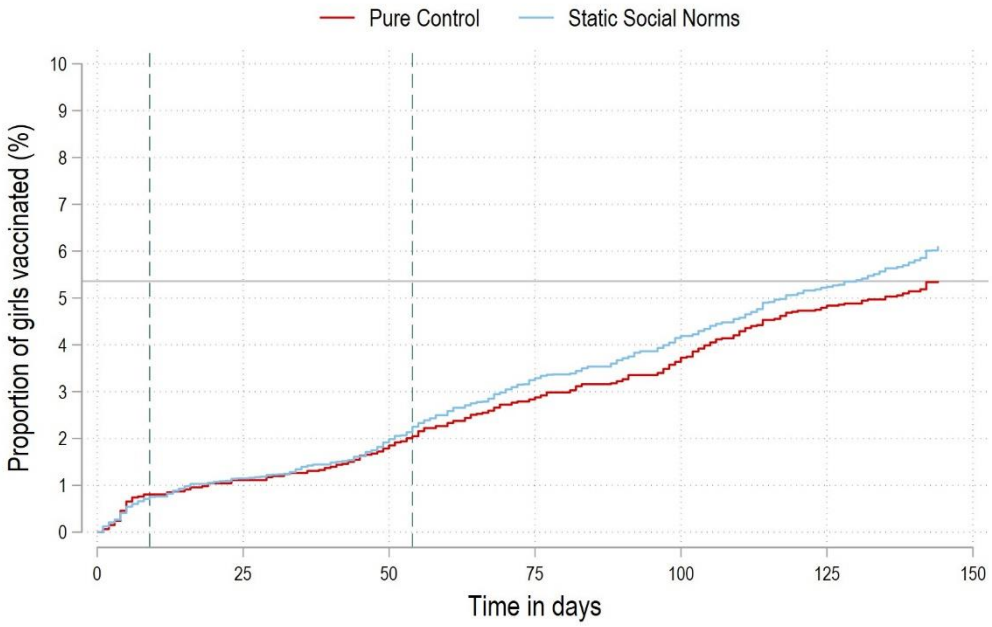


Figure A.5 Effect of social norms on HPV vaccination over time

Note: Authors' elaboration. Horizontal axis gives date at which the outcome was measured. Vertical axis is the treatment effect in percentage points, estimated by pooling data from all outcome periods, estimating Eq.(1) with period dummy variables and one treatment dummy per period. Each triangle measures the cumulative effect of the social norm intervention over time. Vertical bars represent 95% confidence intervals, where standard errors are clustered at the locality level. Dashed vertical lines indicate dates that treatment began and ended.

(a) Static design



(b) Dynamic design

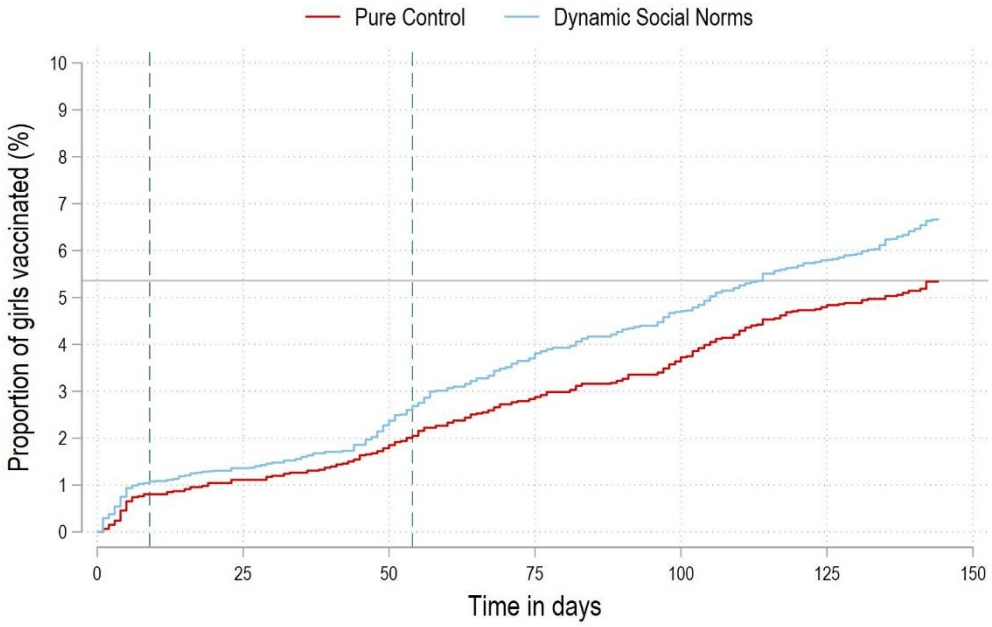


Figure A.6 Kaplan-Meier survival function for HPV vaccination

Note: Authors' elaboration. Horizontal axis gives the number of days after receiving the first message. Vertical axis is the proportion of vaccinated girls. Dashed vertical lines indicate dates that treatment began and ended. All participants were right-censored at 130 days after the first reminder date (144 days if we include the two pre-intervention weeks). The solid horizontal line indicates the proportion of girls in the pure control group that had been vaccinated by the end of 130 days after the first message.

Table A1. p-values for the orthogonality test of pairwise comparisons between treatment arms

	C1 vs C2	C1 vs C3	C1 vs T1	C1 vs T2	C1 vs T3	C1 vs T4	C1 vs T5	C2 vs C3	C2 vs T1	C2 vs T2	C2 vs T3	C2 vs T4	C2 vs T5
Daughter's age	0.247	0.542	0.705	0.414	0.723	0.338	0.442	0.741	0.433	0.725	0.416	0.845	0.696
Ethnic group	0.643	0.115	0.284	0.563	0.144	0.282	0.998	0.219	0.543	0.908	0.317	0.540	0.644
Displaced by armed conflict	0.937	0.359	0.802	0.934	0.515	0.378	0.744	0.328	0.742	0.872	0.567	0.422	0.805
Colombian nationality	0.997	0.156	0.677	0.376	0.837	0.833	0.524	0.155	0.679	0.375	0.839	0.836	0.526
Contributory Scheme	0.517	0.613	0.663	0.936	0.214	0.254	0.873	0.980	0.278	0.570	0.058	0.074	0.419
Uninsured	0.876	0.995	0.241	0.912	0.129	0.341	0.657	0.893	0.184	0.964	0.173	0.268	0.549
Subsidized Scheme	0.282	0.216	0.272	0.926	0.131	0.710	0.684	0.725	0.982	0.326	0.010	0.148	0.503
Other scheme	0.519	0.291	0.088	0.925	0.148	0.426	0.553	0.592	0.289	0.582	0.422	0.881	0.958
EPS Sanitas	0.839	0.714	0.458	0.832	0.690	0.768	0.982	0.594	0.589	0.677	0.547	0.927	0.857
EPS Salud Total	0.779	0.594	0.925	0.443	0.093	0.513	0.250	0.445	0.852	0.295	0.050	0.350	0.153
EPS Famisanar	0.821	0.867	0.799	0.735	0.475	0.666	0.645	0.986	0.978	0.911	0.347	0.510	0.815
EPS Compensar	0.759	0.714	0.449	0.904	0.194	0.827	0.970	0.537	0.652	0.669	0.321	0.930	0.788
EPS Capital Salud	0.536	0.252	0.156	0.440	0.164	0.654	0.745	0.524	0.424	0.164	0.044	0.286	0.769
Other EPS	0.963	0.307	0.506	0.730	0.663	0.573	0.547	0.289	0.476	0.765	0.698	0.541	0.516
Stratum 1	0.860	0.596	0.856	0.847	0.549	0.196	0.353	0.500	0.720	0.987	0.673	0.142	0.453
Stratum 2	0.625	0.463	0.866	0.715	0.892	0.255	0.428	0.257	0.749	0.393	0.724	0.104	0.761
Stratum 3	0.542	0.850	0.626	0.933	0.781	0.873	0.494	0.493	0.903	0.488	0.740	0.653	0.941
Stratum 4	0.693	0.521	0.703	0.223	0.278	0.219	0.383	0.748	0.989	0.410	0.490	0.404	0.633
Stratum 5	0.942	0.666	0.697	0.451	0.475	0.997	0.411	0.710	0.643	0.496	0.431	0.938	0.453
Stratum 6	0.921	0.934	0.573	0.847	0.406	0.517	0.184	0.999	0.508	0.926	0.352	0.455	0.219

Authors' elaboration: Each column presents the p-value for the pairwise comparisons between treatment arms. Each test assesses the null hypothesis that the means of two treatment arms are equal to zero.C1 is the pure control group. C2 is the experimental control group. C3 is the policy control group. T1 is the positive descriptive norm treatment. T2 is the negative descriptive norm treatment. T3 is the injunctive norm treatment. T4 is the dynamic norm treatment. T5 is the trending norm treatment. All observable characteristics of the sample are coded as dummy variables and receive a value of 1 if they apply to the girl's record. Variables labeled with "EPS" denote the name of the insurance provider. Contributory insurance refers to insurance plans in which the employee contributes a portion of the premium, with the employer covering the remainder. Uninsured, subsidized insurance, ethnic group, displacement due to armed conflict, Colombian nationality, and contributory insurance are binary variables. "Stratum low" is also binary and was derived by aggregating the two lowest strata used by the local government of Bogotá to define low socioeconomic status.

Table A2. p-values for the orthogonality test of pairwise comparisons between treatment arms

	C3 vs T1	C3 vs T2	C3 vs T3	C3 vs T4	C3 vs T5	T1 vs T2	T1 vs T3	T1 vs T4	T1 vs T5	T2 vs T3	T2 vs T4	T2 vs T5	T3 vs T4	T3 vs T5	T4 vs T5
Daughter's age	0.759	0.963	0.742	0.866	0.990	0.661	0.980	0.559	0.694	0.641	0.879	0.967	0.540	0.674	0.847
Ethnic group	0.447	0.254	0.652	0.449	0.115	0.622	0.695	0.997	0.285	0.376	0.619	0.564	0.698	0.145	0.283
Displaced by armed conflict	0.473	0.395	0.154	0.109	0.241	0.867	0.368	0.258	0.564	0.463	0.335	0.683	0.818	0.745	0.579
Colombian nationality	0.076	0.503	0.111	0.110	0.049	0.194	0.833	0.836	0.825	0.276	0.274	0.129	0.997	0.666	0.669
Contributory Scheme	0.388	0.660	0.127	0.149	0.524	0.606	0.419	0.481	0.783	0.186	0.222	0.810	0.917	0.279	0.327
Uninsured	0.337	0.923	0.218	0.437	0.721	0.200	0.007	0.826	0.466	0.159	0.288	0.579	0.014	0.050	0.611
Subsidized Scheme	0.739	0.246	0.013	0.123	0.367	0.315	0.009	0.142	0.489	0.109	0.642	0.754	0.255	0.055	0.437
Other scheme	0.742	0.328	0.907	0.678	0.563	0.107	0.796	0.362	0.266	0.176	0.484	0.618	0.514	0.392	0.840
EPS Sanitas	0.332	0.846	0.967	0.544	0.700	0.339	0.254	0.654	0.471	0.852	0.612	0.814	0.487	0.673	0.785
EPS Salud Total	0.542	0.924	0.403	0.998	0.684	0.389	0.077	0.455	0.214	0.363	0.909	0.703	0.306	0.597	0.620
EPS Famisanar	0.968	0.913	0.454	0.603	0.835	0.933	0.333	0.493	0.837	0.292	0.441	0.903	0.778	0.240	0.372
EPS Compensar	0.323	0.789	0.151	0.586	0.691	0.380	0.588	0.590	0.472	0.156	0.734	0.874	0.280	0.207	0.857
EPS Capital Salud	0.985	0.074	0.021	0.129	0.380	0.029	0.005	0.062	0.274	0.536	0.745	0.272	0.345	0.086	0.440
Other EPS	0.632	0.193	0.169	0.574	0.596	0.312	0.271	0.919	0.949	0.928	0.363	0.343	0.318	0.300	0.969
Stratum 1	0.702	0.492	0.310	0.599	0.200	0.708	0.435	0.267	0.267	0.685	0.137	0.462	0.059	0.742	0.026
Stratum 2	0.383	0.663	0.398	0.845	0.167	0.594	0.975	0.191	0.533	0.616	0.439	0.247	0.202	0.512	0.053
Stratum 3	0.558	0.904	0.678	0.750	0.455	0.568	0.834	0.743	0.844	0.718	0.808	0.443	0.906	0.684	0.600
Stratum 4	0.740	0.725	0.809	0.719	0.946	0.402	0.482	0.397	0.624	0.894	0.992	0.729	0.886	0.831	0.721
Stratum 5	0.450	0.852	0.304	0.663	0.809	0.253	0.746	0.700	0.226	0.142	0.448	0.945	0.478	0.125	0.408
Stratum 6	0.592	0.940	0.453	0.546	0.305	0.450	0.788	0.933	0.059	0.306	0.401	0.255	0.854	0.031	0.049

Authors' elaboration: Each column presents the p-value for the pairwise comparisons between treatment arms. Each test assesses the null hypothesis that the means of two treatment arms are equal to zero.C1 is the pure control group. C2 is the experimental control group. C3 is the policy control group. T1 is the positive descriptive norm treatment. T2 is the negative descriptive norm treatment. T3 is the injunctive norm treatment. T4 is the dynamic norm treatment. T5 is the trending norm treatment. All observable characteristics of the sample are coded as dummy variables and receive a value of 1 if they apply to the girl's record. Variables labeled with "EPS" denote the name of the insurance provider. Contributory insurance refers to insurance plans in which the employee contributes a portion of the premium, with the employer covering the remainder. Uninsured, subsidized insurance, ethnic group, displacement due to armed conflict, Colombian nationality, and contributory insurance are binary variables. "Stratum low" is also binary and was derived by aggregating the two lowest strata used by the local government of Bogotá to define low socioeconomic status.

Table A.3 Contamination bias in the social norms experiment

	(1)	(2)	(3)	(4)
	Dependent variable: (1=if daughter was vaccinated)*100			
	Panel A: Aggregate treatment			
Experimental control	0.251	0.253	0.252	0.252
	(0.703)	(0.703)	(0.703)	(0.702)
Policy control	-0.786	-0.788	-0.786	-0.787
	(0.566)	(0.566)	(0.566)	(0.566)
Social norms treatment	0.907***	0.905***	0.907***	0.906***
	(0.254)	(0.255)	(0.254)	(0.255)
	Panel B: Subgroup aggregation for the treatment			
Experimental control	0.251	0.253	0.252	0.252
	(0.703)	(0.702)	(0.703)	(0.702)
Policy control	-0.786	-0.788	-0.786	-0.787
	(0.566)	(0.566)	(0.566)	(0.566)
Static design	0.660**	0.659**	0.660**	0.659**
	(0.257)	(0.257)	(0.257)	(0.257)
Dynamic design	1.275***	1.275***	1.277***	1.275***
	(0.372)	(0.372)	(0.372)	(0.372)
Mean dependent variable	5.56	5.56	5.56	5.56
Estimator	Own	ATE	EW	CW
Number of observations	34,506	34,506	34,506	34,506

Note: * significant at 10%; ** significant at 5%; *** significant at 1%. Huber-White standard errors, clustered at the locality level, are reported in parentheses. The dependent variable has been rescaled using a scale factor of 100 to facilitate the interpretation of the results. Panel A presents the results of a linear regression model where all the social norm treatments were collapsed into a single treatment variable. Panel B reports the results of a similar exercise where the static social norms treatments (positive descriptive, negative descriptive, and injunctive norms) and dynamic social norms treatments (dynamic and trending norms) were collapsed into single treatment variables. Column 1 reports the results of an exercise to evaluate the magnitude of contamination bias in the linear regressions reported in Column 1 in Table 4. We apply the decomposition proposed by Goldsmith-Pinkham et al., (2024) to estimate own-treatment effect components from the estimated regression, thus removing contamination bias. Column 2 presents the results for the estimation of the unweighted ATE. Column 3 shows the weighted ATE using the variance-minimizing weighting scheme. Column 4 reports the weighted ATE using the easiest-to-estimate common weighting scheme. The mean of the dependent variable was calculated for the pure control group. The number of observations is reported in the last row.

Table A.4 Contamination bias in the social norms experiment

	(1)	(2)	(3)	(4)
	Dependent variable: (1=if daughter was vaccinated)*100			
Experimental control	0.251	0.253	0.252	0.253
	(0.703)	(0.702)	(0.703)	(0.702)
Policy control	-0.786	-0.788	-0.786	-0.788
	(0.566)	(0.566)	(0.566)	(0.566)
Positive descriptive norm	0.240	0.240	0.241	0.240
	(0.374)	(0.374)	(0.374)	(0.374)
Negative descriptive norm	0.651**	0.646**	0.651**	0.646**
	(0.258)	(0.258)	(0.258)	(0.258)
Injunctive social norm	1.085**	1.086**	1.085**	1.086**
	(0.477)	(0.477)	(0.477)	(0.477)
Dynamic norm	1.275**	1.270**	1.275**	1.270**
	(0.544)	(0.544)	(0.544)	(0.544)
Trending norm	1.274***	1.277***	1.276***	1.277***
	(0.298)	(0.298)	(0.298)	(0.298)
Mean of dependent variable	5.56	5.56	5.56	5.56
Model	Own	ATE	EW	CW
Number of observations	34,506	34,506	34,506	34,506

Note: * significant at 10%; ** significant at 5%; *** significant at 1%. Huber-White standard errors, clustered at the locality level, are reported in parentheses. The dependent variable has been rescaled using a scale factor of 100 to facilitate the interpretation of the results. Column 1 reports the results of an exercise to evaluate the magnitude of contamination bias in the linear regressions reported in Column 1 in Table 4. We apply the decomposition proposed by Goldsmith-Pinkham et al., (2024) to estimate own-treatment effect components from the estimated regression, thus removing contamination bias. Column 2 presents the results for the estimation of the unweighted ATE. Column 3 shows the weighted ATE using the variance-minimizing weighting scheme. Column 4 reports the weighted ATE using the easiest-to-estimate common weighting scheme. The mean of the dependent variable was calculated for the pure control group. The number of observations is reported in the last row.

Appendix B: Pre-Analysis Plan

Nudging parents to increase HPV vaccine demand in Bogota, Colombia[1]

Stanislao Maldonado[2], Deborah Martinez[3], Lina Diaz[4], and Erika Rees-Punia[5]

January 20, 2022

Abstract

We study the effectiveness of a large-scale SMS campaign based on behavioral insights to boost vaccine take-up against the Human Papillomavirus in Bogota, Colombia. Messages were crafted taking advantage of behavioral science lessons, including social norms, beliefs, emotions, and a set of decision aids.

1. Introduction

The Human Papillomavirus (HPV) is one of the leading causes of cervical cancer, one of the major public health problems in the developing world. Vaccines against HPV have been available since 2006, yet vaccination coverage is very low. As with many other preventive health investments, adoption is shallow despite their large economic and social benefits.

In this project, we implement large-scale interventions based on behavioral science to boost vaccination rates using cost-effective strategies based on SMS campaigns with parents in Bogota, Colombia. Text messages for this campaign were designed based on behavioral insights, including social norms, beliefs, emotions, and a set of decision aids. These interventions were developed by

[1] This pre-analysis plan was written by Stanislao Maldonado with inputs by Deborah Martinez, Lina Diaz, and Erika Rees-Punia. Julian Pena provided superb research assistance. Comments by Meenu Anand, Carlos Scartascini, and Carlos Castro are greatly appreciated. This version corresponds to the one registered at the AEA RCT registry on February 2nd, 2022, with minor edits to adjust changes in affiliation.

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a team of researchers at the American Cancer Society, the Behavioral Government Lab (Universidad del Rosario), and the Inter-American Development Bank, and implemented in partnership with the Health Secretariat (HS) of the City of Bogota, and the Liga Colombiana de Lucha contra el Cancer.

This plan outlines a pre-analysis plan for evaluating the effectiveness of the SMS campaign described above. Because the authors completed the plan before endline data was requested and analyzed (March 2022), this document provides a valuable reference in evaluating the results of these interventions.

The plan is outlined as follows: Section 2 reviews the background of the study, the setting of the experiment, and describes the interventions; Section 3 describes the sample and the data; Section 4 outlines the study hypotheses; Section 5 describes the research design, and Section 6 the estimation strategy. The Appendix offers details about the interventions and other aspects of our research design.

2. Motivation and Intervention Overview

2.1. Background

Preventive health investments have large economic and social benefits, yet these health technologies are often adopted at low rates (Newhouse 2021). HPV vaccination is a leading example of this phenomenon. Cervical cancer (CC), caused by infections from HPV, is a significant public health problem in the developing world. Despite that HPV vaccines have been available since 2006, vaccine coverage in most developing countries is still sub-optimal (WHO 2018). According to some estimates, only 15% of girls in the target age for HPV vaccination are fully protected (Bruni et al. 2021).

CC is the leading cause of death from cancer in Colombia's women aged 30 to 59. In addition to CC, HPV is also associated with oropharyngeal, anus, genital (vulva, vagina, and penis), head and neck cancer. Infection by this virus is widespread among women, and it is estimated that 70% of them will acquire HPV at some point in their lives. Currently, the risk of HPV infection can be reduced thanks to a vaccine administered in Colombia through the Expanded Program on Immunization (PAI). This vaccine is targeted to girls and adolescents from fourth grade (9 years or older) to eleventh grade. Non-schooled women from 9 to 18 years old are also covered.

In 2012, Colombia was one of the leaders in HPV vaccination coverage in Latin America. The vaccine became mandatory and was distributed free of charge by the National Committee for Immunization Practices. However, the program's success came to a halt after an outbreak of unknown etiology in the municipality of Carmen de Bolívar. Community members and vaccine opponents claimed this outbreak was associated with the HPV vaccine. This issue led to a public relations crisis that made the vaccine controversial. Eventually, these events led to the collapse of the school's HPV vaccination program. Although safety studies found no association between the HPV vaccine and Carmen de Bolívar's events, vaccine coverage rates began to decline steadily, reaching their lowest point in 2016 with a 6.1% coverage for the first dose. Although coverage levels of HPV vaccination have been recovering over the past years, they are still far from the pre-Carmen de Bolivar levels, representing a challenge for the vaccination policy in Colombia.

2.2. Setting

The research team designed an SMS campaign to offer solutions to the above challenges. The team designed text messages based on behavioral science to induce parents to vaccinate their daughters against HPV. Taking advantage of essential lessons from the international literature and qualitative work carried out as part of this research project, the team decided to craft text messages that appeal to social norms, seek to modify beliefs, take advantage of emotions, and use a set of decision aids. These interventions were implemented in large-scale experiments with the population of eligible girls in Bogota, Colombia's largest city.

We implemented the SMS campaign using the existing technological structure of the HS and within its vaccination efforts. Due to the current institutional framework in Colombia, health providers report data to the HS about all eligible individuals for vaccination. These include information about their progress in terms of their vaccination schedules. This centralized information system will be instrumental in evaluating the effectiveness of our interventions.

Although each person can be affiliated with a private insurer or covered under the subsidized regime, Bogota's health system allows citizens to be vaccinated at any vaccination point regardless of their health provider. This is true for all vaccines included in the PAI, as is the case for HPV vaccines. Therefore, we take advantage of this institutional feature to launch

a city-wide SMS campaign to boost HPV vaccination rates across almost all city's localities.[6] Our target population can get HPV vaccines from their health providers and vaccination points run by the HS across different areas in the city.

2.3. Interventions

In this setting, we implemented two sets of experiments designed to increase vaccination rates among two groups: a) unvaccinated girls; and b) girls with incomplete HPV vaccination schedules. We treat these groups differently because the behavioral biases preventing HPV vaccination may differ. Because the target population is composed of minors, these interventions were targeted to their parents. The timeline for these experiments is presented in Figure 1.

We describe these experiments below.

2.3.1. Experiments for Unvaccinated Girls

For the first group, four experiments were implemented. The first experiment explored the role of social norms following a large literature on the matter in vaccination and other health areas. A second experiment exploited the role of beliefs, taking advantage of an extensive literature about the role of beliefs in vaccination decisions. A third experiment appealed to emotions to induce behavior change regarding HPV vaccination. Finally, the fourth experiment considered the use of decision aids that directly seek to modify behavior in contexts where there is a gap between intentions and actions.

a. Experiment 1: Social Norms

The social norm experiment exploited alternative ways to communicate the norms regarding HPV vaccination in our setting. Our treatments include a static (descriptive and injunctive norms) and a dynamic design (dynamic and trending norms). Table A1 in the Appendix describes the messages delivered as part of this intervention. As an example, a subset of parents in this experiment received an SMS with a descriptive social norm of the following form:

"Hello NAME. X of each 10 parents in your neighborhood vaccinated their daughters against HPV and protected them against cancer. Health Secretariat."

[6] Bogota is divided in 20 localities. We excluded one locality, Sumapaz, due to its small size in terms of eligible girls.

All messages include fixed elements across treatment arms proven effective in other settings. For instance, we added the parent's name and the sender's information in all the messages in this experiment. We tested other fixed elements in the experiments described below.

b. Experiment 2: Beliefs

The second experiment seeks to correct a set of beliefs regarding HPV. In particular, we were interested in correcting beliefs about HPV, HPV vaccination, and vaccine support by doctors and the government.

The messages in this experiment were designed to correct beliefs about HPV. These messages were targeted to issues of likelihood and severity. Regarding beliefs about HPV vaccines, we paid attention to effectiveness, safety, and cost issues. Finally, we targeted beliefs about government and health provider support for HPV vaccination.

Table A2 in the Appendix describes the messages sent in this experiment.

c. Experiment 3: Emotions

The third experiment explored the role of emotions. There is an important scholarship exploring the role of emotions in vaccination decisions. We designed messages that emphasized anticipated regret, worry, and soft shame to boost vaccination rates based on this research.

Table A3 in the Appendix describes the messages sent in this experiment.

d. Experiment 4: Decision Aids

The fourth experiment uses tools to induce a direct behavioral change, including an appeal to prosocial concerns, adapting them for an SMS format. We are particularly interested in the potential of soft-defaults, enhanced active choice, and pseudo sets in inducing behavioral change. We also explore the role of altruism, considering that previous communication strategies in our setting were built on this principle.

We acknowledge that many of these instruments are not easy to capture using an SMS format. Yet, we hope the messages crafted following these principles offer an alternative way to capture the potential of these instruments in practice.

Table A4 in the Appendix describes the messages sent in this experiment.

2.3.2. Experiments for Girls with Incomplete Vaccination Schedules

The second set of experiments was targeted at girls with incomplete vaccination schedules. We hypothesized that parents of girls with incomplete vaccination schedules are not necessarily affected by the same set of behavioral biases as those affecting parents of unvaccinated girls. To avoid sample constraints, we only implemented two experiments with this sub-population. The first one was based on social norms, following a similar structure to Experiment 1. The second experiment tested different decision aids to help parents close the intention-behavior gap. These experiments are described below.

e. Experiment 5: Social Norms

The fifth experiment used social norms with similar static and dynamic designs as Experiment 1. We introduced a minor variation to incorporate a comparison between qualitative and quantitative dynamic norms. In this way, we can offer a complete picture regarding the use of social norms to induce behavioral change in the context of vaccination.

Table A5 in the Appendix describes the messages sent in this experiment.

f. Experiment 6: Decision Aids

The second experiment introduced a set of decision aids to close the intention-action gap. It was presumed that parents of girls with incomplete vaccination schedules already expressed their desire to vaccinate their daughters, but failed to complete the process. Reminders, presumptive announcements, priming, and planning tools were used in this case. For each of these tools, variations were introduced to complement these messages. These variations were designed to elicit implementation intentions or to introduce an anchor. In the case of priming, question-behavior effects and mere-measurement effects were used.

Table A6 in the Appendix describes the messages sent in this experiment.

2.3.3. Cross-randomized Experiment: Planning Tools

All the treatments in the two sets of experiments were cross-randomized with planning tools. In other words, half of the sample in each of the six experiments described above also received a second message with a planning tool. These planning tools offer a link or a telephone number where parents can have access to information about the closest vaccination point and other related information about HPV vaccination.

Table A7 in the Appendix describes the messages sent in this experiment.

3. Sample and Data

3.1. Target Population

The target population for this intervention consists of parents with unvaccinated or partially vaccinated daughters ages 9-17 who are registered with a cellphone number in the administrative records of the HS. We were forced to discard many observations due to incomplete information, which has implications for the experiment's external validity. We describe this issue below.

The population of unvaccinated girls aged 9-17 in the city is 440,010. Given the nature of the intervention, we need to have information about parents, and therefore, we discarded 216,371 records due to incomplete information about parents. Because the intervention was planned to be delivered using text messages, we dropped those parents with no info about cellphone numbers. Hence, 63,602 observations were discarded in this step. Finally, because the experiments were block-randomized based on locality and girls' age, we dropped all the observations from neighbor localities outside Bogota or records without information regarding their locality. We also dropped records from Sumapaz, a tiny locality in Bogota, with only 41 observations. The final sample size for the experiments with unvaccinated girls is 131,124.

We constructed the sample size for the experiments with girls with incomplete vaccination schedules using the same procedure as above. The population of eligible girls is 93,542. After discarding observations as before, the final sample consists of 43,057 observations.

Figures 2A and 2B summarize the steps we use to construct the final sample for both sets of experiments.

3.2. Data

The primary source of data for the experiments is the HS administrative records. HS administers health records from all the institutional health providers in the city and directs the vaccination policy at the city level. These records are monthly updated, so the information about vaccination progress is handy to test the effectiveness of our interventions.

The main advantage of the HS records for evaluating the impact of our interventions is its coverage. We had access to all the records of eligible girls in the city. The main disadvantage is its limited set of pre-treatment covariates. These variables include enrollment to institutional health providers (EPS), type of health provider, access to health insurance, nationality, ethnicity, displacement by civil war, and daughter's age. Descriptive statistics for the

experimental sample are reported in Table 1A for the experiment with unvaccinated girls and Table 1B for the case of girls with incomplete vaccination schedules. Unfortunately, detailed information about socioeconomic characteristics is not collected besides these variables.

Figure 4 shows the distribution of the target population by locality. A large fraction of girls and parents for the experiments are located in populated and low-income areas in the city.

3.3. Power calculations

We estimated the minimum sample size for each experiment assuming an individual randomized design with an effect size of 3 percentage points, 90% power, and a Chi-Square test for a difference in proportions with a 5% significance level. Because of the multiplicity of treatments, we adjusted for multiple testing using a Bonferroni correction for up to 17 comparisons in each experiment. Under these assumptions, the minimum sample size for each experiment is 13,578 subjects.

A critical parameter in power calculations is the effect size (Cohen 1988). A very influential experiment about vaccination in the US (Milkman et al. 2021) used 4.8 percentage points as an effect size to put our assumption in perspective. Therefore, our assumptions seem to be relatively conservative. Moreover, we implemented our experiments with sample sizes larger than this minimum requirement (see Tables A1 to A7).

Notice that we do not exploit the panel structure of our data in our main specifications (see Section 6). This could lead to potential gains in power as suggested by McKenzie (2012). This implies that our power analysis is more conservative than needed.

4. Hypotheses

Because of the nature of our data, we can test a limited set of hypotheses. The main hypothesis is related to the impact of the behavioral-based text messages on HPV vaccination take-up. The second set of hypotheses is related to exploring heterogeneous effects.

Because all the experiments have a similar treatment structure, we formulate a single hypothesis regarding the effectiveness of these interventions and one for the joint effect of both behavioral insights and planning tools.

4.1. Hypothesis about Impact on Outcomes

We consider a set of main individual hypotheses M about the impact on outcomes. We also consider aggregated or global hypothesis G for the effect of any behavioral treatment.

Additionally, we also consider a set of auxiliary hypotheses A regarding additional analysis with the main outcomes for some relevant comparisons.

The main individual hypotheses are the following:

Hypothesis M.1: Receiving a text message based on behavioral insights positively affects HPV vaccination take-up.

Hypothesis M.2: Receiving a text message with a planning tool positively affects HPV vaccination take-up.

Hypothesis M.3: Receiving both a text message based on behavioral insights and one with a planning tool has a larger positive effect on HPV vaccination take-up than the individual effects of these treatments.

All these hypotheses will be evaluated for a single behavioral treatment. Because we test many behavioral treatments, we will also test a general hypothesis about the effectiveness of receiving a message with a behavioral insight regardless of the behavioral principle in each experiment. The hypothesis is the following:

Hypothesis G.1: Receiving a text message based on *any* behavioral insights positively affects HPV vaccination take-up.

All these hypotheses are based on a comparison with the experimental control group. We also consider a set of auxiliary hypotheses related to the different control groups in our experimental designs:

Hypothesis A.1: There is no difference between receiving a placebo message (experimental control) and not receiving a message at all (pure control) in increasing HPV vaccination take-up.

Hypothesis A.2: Receiving the "business as usual" text message has a larger effect than not receiving a message at all (pure control) in increasing HPV vaccination take-up.

Hypothesis A.3: Receiving a text message based on behavioral insights has a larger effect on HPV vaccination take-up than receiving the "business as usual" text message.

4.2. Hypotheses about the Heterogeneity of Impacts

We don't have access to rich information on covariates for these experiments, limiting our ability to perform more sophisticated heterogeneous analysis. We will explore the heterogeneity of impacts on the socioeconomic stratum, access to health insurance, nationality, ethnicity, and displacement by civil war. The hypothesis is the following:

Hypothesis H.1: The individual characteristics of parents and girls are likely to determine HPV vaccination take-up.

We consider this hypothesis for each of the characteristics mentioned above for any given experiment.

5. Research Design

This section describes the experimental design. As noted above, we implemented six experiments in total. Because all of them followed a similar structure, we describe each of them in the Appendix.

5.1. Outcomes

The main outcome is a binary measure of whether a parent's daughter is vaccinated against HPV during the SMS campaign window (8 weeks).

5.2. Treatment Assignment

All eligible girls in the target population were randomly assigned to an experimental condition using a block-randomized design (Imbens and Rubin 2015, and Gerber and Green 2012). One of the girls' parents (typically their mothers) was assigned to one of the treatment or control groups. This decision was driven by the information available at the HS's records, which typically collects information about mothers. Notice that participants were assigned to only one of the aforementioned behavioral experiments.

The research team randomly selected parents into treatment after stratifying on locality and vaccinee's age using the re-randomization algorithm by Morgan and Rubin (2012). This algorithm avoids the risk of pre-treatment imbalance for a given set of covariates by allowing treatment re-randomization without affecting the design's statistical properties. Because stratification was based on age, we constructed a set of indicator variables to avoid the "curse of dimensionality," typically associated with using a categorical variable. For the sample of unvaccinated girls, a dummy variable equal to 1 for girls aged 9 and 10 years old was used for the stratification. In the case of the sample of girls with incomplete vaccination schedules, that dummy variable was equal to 1 for girls aged 9 to 12 years old. On average, these dummy variables split the experimental sample in half.

Figures 3A to 3G present the experimental design, and Tables A1 to A6 summarize the relevant information for each experiment. This information includes the behavioral principle, the fixed elements that complement the message, the SMS content, and the sample size for

each treatment arm. For instance, the social norm experiment for the unvaccinated daughters (Experiment 1) includes eight treatment conditions (Figure 3A and Table A1). This experiment considers five treatment groups (positive descriptive norm, negative descriptive norm, injunctive norm, trending norm, and dynamic norm) and three control groups (described below). Each experimental arm has about 4,600 observations, and the total sample size is 34,506 observations. According to our power calculations, this sample size is larger than the minimum required.

Each experiment includes three control groups besides the experimental groups assigned to receive behavioral treatments. The **Pure Control Group** does not receive any message based on behavioral insights. One critical concern in this type of experiment is disentangling the effect of the message from the effect of the mean used to deliver that message. Therefore, including a pure control group is helpful to evaluate the role of receiving a message regardless of its content. The **Experimental Control Group** receives placebo messages that include the fixed elements described above. This element is essential because it controls the role of these fixed elements from the main behavioral insight delivered by the message. Finally, the **Policy Control Group** receives the "business as usual" message that the HS uses in its current communication strategy with the target population. The messages delivered to the control groups are also described in Tables A1 to A6.

A planning tool intervention was cross-randomized with the behavioral experiments described above. In Experiment 1, 2, 5, and 6, we sent a message with a link with information about the closest vaccination points. In Experiment 3, we sent a message with a cellphone number where participants could request information about HPV and HPV vaccination. In Experiment 4, both strategies were implemented: half of the experimental sample received a link, and the other half the telephone number. Table A7 presents the design of these experiments.

Because these interventions were implemented within the regular HS communication policy, participants were not informed that they were part of these experiments. This is standard practice for government interventions and was approved by IRB.

A weekly message was sent to the treatment sample for eight weeks. The timeline and exact day of SMS delivery during the intervention are reported in Figure 1.

5.3. Pre-treatment Balance

Tables 2A to 2F show balance in the limited set of pre-treatment covariates for each experiment. These tables suggest that the randomization strategy successfully achieved statistical balance across treatment arms.

6. Estimation Strategy

This section discusses the methodological steps to evaluate the impact of the SMS campaign on HPV vaccination take-up.

6.1. Pre-treatment Balance

To test balance, we will use two strategies to capture differences between treatment and control groups at the baseline:

- t-test.
- Standardized differences.

The joint equality of treatment arms will be assessed using standard F-tests.

6.2. Estimation of Treatment Effects

The impact analysis will be based on a standard intention to treat analysis (ITT). We will estimate models of the following form:

$$Y_{ij} = \alpha + \sum_{k=1}^{K} \beta_k Z_j + \theta_s + X'_{ij}\delta + \varepsilon_{ij}; \quad (1)$$

where Y_{ij} is the outcome of interest for vaccinee i from parent j measured two months after the end of the SMS campaign, Z_j is an indicator for a parent being assigned to one of the treatment conditions, θ_s is a vector of randomization strata dummy variables (locality*age), X_{ij} is a set of pre-treatment covariates at the vaccinee and parent level, and ε_{ij} is the error term. Cluster standard errors at the parent level will be used, given that randomization was implemented at this level conditional on locality by age strata. β_k captures the ITT effect for each treatment arm in a given experiment, which is the effect of being selected to receive a text message based on a behavioral insight.

6.3. Heterogeneous Treatment Effects

Heterogeneous treatment effects will be estimated interacting treatment status with the pre-treatment variable of interest W_j for parent j. We will estimate models of the following form:

$$Y_{ij} = \alpha + \sum_{k=1}^{K} \beta_k Z_j + \gamma W_j + \sum_{k=1}^{K} \varphi_k \left(Z_j . W_J \right) + \theta_s + X_{ij}^{'} \delta + \varepsilon_{ij};$$

(2)

where φ_k is the coefficient of interest for interaction between the pre-treatment variable W_j and the treatment arm k. The pre-treatment covariates of interest are the socioeconomic stratum, access to health insurance, nationality, ethnicity, and displacement by civil war.

Alternatively, if we can expand our set of covariates from administrative records and data are sufficiently rich in terms of variability, we will use the generic machine learning strategy proposed by Chenozhukov et al. (2020).

6.4. Addressing Multiple Inference

We have multiple treatment arms in each experiment and pre-treatment characteristics to explore heterogeneities. To consider multiple hypothesis testing, we will implement the Benjamini and Hochberg (1995) procedure to control the false discovery rate.

6.5. Non-compliance

ITT estimates will capture the effect of receiving a text message, but this does not imply that they were read by those assigned to each treatment arm. Although a tiny fraction of those assigned to treatment did not read the messages, we will adjust by non-compliance using the standard IV approach.

6.6. Attrition

Because we will work with administrative records, attrition is not relevant in our setting. Nevertheless, Lee's (2009) bounds will be implemented if needed.

6.7. Issues with Factorial Designs

Recent scholarship has raised concerns about how factorial designs are analyzed and implemented in practice (Muralidharan et al. 2022). Our design is subjected to these issues because of the cross-randomization of planning tools in all the experiments discussed above.

Following Muralidharan and coauthors, we will estimate the "long model" (potentially in the Appendix), but our main focus is on the "short model" for the main results in the paper. Our interest in our experiments is the main effects, but it is also of secondary interest to evaluate whether there are positive complementarities between behavioral insights and planning tools. We will clarify that the results are weighted averages of interactions with other treatments for those specifications based on the "short model."

The nature of our interventions justifies our focus on the "short model" for the analysis. As recognized by the technical literature in experimental designs, analyzing the "short model" in factorial designs is appropriate when evaluating the effectiveness of many potential treatments or many variations of the same treatment (Cochran and Cox 1957). In this scenario, researchers are interested in learning what works among many alternatives and further test the power of promising approaches to affect outcomes. Our experiments are based on the same principle because they will be the first phase of a learning process to define which behavioral insights may be more appropriate to boost vaccination rates in our setting.

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Figure 1. Experiment Timeline

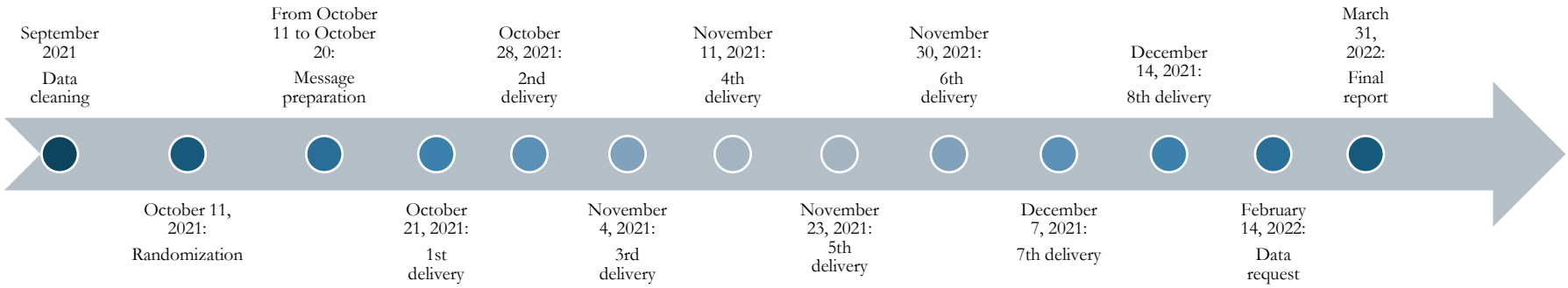


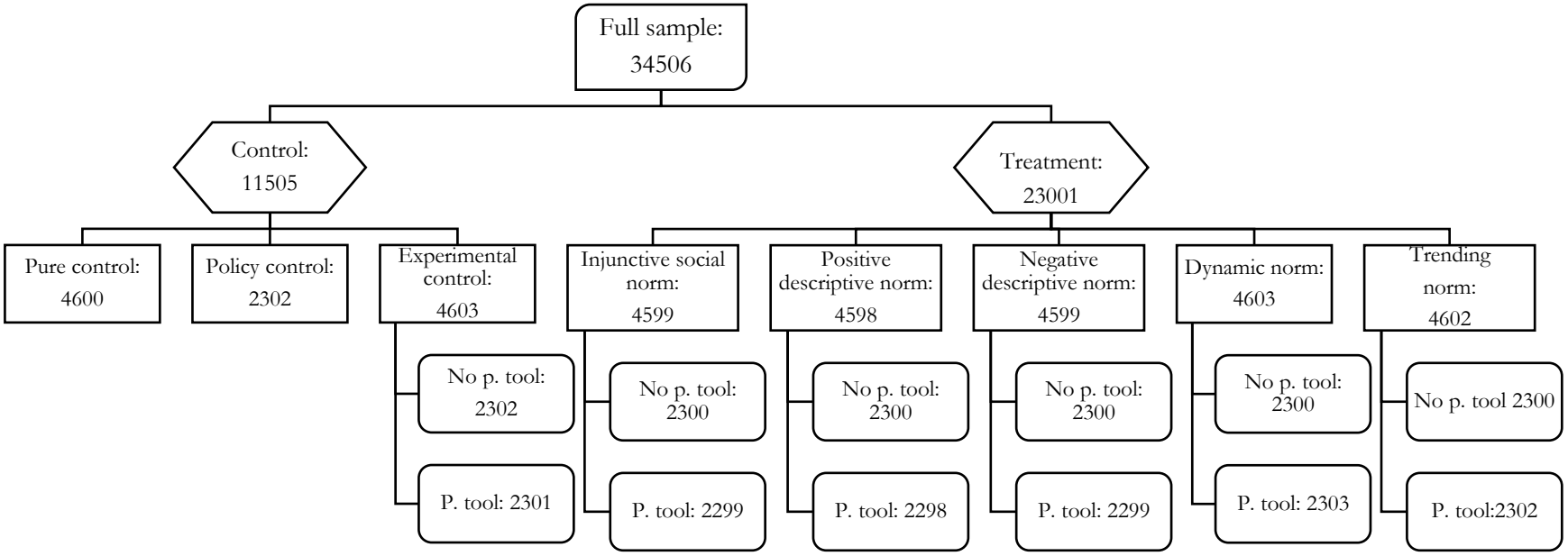
Figure 2A. Sample construction for experiments with unvaccinated girls



Figure 2B. Sample construction for experiments with incomplete vaccination schedules

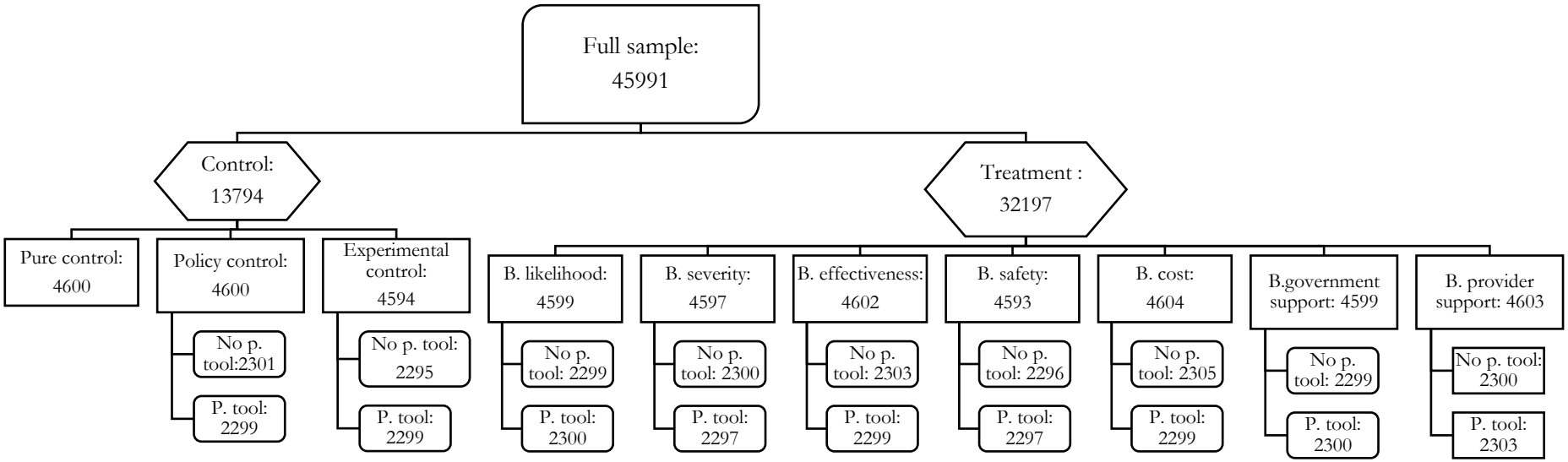


Figure 3A. Experimental Design for Experiment 1-Social Norms



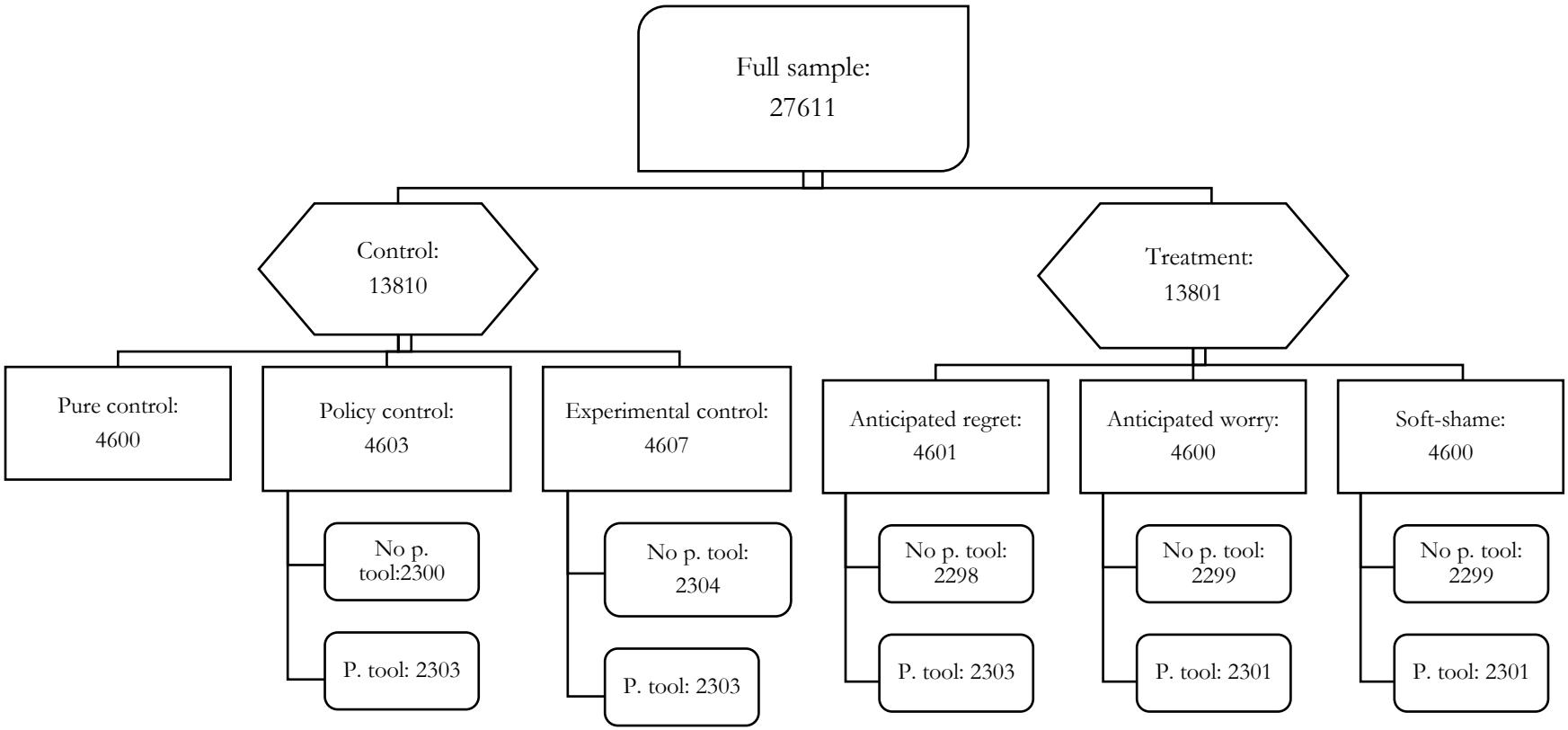
Source: Own elaboration.

Figure 3B. Experimental Design for Experiment 2-Beliefs



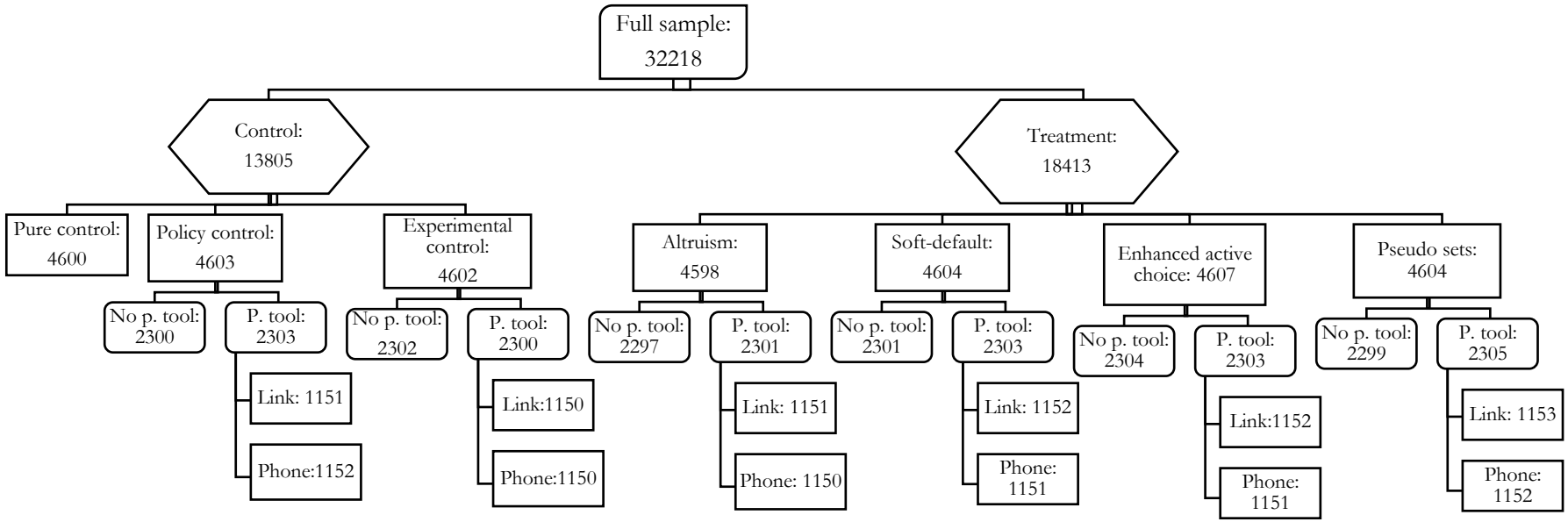
Source: Own elaboration.

Figure 3C. Experimental Design for Experiment 3- Emotions



Source: Own elaboration.

Figure 3D. Experimental Design for Experiment 4- Behavior



Source: Own elaboration.

Figure 3E. Experimental Design for Experiment 5-Decision Aids

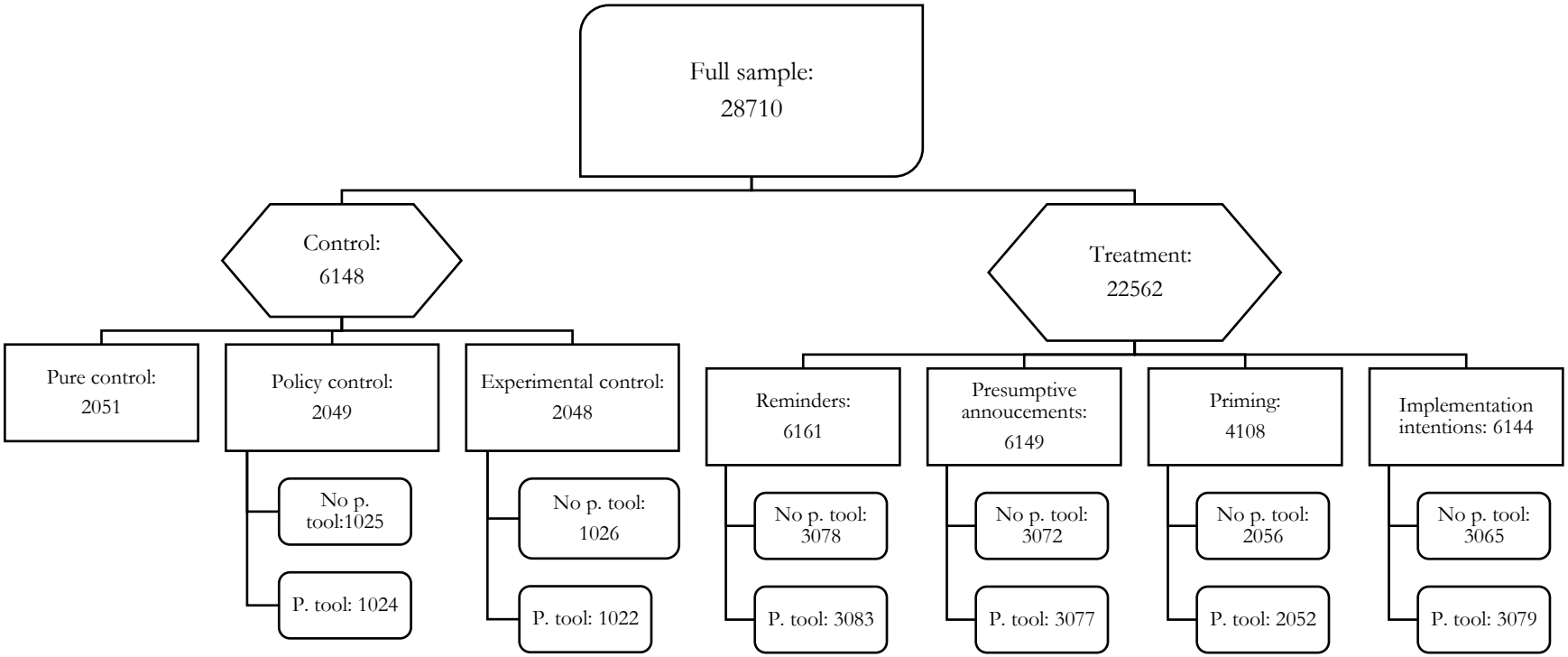
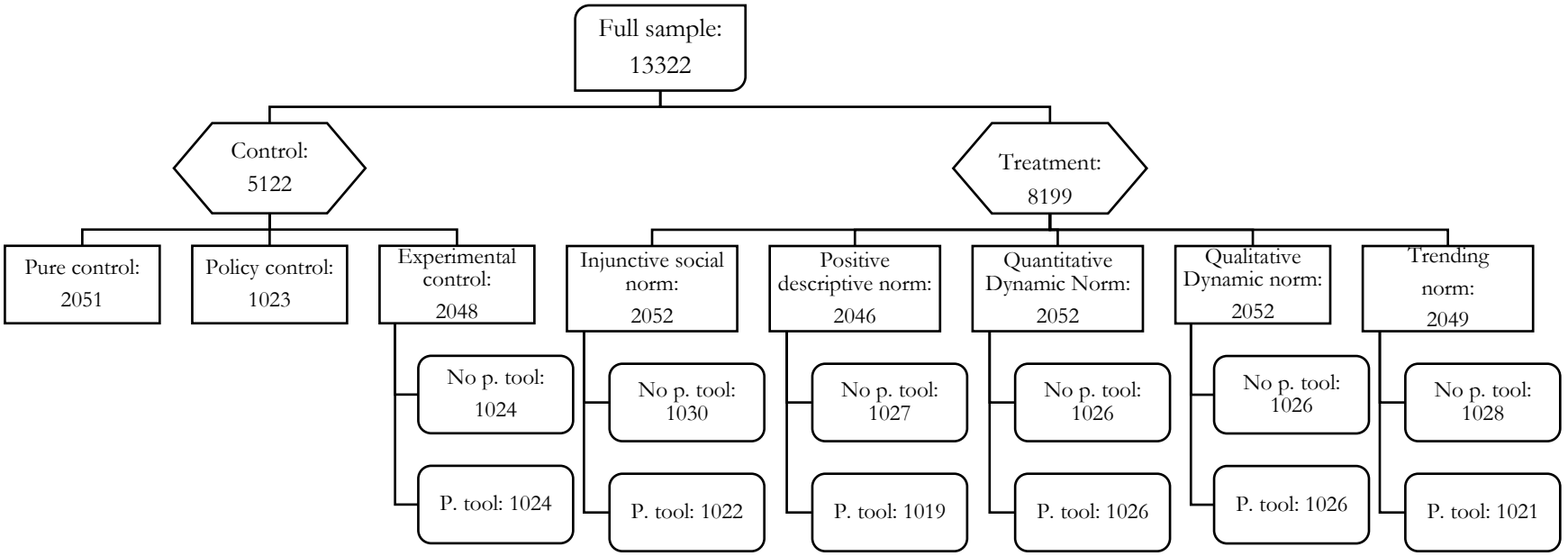
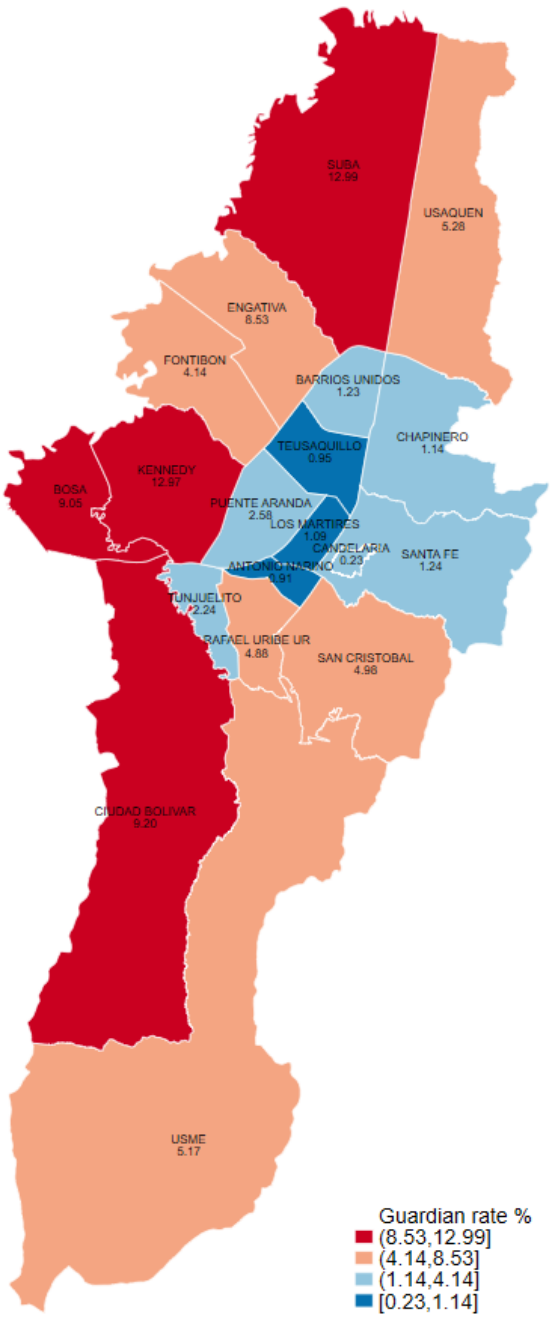


Figure 3F. Experimental Design for Experiment 6-Social Norms



Source: Own elaboration.

Figure 4. Distribution of Bogota's Target Population by Locality



Source: Own elaboration.

Table 1A. Descriptive Statistics for Sample of Unvaccinated Girls.

Variables	Mean	Std. Dev.	Min	Max	N
Daughter age	10.74	1.713	9	17	131,124
EPS Sanitas	0.136	0.342	0	1	131,124
EPS Salud Total	0.109	0.312	0	1	131,124
EPS Famisanar	0.191	0.393	0	1	131,124
EPS Compensar	0.149	0.356	0	1	131,124
EPS Capital Salud	0.111	0.314	0	1	131,124
Other EPS	0.305	0.460	0	1	131,124
Contributory Scheme	0.771	0.420	0	1	131,124
Uninsured	0.0374	0.190	0	1	131,124
Subsidized Scheme	0.146	0.354	0	1	131,124
Other scheme	0.0451	0.208	0	1	131,124
Ethnicity	0.00753	0.0864	0	1	131,124
Displaced	0.0169	0.129	0	1	131,124
Colombian nationality	0.989	0.103	0	1	131,124

Source: Own elaboration.

Table 1B. Descriptive Statistics for the Sample of Girls with Incomplete Vaccination Schedules.

Variables	Mean	Std. Dev.	Min	Max	N
Daughter age	12.53	2.108	9	17	43,057
EPS Sanitas	0.154	0.361	0	1	43,057
EPS Salud Total	0.125	0.330	0	1	43,057
EPS Famisanar	0.183	0.387	0	1	43,057
EPS Compensar	0.156	0.363	0	1	43,057
EPS Capital Salud	0.143	0.350	0	1	43,057
Other EPS	0.239	0.426	0	1	43,057
Contributory Scheme	0.761	0.427	0	1	43,057
Uninsured	0.0303	0.172	0	1	43,057
Subsidized Scheme	0.173	0.379	0	1	43,057
Other scheme	0.0354	0.185	0	1	43,057
Ethnicity	0.00557	0.0745	0	1	43,057
Displaced	0.0110	0.104	0	1	43,057
Colombian nationality	0.977	0.149	0	1	43,057

Source: Own elaboration.

Table 2A. Test for Randomization. Experiment 1-Social Norms.

Variables	Pure Control	Policy Control	Experimental Control	Injunctive Social Norm	Positive Descriptive Norm	Negative Descriptive Norm	Dynamic norm	Trending Norm	Joint H0 p-value
EPS Sanitas	0.131	0.128	0.133	0.129	0.137	0.130	0.133	0.131	0.964
	(0.005)	(0.007)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	
EPS Salud Total	0.108	0.113	0.106	0.119	0.108	0.113	0.113	0.116	0.513
	(0.005)	(0.007)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	
EPS Famisanar	0.193	0.192	0.191	0.199	0.191	0.190	0.197	0.189	0.940
	(0.006)	(0.008)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	
EPS Compensar	0.150	0.153	0.147	0.140	0.144	0.150	0.148	0.149	0.821
	(0.005)	(0.008)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	
EPS Capital Salud	0.109	0.119	0.113	0.100	0.119	0.104	0.106	0.111	0.089
	(0.005)	(0.007)	(0.005)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)	
Other EPS	0.308	0.296	0.309	0.312	0.302	0.312	0.303	0.302	0.811
	(0.007)	(0.010)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	
Contributory Scheme	0.770	0.765	0.764	0.781	0.774	0.769	0.780	0.771	0.500
	(0.006)	(0.009)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	
Subsidized Scheme	0.143	0.154	0.151	0.132	0.151	0.144	0.140	0.146	0.121
	(0.005)	(0.008)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	
Uninsured	0.038	0.038	0.039	0.045	0.034	0.039	0.035	0.037	0.205
	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	
Other scheme	0.049	0.043	0.046	0.042	0.041	0.048	0.045	0.046	0.645
	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	
Colombian nationality	0.990	0.986	0.990	0.990	0.990	0.988	0.990	0.991	0.510
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	
Ethnicity	0.009	0.005	0.008	0.006	0.007	0.008	0.007	0.009	0.613
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	
Displaced	0.016	0.013	0.016	0.018	0.015	0.016	0.018	0.017	0.814
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	
Daughter age	10.766	10.739	10.725	10.753	10.753	10.737	10.731	10.738	0.960
	(0.026)	(0.036)	(0.025)	(0.025)	(0.026)	(0.025)	(0.025)	(0.025)	0.964
Observations	4600	2302	4603	4599	4598	4599	4603	4602	

Source: Own elaboration.

Table 2B. Test for Randomization. Experiment 2-Beliefs.

Variables	Pure Control	Policy Control	Experimental Control	Beliefs about likelihood	Beliefs about severity	Beliefs about effectiveness	Beliefs about safety	Beliefs about cost	Beliefs about government support	Beliefs about provider support	Joint H0 p-value
EPS Sanitas	0.131	0.130	0.141	0.139	0.134	0.144	0.133	0.143	0.139	0.134	0.428
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	
EPS Salud Total	0.108	0.111	0.103	0.106	0.114	0.102	0.104	0.117	0.106	0.110	0.296
	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	
EPS Famisanar	0.193	0.187	0.189	0.199	0.188	0.184	0.192	0.187	0.183	0.186	0.741
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	
EPS Compensar	0.150	0.152	0.154	0.153	0.154	0.149	0.152	0.144	0.159	0.156	0.784
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	
EPS Capital Salud	0.109	0.111	0.111	0.107	0.108	0.104	0.116	0.113	0.102	0.113	0.578
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)	(0.005)	
Other EPS	0.308	0.308	0.302	0.297	0.301	0.316	0.304	0.297	0.310	0.302	0.589
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	
Contributory Scheme	0.770	0.773	0.773	0.774	0.772	0.769	0.777	0.768	0.784	0.767	0.755
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	
Subsidized Scheme	0.143	0.147	0.145	0.144	0.146	0.143	0.148	0.147	0.137	0.149	0.926
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	
Uninsured	0.038	0.037	0.038	0.037	0.038	0.035	0.033	0.033	0.037	0.039	0.788
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	
Other scheme	0.049	0.043	0.044	0.045	0.044	0.053	0.042	0.052	0.042	0.045	0.069
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	
Colombian nationality	0.990	0.988	0.988	0.988	0.990	0.989	0.992	0.989	0.990	0.991	0.613

	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	
Ethnicity	0.009	0.009	0.008	0.010	0.009	0.006	0.008	0.006	0.008	0.005	0.096
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	
Displaced	0.016	0.017	0.022	0.016	0.015	0.019	0.016	0.019	0.016	0.019	0.323
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	
Daughter age	10.766	10.728	10.746	10.717	10.707	10.729	10.739	10.731	10.735	10.742	0.928
	(0.026)	(0.025)	(0.026)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.026)	
Observations	4600	4600	4594	4599	4597	4602	4593	4604	4599	4603	

Source: Own elaboration.

Table 2C. Test for Randomization. Experiment 3-Emotions.

Variables	Pure Control	Policy Control	Experimental Control	Anticipated Regret	Anticipated Worry	Soft-shame	Joint H0 p-value
EPS Sanitas	0.131	0.138	0.133	0.135	0.136	0.129	0.806
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	
EPS Salud Total	0.108	0.110	0.114	0.106	0.105	0.116	0.536
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	
EPS Famisanar	0.193	0.188	0.200	0.188	0.192	0.188	0.605
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	
EPS Compensar	0.150	0.150	0.148	0.151	0.142	0.149	0.882
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	
EPS Capital Salud	0.109	0.114	0.103	0.106	0.111	0.109	0.628
	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)	(0.005)	
Other EPS	0.308	0.300	0.302	0.314	0.313	0.310	0.598
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	
Contributory Scheme	0.770	0.761	0.776	0.773	0.764	0.772	0.569
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	
Subsidized Scheme	0.143	0.154	0.140	0.143	0.150	0.141	0.306
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	
Uninsured	0.038	0.038	0.040	0.035	0.039	0.042	0.500
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	
Other scheme	0.049	0.046	0.043	0.050	0.047	0.045	0.760
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	
Colombian nationality	0.990	0.986	0.988	0.990	0.990	0.988	0.326
	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	
Ethnicity	0.009	0.008	0.008	0.006	0.006	0.006	0.434
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	
Displaced	0.016	0.014	0.014	0.017	0.017	0.016	0.860
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	0.806
Daughter age	10.766	10.739	10.708	10.739	10.764	10.737	
	(0.026)	(0.025)	(0.025)	(0.025)	(0.026)	(0.025)	
Observations	4600	4603	4607	4601	4600	4600	

Source: Own elaboration.

Table 2D. Test for Randomization. Experiment 4-Decision Aids.

Variables	Pure control	Policy control	Experimental control	Altruism	Soft-default	Enhanced active choice	Pseudo sets	Joint H0 p-value
EPS Sanitas	0.131	0.138	0.147	0.139	0.144	0.137	0.129	0.157
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	
EPS Salud Total	0.108	0.105	0.104	0.111	0.109	0.100	0.108	0.715
	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)	(0.004)	(0.005)	
EPS Famisanar	0.193	0.184	0.195	0.189	0.197	0.194	0.186	0.614
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	
EPS Compensar	0.150	0.143	0.151	0.151	0.142	0.152	0.146	0.708
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	
EPS Capital Salud	0.109	0.120	0.108	0.114	0.108	0.113	0.118	0.360
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	
Other EPS	0.308	0.310	0.295	0.296	0.300	0.304	0.313	0.370
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	
Contributory Scheme	0.770	0.762	0.784	0.774	0.772	0.769	0.751	0.010
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	
Subsidized Scheme	0.143	0.156	0.139	0.144	0.149	0.153	0.161	0.028
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	
Uninsured	0.038	0.038	0.038	0.039	0.034	0.037	0.040	0.794
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	
Other scheme	0.049	0.044	0.039	0.043	0.045	0.041	0.047	0.274
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	
Colombian nationality	0.990	0.988	0.992	0.988	0.987	0.992	0.990	0.167
	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	
Ethnicity	0.009	0.009	0.007	0.007	0.006	0.010	0.010	0.368
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	
Displaced	0.016	0.019	0.018	0.016	0.015	0.016	0.023	0.065
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	
Daughter age	10.766	10.749	10.759	10.738	10.715	10.758	10.740	0.844
	(0.026)	(0.025)	(0.026)	(0.025)	(0.025)	(0.026)	(0.025)	
Observations	4600	4603	4602	4598	4604	4607	4604	

Source: Own elaboration.

Table 2E. Test for Randomization. Experiment 5-Social Norms.

Variables	Pure control	Policy control	Experimental control	Injunctive social norm	Positive Descriptive Norm	Quantitative Dynamic Norm	Qualitative Dynamic Norm	Trending Norm	Joint H0 p-value
EPS Sanitas	0.155	0.153	0.156	0.154	0.143	0.154	0.145	0.149	0.926
	(0.008)	(0.011)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	
EPS Salud Total	0.114	0.115	0.137	0.118	0.125	0.123	0.123	0.111	0.250
	(0.007)	(0.010)	(0.008)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	
EPS Famisanar	0.190	0.179	0.170	0.205	0.179	0.185	0.180	0.179	0.192
	(0.009)	(0.012)	(0.008)	(0.009)	(0.008)	(0.009)	(0.008)	(0.008)	
EPS Compensar	0.154	0.146	0.141	0.154	0.154	0.158	0.148	0.169	0.382
	(0.008)	(0.011)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	
EPS Capital Salud	0.144	0.147	0.140	0.133	0.154	0.140	0.153	0.153	0.474
	(0.008)	(0.011)	(0.008)	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)	
Other EPS	0.243	0.260	0.255	0.237	0.244	0.240	0.251	0.239	0.764
	(0.009)	(0.014)	(0.010)	(0.009)	(0.010)	(0.009)	(0.010)	(0.009)	
Contributory Scheme	0.765	0.751	0.751	0.772	0.751	0.772	0.751	0.753	0.424
	(0.009)	(0.014)	(0.010)	(0.009)	(0.010)	(0.009)	(0.010)	(0.010)	
Subsidized Scheme	0.171	0.173	0.175	0.158	0.187	0.172	0.190	0.183	0.170
	(0.008)	(0.012)	(0.008)	(0.008)	(0.009)	(0.008)	(0.009)	(0.009)	
Uninsured	0.029	0.034	0.037	0.033	0.026	0.029	0.030	0.027	0.537
	(0.004)	(0.006)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	
Other scheme	0.035	0.042	0.037	0.037	0.036	0.027	0.029	0.037	0.347
	(0.004)	(0.006)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	
Colombian nationality	0.979	0.972	0.972	0.974	0.982	0.979	0.975	0.978	0.410
	(0.003)	(0.005)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	
Ethnicity	0.010	0.004	0.006	0.003	0.008	0.004	0.005	0.003	0.060
	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	
Displaced	0.009	0.015	0.011	0.010	0.010	0.011	0.011	0.012	0.925
	(0.002)	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	
Daughter age	12.584	12.540	12.519	12.498	12.581	12.569	12.519	12.553	0.865
	(0.047)	(0.067)	(0.047)	(0.046)	(0.047)	(0.047)	(0.047)	(0.047)	
Observations	2051	1023	2048	2052	2046	2052	2052	2049	

Source: Own elaboration.

Table 2F. Test for Randomization. Experiment 6-Decision Aids.

Variables	Pure control	Policy control	Experimental control	Reminder Simple	Reminder Simple + Eliciting implementation intentions	Reminder Simple + Anchoring (date)	Pres. annoucement Standard	Pres. annoucement Standard + Eliciting implementation intentions	Pres. annoucement Standard + Anchoring (date)	Priming Question-behavior Effect	Priming Mere-measurement Effect	Implementation intentions	Implementation intentions + Anchoring (this week as T9)	Implementation intentions+ Urgency (vaccinate this week)	Joint H0 p-val.
EPS Sanitas	0.155	0.142	0.157	0.154	0.164	0.160	0.169	0.146	0.155	0.156	0.150	0.153	0.167	0.155	0.585
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	
EPS Salud Total	0.114	0.131	0.137	0.132	0.136	0.132	0.121	0.122	0.131	0.118	0.114	0.120	0.133	0.124	0.285
	(0.007)	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	
EPS Famisanar	0.190	0.181	0.173	0.184	0.174	0.177	0.189	0.196	0.169	0.189	0.189	0.187	0.178	0.186	0.610
	(0.009)	(0.009)	(0.008)	(0.009)	(0.008)	(0.008)	(0.009)	(0.009)	(0.008)	(0.009)	(0.009)	(0.009)	(0.008)	(0.009)	
EPS Compensar	0.154	0.164	0.156	0.167	0.156	0.157	0.161	0.166	0.152	0.159	0.157	0.154	0.144	0.156	0.905
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	
EPS Capital Salud	0.144	0.149	0.134	0.142	0.137	0.140	0.125	0.141	0.141	0.145	0.139	0.154	0.150	0.148	0.536
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	
Other EPS	0.243	0.233	0.243	0.222	0.233	0.234	0.235	0.228	0.252	0.234	0.250	0.232	0.227	0.231	0.622
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.010)	(0.009)	(0.010)	(0.009)	(0.009)	(0.009)	
Contributory Scheme	0.765	0.748	0.758	0.773	0.772	0.761	0.780	0.769	0.761	0.759	0.753	0.755	0.756	0.764	0.584
	(0.009)	(0.010)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.010)	(0.010)	(0.009)	(0.009)	
Subsidized Scheme	0.171	0.178	0.164	0.166	0.162	0.174	0.163	0.170	0.172	0.175	0.175	0.178	0.179	0.174	0.947
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	
Uninsured	0.029	0.036	0.034	0.030	0.033	0.028	0.027	0.027	0.033	0.034	0.033	0.026	0.028	0.028	0.748
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	
Other scheme	0.035	0.039	0.044	0.032	0.033	0.038	0.029	0.034	0.034	0.032	0.039	0.041	0.038	0.035	0.428
	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	
Colombian nationality	0.979	0.977	0.974	0.977	0.974	0.980	0.981	0.978	0.975	0.973	0.979	0.981	0.979	0.978	0.784
	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	

Ethnicity	0.010	0.006	0.006	0.004	0.004	0.009	0.005	0.003	0.007	0.004	0.005	0.006	0.005	0.004	0.151
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	
Displaced	0.009	0.013	0.013	0.005	0.009	0.012	0.010	0.008	0.010	0.009	0.018	0.013	0.015	0.011	0.032
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	
Daughter age	12.584	12.508	12.515	12.491	12.546	12.528	12.514	12.549	12.562	12.558	12.508	12.531	12.521	12.546	0.992
	(0.047)	(0.046)	(0.046)	(0.046)	(0.046)	(0.047)	(0.046)	(0.046)	(0.046)	(0.046)	(0.047)	(0.046)	(0.046)	(0.048)	
Observations	2051	2049	2048	2054	2056	2051	2049	2052	2048	2053	2055	2047	2051	2046	

Source: Own elaboration.

Table 2G. Test for Randomization. Planning Tools for Experiments 1, 2, 3, and 4.

Variables	Pure control	Planning tool-link	Planning tool-phone	Joint H0 p-value
EPS Sanitas	0.131	0.147	0.126	0.089
	(0.005)	(0.007)	(0.007)	
EPS Salud Total	0.108	0.115	0.107	0.612
	(0.005)	(0.007)	(0.006)	
EPS Famisanar	0.193	0.199	0.188	0.629
	(0.006)	(0.008)	(0.008)	
EPS Compensar	0.150	0.142	0.148	0.694
	(0.005)	(0.007)	(0.007)	
EPS Capital Salud	0.109	0.122	0.123	0.155
	(0.005)	(0.007)	(0.007)	
Other EPS	0.308	0.275	0.308	0.010
	(0.007)	(0.009)	(0.010)	
Contributory Scheme	0.770	0.778	0.757	0.262
	(0.006)	(0.009)	(0.009)	
Subsidized Scheme	0.143	0.147	0.154	0.489
	(0.005)	(0.007)	(0.008)	
Uninsured	0.038	0.029	0.040	0.076
	(0.003)	(0.003)	(0.004)	
Other scheme	0.049	0.047	0.049	0.920
	(0.003)	(0.004)	(0.004)	
Colombian nationality	0.990	0.988	0.988	0.835
	(0.001)	(0.002)	(0.002)	
Ethnicity	0.009	0.006	0.013	0.062
	(0.001)	(0.002)	(0.002)	
Displaced	0.016	0.018	0.013	0.427
	(0.002)	(0.003)	(0.002)	
Daughter age	10.766	10.683	10.743	0.165
	(0.026)	(0.034)	(0.036)	
Observations	4600	2297	2301	

Source: Own elaboration.

Table 2H. Test for Randomization. Planning Tools for Experiments 5 and 6.

Variables	Pure control	Planning tool-link	Joint H0 p-value
EPS Sanitas	0.155	0.140	0.255
	(0.008)	(0.011)	
EPS Salud Total	0.114	0.112	0.908
	(0.007)	(0.010)	
EPS Famisanar	0.190	0.191	0.943
	(0.009)	(0.012)	
EPS Compensar	0.154	0.161	0.595
	(0.008)	(0.011)	
EPS Capital Salud	0.144	0.151	0.610
	(0.008)	(0.011)	
Other EPS	0.243	0.245	0.923
	(0.009)	(0.013)	
Contributory Scheme	0.765	0.758	0.670
	(0.009)	(0.013)	
Subsidized Scheme	0.171	0.178	0.633
	(0.008)	(0.012)	
Uninsured	0.029	0.026	0.646
	(0.004)	(0.005)	
Other scheme	0.035	0.038	0.680
	(0.004)	(0.006)	
Colombian nationality	0.979	0.983	0.408
	(0.003)	(0.004)	
Ethnicity	0.010	0.007	0.413
	(0.002)	(0.003)	
Displaced	0.009	0.012	0.523
	(0.002)	(0.003)	
Daughter age	12.584	12.525	0.465
	(0.047)	(0.065)	
Observations	2051	1025	

Source: Own elaboration.

Table A1. SMS Content for Experiment 1. Social Norms.

Number		*Behavioral Principle*	*Fixed Element 1*	*Fixed Element 2*	*SMS Content*	*SMS content in English*	*Sample size*
1	*Control*	*Pure control*	*None*	*None*	*No message*	*No message*	*4,600*
2		*Policy control*	*None*	*Sender*	*Vacúnalo: bríndale a tu hijo o hija toda la protección. Consulta en https://bit.ly/ssaludbog el punto más cercano. Secretaría de Salud*	*Vaccinate him/her: give your son or daughter full protection. Consult https://bit.ly/ssaludbog for the nearest point. Secretary of Health*	*2,302*
3		*Experimental control*	*Personalized*	*Sender*	*Hola XXXXXXXXXX. Vacúnala contra el VPH: bríndale toda la protección. Secretaría de Salud*	*Hello XXXXXXXXXXXXX. Vaccinate her against HPV: give her all the protection. Secretary of Health*	*4,603*
4	*Static design*	*Injunctive social norm*	*Personalized*	*Sender*	*Hola XXXXXXXXXX. X de cada 10 padres en tu localidad perdieron la opción de vacunar a sus hijas contra el VPH y cuidarlas del cáncer :(. Secretaría de Salud*	*Hello XXXXXXXXXX. X out of 10 parents in your locality lost the option of vaccinating their daughters against HPV and taking care of them from cancer :(. Secretary of Health*	*4,599*
5		*Positive descriptive norm*	*Personalized*	*Sender*	*Hola XXXXXXXXXX. X de cada 10 padres en tu localidad vacunaron a sus hijas contra el VPH y las protegieron contra el cáncer. Secretaría de Salud*	*Hello XXXXXXXXXXXXX. X out of 10 parents in your locality vaccinated their daughters against HPV and protected them against cancer. Secretary of Health*	*4,598*
6		*Negative descriptive norm*	*Personalized*	*Sender*	*Hola XXXXXXXXXX. X de cada 10 padres en tu localidad perdieron la opción de vacunar a sus hijas contra el VPH y cuidarlas del cáncer. Secretaría de Salud*	*Hello XXXXXXXXXXXXX. X out of 10 parents in your locality lost the option to vaccinate their daughters against HPV and take care of them against cancer. Secretary of Health*	*4,599*
7	*Dynamic design*	*Dynamic norm*	*Personalized*	*Sender*	*Hola XXXXXXXXXX. Desde 2016, 4 de cada 10 padres en Bogotá han empezado a vacunar a sus hijas contra el VPH cuidándolas del cáncer. Secretaría de Salud*	*Hello XXXXXXXXXXXXX. Since 2016, 4 out of 10 parents in Bogota have started vaccinating their daughters against HPV guarding them against cancer. Secretary of Health*	*4,603*
8		*Trending norm*	*Personalized*	*Sender*	*Hola XXXXXXXXXX. 4 de cada 10 padres en Bogotá han vacunado a sus hijas contra el*	*Hello XXXXXXXXXX. 4 out of 10 parents in Bogotá have vaccinated their daughters against HPV caring for them from cancer,*	*4,602*

					VPH cuidándolas del cáncer, un alza del 128% desde 2016. Secretaría de Salud	*an increase of 128% since 2016. Secretary of Health*	

Overall Sample size: 34,506

Table A2. SMS Content for Experiment 2. Beliefs.

Number		*Behavioral Principle*	*Fixed Element 1*	*Fixed Element 2*	*Fixed Element 3*	*SMS Content*	*SMS content in English*	*Sample size*
1	*Control*	*Pure control*	*None*	*None*	*None*	*No message*	*No message*	*4,600*
2		*Policy control*	*None*	*None*	*Sender*	*Vacúnalo: bríndale a tu hijo o hija toda la protección. Secretaría de Salud*	*Vaccinate him/her: give your son or daughter full protection. Secretary of Health*	*4,600*
3		*Experimental control*	*Personalized*	*Milkman's insight*	*Sender*	*Hola XXXXXXXXXX Hay una vacuna contra el VPH que espera a tu hija. Secretaría de Salud*	*Hello XXXXXXXXXX There is an HPV vaccine waiting for your daughter. Secretary of Health*	*4,594*
4	*Beliefs about VPH*	*Beliefs about likelihood*	*Personalized*	*Milkman's insight*	*Sender*	*Hola XXXXXXXXXX ¿Sabías que la probabilidad de contagio de VPH para tu hija es del 80%? Hay una vacuna contra el VPH que espera a tu hija. Secretaría de Salud*	*Hello XXXXXXXXXX Did you know that the probability of HPV infection for your daughter is 80%? There is an HPV vaccine waiting for your daughter. Secretary of Health*	*4,599*
5		*Beliefs about severity*	*Personalized*	*Milkman's insight*	*Sender*	*Hola XXXXXXXXXX ¿Sabías que en el 2018, 974 mujeres con VPH desarrollan cáncer en Bogotá? Hay una vacuna contra el VPH que espera a tu hija. Secretaría de Salud*	*Hello XXXXXXXXXXXXXX Did you know that in 2018, 974 women with HPV develop cancer in Bogota? There's an HPV vaccine waiting for your daughter. Secretary of Health*	*4,597*
6	*Beliefs about VPH vaccine*	*Beliefs about effectiveness*	*Personalized*	*Milkman's insight*	*Sender*	*Hola XXXXXXXXXX ¿Sabías que la vacuna del VPH reduce 89% el riesgo de cáncer cervical? Hay una vacuna contra el VPH que espera a tu hija. Secretaría de Salud*	*Hello XXXXXXXXXX Did you know that the HPV vaccine reduces the risk of cervical cancer by 89%? There is an HPV vaccine waiting for your daughter. Secretary of Health*	*4,602*
7		*Beliefs about safety*	*Personalized*	*Milkman's insight*	*Sender*	*Hola XXXXXXXXXX. ¿Sabes que la vacuna contra el VPH es la más segura del plan de vacunación?*	*Hello XXXXXXXXXX. Do you know that the HPV vaccine is the safest in the vaccination plan? There is a vaccine waiting*	*4,593*

						Hay una vacuna que espera a tu hija. Secretaría de Salud	*for your daughter. Secretary of Health*	
8		*Beliefs about cost*	*Personalized*	*Milkman's insight*	*Sender*	*Hola XXXXXXXXXX ¿Sabías que la vacuna contra el VPH es gratuita? Hay una vacuna contra el VPH que espera a tu hija. Secretaría de Salud*	*Hello XXXXXXXXXX Did you know that the HPV vaccine is free? There is an HPV vaccine waiting for your daughter. Secretary of Health*	*4,604*
9	*Beliefs about government support*	*Beliefs about government support*	*Personalized*	*Milkman's insight*	*Sender*	*Hola XXXXXXXXXX La Secretaría de Salud recomienda que vacunes a tu hija contra el VPH. Hay una vacuna contra el VPH que espera a tu hija. Secretaría de Salud*	*Hello XXXXXXXXXX The Secretary of Health recommends that you vaccinate your daughter against HPV. There is an HPV vaccine waiting for your daughter. Secretary of Health*	*4,599*
10	*Beliefs about provider support*	*Beliefs about provider support*	*Personalized*	*Milkman's insight*	*Sender*	*Hola XXXXXXXXXX. Los médicos especialistas recomiendan la vacunación de tu hija contra el VPH. Hay una vacuna esperando por tu hija. Secretaría de Salud*	*Hello XXXXXXXXXX. Specialist doctors recommend vaccinating your daughter against HPV. There is a vaccine waiting for your daughter. Secretary of Health*	*4,603*

Overall Sample size: 45,991

Table A3. SMS Content for Experiment 3. Emotions.

Number	*Behavioral Principle*	*Fixed Element 1*	*Fixed Element 2*	*Fixed Element 3*	*Fixed Element 4*	*SMS Content*	*SMS content in English*	*Sample size*
1	*Pure control*	*None*	*None*	*None*	*None*	*No message*	*No message*	*4,600*
2	*Policy control*	*None*	*Closest vaccination point*	*Call for action*	*Sender*	*Vacúnalo: bríndale a tu hijo o hija toda la protección. Vacuna a tu hija y protégela del cáncer cervical. Secret. de Salud*	*Vaccinate him/her: give your son or daughter full protection. Vaccinate your daughter and protect her from cervical cancer. Secretary of Health*	*4,603*
3	*Experimental control*	*Personalized*	*Closest vaccination point*	*Call for action*	*Sender*	*Hola XXXXXXXXXX. Vacuna a tu hija contra el VPH. Consulta aquí el punto más cercano https://bit.ly/ssaludbog . Secret. de Salud*	*Hello XXXXXXXXXX. Vaccinate your daughter against HPV. Check here for the nearest point https://bit.ly/ssaludbog . Secret. of health*	*4,607*
4	*Anticipated regret*	*Personalized*	*Closest vaccination point*	*Call for action*	*Sender*	*Hola XXXXXXXXXX. Vacuna tu hija contra el VPH y no lamentaras un cáncer después. Consulta aquí el punto más cercano https://bit.ly/ssaludbog . Secret. de Salud*	*Hello XXXXXXXXXX. Vaccine your daughter against HPV and you will not regret a cancer later. Check here the nearest point https://bit.ly/ssaludbog. Secret. of health*	*4,601*
5	*Anticipated worry*	*Personalized*	*Closest vaccination point*	*Call for action*	*Sender*	*Hola XXXXXXXXXX. Vacuna tu hija contra el VPH y no te preocupes por cancer despues. Consulta aquí el punto más cercano https://bit.ly/ssaludbog Secret. de Salud*	*Hello XXXXXXXXXX. Get your daughter vaccinated against HPV, and don't worry about cancer later. Check here the closest point https://bit.ly/ssaludbog. Secret. of health*	*4,600*

6	*Soft-shame*	*Personalized*	*Closest vaccination point*	*Call for action*	*Sender*	*Hola XXXXXXXXXX. Tu hija no tiene la vacuna contra el VPH :(Vacuna a tu hija. Consulta aquí el punto más cercano https://bit.ly/ssaludbog . Secret. de Salud*	*Hello XXXXXXXXXX. Your daughter is not vaccinated against HPV :(Vaccinate your daughter. Consult the nearest point at https://bit.ly/ssaludbog. Secret. of health*	*4,600*

Overall Sample size: 27,611

Table A4. SMS Content for Experiment 4. Decision Aids.

Number	*Behavioral Principle*	*Fixed Element 1*	*Fixed Element 2*	*Fixed Element 3*	*SMS Content*	*SMS content in English*	*Sample size*
1	*Pure control*	*None*	*None*	*None*	*No message*	*No message*	*4,600*
2	*Policy control*	*None*	*None*	*Sender*	*Vacúnalo: bríndale a tu hijo o hija toda la protección. Secretaría de Salud*	*Vaccinate him/her: give your son or daughter full protection. Secretary of Health*	*4,603*
3	*Experimental control*	*Personalized*	*Belief about cost*	*Sender*	*Hola XXXXXXXXXX. La vacuna contra el VPH es gratuita. Secretaría de Salud*	*Hello XXXXXXXXXXXXX. The HPV vaccine is free. Secretary of Health*	*4,602*
4	*Altruism*	*Personalized*	*Belief about cost*	*Sender*	*Hola XXXXXXXXXX. Vacuna a tu hija contra el VPH y protégela del cáncer cervical. La vacuna es gratuita. Secretaría de Salud*	*Hello XXXXXXXXXXXXX. Vaccinate your daughter against HPV and protect her from cervical cancer. The vaccine is free. Secretary of Health*	*4,598*
5	*Soft-default*	*Personalized*	*Belief about cost*	*Sender*	*Hola XXXXXXXXXX. Tienes una cita el xx de *MES* a las (X) am/pm para vacunar a tu hija contra el VPH. La vacuna es gratuita. Secretaria de Salud*	*Hello XXXXXXXXXXXXX. You have an appointment on the XX of *MONTH* at (X) am/pm to have your daughter vaccinated against HPV. The vaccine is free. Secretary of Health*	*4,604*
6	*Enhanced active choice*	*Personalized*	*Belief about cost*	*None*	*Hola XXXXXXXXXX ¿Quieres vacunar gratis a tu hija contra VPH?* *1 = Sí* *2 = No, prefiero correr el riesgo que desarrolle un cáncer cervical. Secretaria de Salud*	*Hello XXXXXXXXXXXXX Do you want to vaccinate your daughter against HPV for free?* *1 = Yes* *2 = No, I prefer to take the risk of her developing cervical cancer. Secretary of Health*	*4,607*
7	*Pseudo sets*	*Personalized*	*Belief about cost*	*Sender*	*Hola XXXXXXXXXX. Tu hija debe tener 21 vacunas en su carné de vacunación y aún le falta la vacuna contra el VPH. La vacuna es gratuita. Secretaria de Salud*	*Hello XXXXXXXXXXXXX. Your daughter should have 21 vaccines on her immunization record and is still missing the HPV vaccine. The vaccine is free. Secretary of Health*	*4,604*

Overall Sample size: 32,218

Table A5. SMS Content for Experiment 5. Social Norms.

Number		*Behavioral Principle*	*Fixed Element 1*	*Fixed Element 2*	*SMS Content*	*SMS content in English*	*Sample size*
1	*Control*	*Pure control*	*None*	*None*	*No message*	*No message*	*2,051*
2		*Policy control*	*None*	*Sender*	*Vacúnalo: bríndale a tu hijo o hija toda la protección. Consulta en https://bit.ly/ssaludbog el punto más cercano. Sec. de Salud*	*Vaccinate him/her: give your son or daughter full protection. Consult https://bit.ly/ssaludbog for the nearest point. Secretary of Health*	*1,023*
3		*Experimental control*	*Personalized*	*Sender*	*Hola XXXXXXXXXX. Ponle a tu hija la 2da vacuna contra el VPH: bríndale toda la protección. Sec. de Salud*	*Hello XXXXXXXXXXXXXXX. Give your daughter the 2nd HPV vaccine: give her full protection. Sec. of Health*	*2,048*
4	*Static design*	*Injunctive social norm localidad*	*Personalized*	*Sender*	*Hola XXXXXXXXX. El XX% de padres de familia en tu localidad ya le pusieron la 2da vacuna contra el VPH a sus hijas. Faltas tu :(. Secretaria de Salud*	*Hello XXXXXXXXXX. XX% of parents in your area have already given the 2nd HPV vaccine to their daughters. You are missing :(. Secretary of Health*	*2,052*
5		*Positive descriptive norm localidad*	*Personalized*	*Sender*	*Hola XXXXXXXXX. El XX% de padres de familia en tu localidad ya le pusieron la 2da vacuna contra el VPH a sus hijas. Sec. de Salud*	*Hello XXXXXXXXXX. XX% of parents in your locality have already given the 2nd HPV vaccine to their daughters. Sec. of Health*	*2,046*
6	*Dynamic design*	*Quantitative Dynamic Norm localidad*	*Personalized*	*Sender*	*Hola XXXXXXXXX. El XX% de padres de familia en tu localidad ya le pusieron la 2da vacuna contra el VPH a sus hijas y cada vez se suman más. Sec. de Salud*	*Hello XXXXXXXXXX. XX% of parents in your locality have already given the 2nd HPV vaccine to their daughters and many more are joining in. Sec. of Health*	*2,052*
7		*Qualitative Dynamic norm localidad*	*Personalized*	*Sender*	*Hola XXXXXXXXX. Cada vez mas padres de familia en tu localidad le ponen la 2da vacuna contra el VPH a sus hijas. Sec. de Salud*	*Hello XXXXXXXXXX. More and more parents in your locality are giving the 2nd HPV vaccine to their daughters. Sec. of Health*	*2,052*
8		*Trending norm*	*Personalized*	*Sender*	*Hola XXXXXXXXX. Desde el 2016 aumentó 83% el número de padres de familia en Bogotá que le pusieron la 2da*	*Hello XXXXXXXXXX. Since 2016 increased 83% the number of parents in Bogota who gave the 2nd HPV vaccine to their daughters. Sec. of Health*	*2,049*

					vacuna contra el VPH a sus hijas. Sec. de Salud		

Overall Sample size: 15,373

Table A6. SMS Content for Experiment 6. Decision Aids.

Number		*Behavioral Principle*	*Fixed Element 1*	*Fixed Element 2*	*Fixed Element 3*	*SMS Content*	*SMS content in English*	*Sample size*
1	*Control*	*Pure control*	*None*	*None*	*None*	*No message*	*No message*	*2,051*
2		*Policy control*	*None*	*None*	*Sender*	*Vacúnalo: bríndale a tu hijo o hija toda la protección. Secretaría de Salud*	*Vaccinate him/her: give your son or daughter full protection. Secretary of Health*	*2,049*
3		*Experimental control*	*Personalized*	*Milkman's insight*	*Sender*	*Hola XXXXXXXXXX. Hay una vacuna contra el VPH esperando por tu hija. Secretaría de Salud*	*Hello XXXXXXXXXX. There is an HPV vaccine waiting for your daughter. Secretary of Health*	*2,048*
4	*Reminders*	*Simple*	*Personalized*	*Milkman's insight*	*Sender*	*Hola XXXXXXXXXX. Recuerda que a tu hija aun le falta la segunda dosis de la vacuna contra el VPH. Hay una vacuna esperandola. Secretaria de Salud*	*Hello XXXXXXXXXX. Remember that your daughter is still missing her second dose of the HPV vaccine. There is a vaccine waiting for her. Secretary of Health*	*2,054*
5		*Simple+Eliciting implementation intentions*	*Personalized*	*Milkman's insight*	*Sender*	*Hola XXXXXXXXXX. Recuerda que a tu hija aun le falta la segunda dosis de la vacuna contra el VPH. Hay una vacuna esperándola. ¿La vacunaras? Secret. de Salud*	*Hello XXXXXXXXXX. Remember that your daughter is still missing her second dose of the HPV vaccine. There is a vaccine waiting for her. Will you vaccinate her? Secretary of Health*	*2,056*
6		*Simple+Anchoring (date)*	*Personalized*	*Milkman's insight*	*Sender*	*Hola XXXXXXXXXX. Recuerda que a tu hija aun le falta la segunda dosis de la vacuna contra el VPH. Hay una vacuna esperándola esta semana. Secret. de Salud*	*Hello XXXXXXXXXX. Remember that your daughter is still missing her second dose of the HPV vaccine. There is a vaccine waiting for her this week. Secretary of Health*	*2,051*

7	*Presumptive announcements*	*Standard*	*Personalized*	*Milkman's insight*	*Sender*	*Hola XXXXXXXXXX. Es momento de aplicarle la segunda dosis de la vacuna contra el VPH a tu hija. Hay una vacuna esperandola. Secretaría de Salud*	*Hello XXXXXXXXXX. It is time to give your daughter the second dose of the HPV vaccine. There is a vaccine waiting for her. Secretary of Health*	*2,049*
8		*Standard+Eliciting implementation intentions*	*Personalized*	*Milkman's insight*	*Sender*	*Hola XXXXXXXXXX. Es momento de aplicarle la segunda dosis de la vacuna contra el VPH a tu hija. Hay una vacuna esperandola. ¿La vacunaras? Secretaría de Salud*	*Hello XXXXXXXXXX. It is time to give your daughter the second dose of the HPV vaccine. There is a vaccine waiting for her. Will you vaccinate her? Secretary of Health*	*2,052*
9		*Standard+Anchoring (date)*	*Personalized*	*Milkman's insight*	*Sender*	*Hola XXXXXXXXXX. Es momento de aplicarle la segunda dosis de la vacuna contra el VPH a tu hija. Hay una vacuna esperandola esta semana. Secretaría de Salud*	*Hello XXXXXXXXXX. It is time to give your daughter the second dose of the HPV vaccine. There is a vaccine waiting for her this week. Secretary of Health*	*2,048*
10	*Priming*	*Question-behavior effect*	*Personalized*	*Milkman's insight*	*Sender*	*Hola XXXXXXXXXX. ¿Llevaras a tu hija a recibir la 2da dosis de la vacuna contra el VPH? 1: Si, 2: No. Hay una vacuna esperandola. Secret. de Salud*	*Hello XXXXXXXXXX. Will you take your daughter to get the 2nd dose of the HPV vaccine? 1: Yes, 2: No. There is a vaccine waiting for her. Secretary of Health*	*2,053*
11		*Mere-measurement effect*	*Personalized*	*Milkman's insight*	*Sender*	*Hola XXXXXXXXXX. ¿Llevaras a tu hija a recibir la 2da dosis de la vacuna contra el VPH? 1: Seguro 2: Probablemente. Hay una vacuna esperandola. Secret. de Salud*	*Hello XXXXXXXXXX. Will you take your daughter to get the 2nd dose of the HPV vaccine? 1: Sure 2: Probably. There is a vaccine waiting for her. Secretary of Health*	*2,055*
12	*Planning tools*	*Implementation intentions*	*Personalized*	*Milkman's insight*	*Sender*	*Hola XXXXXXXXXX. Escoge el dia y la hora para aplicarle a tu hija la 2da dosis de la vacuna contra el VPH. Hay una vacuna esperandola. Secretaria de Salud*	*Hello XXXXXXXXXX. Choose the day and time to give your daughter the 2nd dose of the HPV vaccine. There is a vaccine waiting for her. Secretary of Health*	*2,047*

13		*Implementation intentions + Anchoring (this week as T9)*	*Personalized*	*Milkman's insight*	*Sender*	*Hola XXXXXXXXXX. Escoge el día y la hora esta semana para aplicarle a tu hija la 2da vacuna contra el VPH. Hay una vacuna esperandola. Secretaria de Salud*	*Hello XXXXXXXXXX. Pick a day and time this week to give your daughter the 2nd dose of the HPV vaccine. There is a vaccine waiting for her. Secretary of Health*	*2,051*
14		*Implementation intentions + Urgency (vaccinate this week)*	*Personalized*	*Milkman's insight*	*Sender*	*Hola XXXXXXXXXX. Escoge el día y la hora para aplicarle esta semana la 2da vacuna contra el VPH a tu hija. Hay una vacuna esperandola. Secretaria de Salud*	*Hello XXXXXXXXXX. Choose the day and time to give your daughter the 2nd HPV vaccine this week. There is a vaccine waiting for her. Secretary of Health*	*2,046*

Overall Sample size: 28,710

Table A7. SMS Content for Experiment 7. Cross-randomized Planning Tool.

Panel A. Experiments 1, 2, 3 and 4.

Number	*Behavioral Principle*	*Fixed Element 1*	*SMS Content*	*SMS content in English*	*Sample size*
1	*Pure control*	*None*	*No message*	*No message*	*4,600*
2	*Planning tool (link)*	*Sender*	*Haz tu cita para vacunar a tu hija contra el VPH en el sitio de vacunación más cercano: https://bit.ly/ssaludbog . Secretaria de Salud*	*Make your appointment to vaccinate your daughter against HPV at the nearest vaccination site: https://bit.ly/ssaludbog . Secretary of Health*	*2,297*
3	*Planning tool (telephone)*	*Sender*	*Llama al call center de la Secretaría de Salud al 6013295090 para más información sobre vacunación contra el VPH. Secretaria de Salud*	*Call the call center of the Secretary of Health at 6013295090 for more information on vaccination against HPV. Secretary of Health*	*2,301*

Overall Sample size: 9,198

Panel B. Experiments 5 and 6.

Number	*Behavioral Principle*	*Fixed Element 1*	*SMS Content*	*SMS content in English*	*Sample size*
1	*Pure control*	*None*	*No message*	*No message*	*2,051*
2	*Planning tool (link)*	*Sender*	*Haz tu cita para vacunar a tu hija contra el VPH en el sitio de vacunación más cercano: https://bit.ly/ssaludbog . Secretaria de Salud*	*Make your appointment to vaccinate your daughter against HPV at the nearest vaccination site: https://bit.ly/ssaludbog . Secretary of Health*	*1,025*

Overall Sample size: 3,076