

# Nudging Null Effects: Reminders Did Not Induce Primary Health Care Utilization

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## Abstract

We conducted a large-scale randomized controlled trial to examine the effectiveness of an informational campaign that reminded citizens aged 55 and above about the importance of early detection and treatment of health conditions. The campaign, that took place during the second year of the COVID-19 pandemic, also informed citizens about a policy change that abolished the copayment for nurse visits in primary care. Drawing on comprehensive administrative data, we study whether the campaign increased primary care utilization. Our results indicate that neither the intervention in general nor the information on the copayment abolition increased primary care utilization. We find no evidence of treatment effect heterogeneity. These findings suggest that informational outreach programs may not be effective in inducing curative primary care visits in a gatekeeping system. They are also a healthy reminder that not all nudges always work.

**Keywords:** Reminder, nudge, cost-sharing, copayment, health care use, primary care, randomized controlled trial

**JEL codes:** I12, I18, I13, H42

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# 1 Introduction

Low-income individuals often have worse access to primary health care (PHC) than wealthier persons — a significant challenge for public health policy in many countries. Inequality in access to primary care has led to calls for more investment in PHC and lower out-of-pocket costs. A common rationale for these access-improving proposals is a conjecture that investments in PHC may lead to long-term savings due to improved health.

We aimed to analyze the effectiveness of PHC services for marginal patients. To induce exogenous variation in PHC use, we conducted a large-scale randomized controlled trial in which we sent informational letters to Finnish citizens aged 55 and above. The letters reminded about the importance of early detection and treatment of health conditions, and informed citizens about a policy change that abolished the copayment for nurse visits in PHC. The outreach campaign took place in late 2021, a time by which unmet health needs had accumulated during the COVID-19 pandemic.

In spirit, we followed Goldin et al. (2020) who illustrate how an easily implementable and inexpensive randomized outreach program can be used to study not only intent-to-treat effects but also the downstream effects of the behavior the experiment induces. More generally, our study relates to an extensive literature on the impacts of cost-sharing (e.g., Finkelstein et al., 2012; Newhouse & the Insurance Experiment Group, 1993) and price transparency (Kling et al., 2012; Lieber, 2017) on health care use. However, instead of randomizing different cost-sharing schemes, we exploited exogenous variation in information about a recent reform in cost-sharing.

This paper summarizes the key findings of our trial. The paper is accompanied by a populated pre-analysis plan (PAP), following the suggestion by Banerjee et al. (2020), that reports the full set of our pre-registered analyses (Haaga et al., 2022). It is noteworthy that our PAP was written using a format of a placebo report and contained all statistical programs used to clean, mutate, and analyze the data as if the trial would have been conducted two years earlier (analysis blinding). By following the PAP, we aim to increase the credibility of our findings (Brodeur et al., 2022; Gelman & Loken, 2014).

We find that neither receiving a reminder in general nor information about the abolition of copayments affected the use of curative nurse and GP visits during a 6-month follow-up. The effect estimates on annualized nurse and GP visits are statistically insignificant and close to zero, the largest relative change being 0.7% in absolute value. When receiving any reminder is the intervention, our confidence intervals are relatively tight and do not include effects larger than +3.8% for nurse visits and +2.5% for GP visits. The effect estimates on the indicator of having any such visits are also insignificant and mostly close to zero. We find no heterogeneity in the null average effects using pre-registered heterogeneity tests and data-driven machine learning methods.<sup>1</sup>

Our paper contributes to the literature aiming to understand the effectiveness of subtle choice architecture interventions (nudges) at changing human behavior (Maier et al., 2022; Mertens et al., 2022). Relevant to this debate, a recent literature suggests that the large average effect sizes of various nudge interventions reported in academic journals are largely explained by publication bias with null results being underrepresented (DellaVigna & Linos, 2022; Szaszi et al., 2022). At the same time, it is important to notice that nonsignificant results may provide substantially more information than significant results, even when precision is low, if there are no reasons to put substantial prior probability on a point null (Abadie, 2020). Thus, the scientific debate is expected to benefit from actions to reduce the file drawer problem and publication bias against negative results.

Instead of sweeping conclusions based on average effects, it appears important to understand when and where some nudges have positive effects and why others do not (Szaszi et al., 2022). Accordingly, we note that simple reminder letters have previously had positive effects in a health domain and increased influenza vaccination coverage in the Finnish elderly population (Sääksvuori et al., 2022). It is noteworthy that these vaccines are available free-of-charge as a walk-in service and the expected benefit is strictly positive for individuals. In contrast, access to

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<sup>1</sup>Of several tests, only the difference in effects on the number of nurse visits for those who had curative pre-trial public PHC visits is significant when not adjusted for multiple testing. However, a corresponding estimate on having any nurse visits is insignificant.

curative PHC visits is constrained by gatekeeping and waiting times. Healthy individuals receiving reminders (a majority) are not expected to contact PHC nor get an appointment, attenuating the effects. Overall, our findings suggest that informational outreach programs may not be effective in inducing curative PHC visits in the presence of gatekeeping.

## **2 Institutional Background**

Finland has universal health coverage, funded primarily by taxes. Finnish public PHC is characterized by gatekeeping by nurses, varying waiting times for non-urgent care, and modest copayments. Pensioners, the unemployed, and low-income individuals often rely on public PHC, while the employed tend to prefer occupational healthcare or private clinics due to faster access and less or no gatekeeping. Counties organize public PHC. The state coordinates and regulates public PHC, but counties can set their copayments within the national limits.

The supply of public health services is often considered to be tight as there seems to be a shortage of doctors working in public PHC and all public providers face fiscal pressures. Moreover, many nurses were allocated to test, trace, and treat COVID-19 patients during the pandemic. Overall, the number of nurse visits per capita was nationally 5–19% lower during our follow-up period of 10/2021–4/2022 compared to the monthly means in 2018–2019 (Haaga et al., 2023).

The Government of Finland reformed a law on copayments in July 2021, aiming to reduce barriers to access. The reform nationally abolished copayments for PHC nurse visits where many patients with chronic (e.g., diabetes) or acute (e.g., infectious diseases) conditions are treated and monitored. Of our three trial regions, two regions charged copayments of 10.0€ and 11.4€ before the reform, paid for three visits annually. In one region, patients could choose between an annual copayment of 41.2€ and a per-visit copayment of 20.6€.

### 3 Methods and Data

**Intervention.** The study included three treatment arms (T1–T3). The control group received no informational letter (T0). The base reminder (T1) started as follows: *Many non-COVID health care contacts have been missed during the COVID-19 pandemic in Finland. If care is not sought at the right time, there is a risk of further deterioration of health. Diagnosing and treating diseases may be delayed. Chronic conditions may worsen. With this letter, we want to remind you and your household members that you can contact your local health center to treat potential health problems.* The letter was mailed to individuals' home addresses and was localized to each PHC area but did not refer to the trial.

Our copayment reminders (T2–T3) were similar to the base reminder but added the following sentences: *We also want to inform you about the reformed Act on Client Charges in Healthcare and Social Welfare which has affected primary care copayments. Due to the new law, all primary care nurse visits have become free of charge in Finland from July 1st, 2021.* Unlike Reminder T2, Reminder T3 mentioned the unchanged level of GP visit copayments. The reminders for one region (South Karelia) are available, translated to English, in the Appendix (T1: Figure A1; T2: Figure A2; T3: Figure A3).

**Sample.** The trial covered three regional PHC areas, Kymenlaakso, Päijät-Häme, and South Karelia, and approximately 480,000 residents out of 5.5 million Finns. We included individuals born in 1966 or earlier (aged 55 or above at the end of 2021) in households i) with a permanent address in the target areas on September 15th, 2021, and ii) with at maximum three individuals born in 1966 or earlier. Ultimately, the target sample included 198,657 residents living in 142,194 households.

**Randomization.** We performed stratified randomization by municipality and randomly assigned 2/3 of the eligible households in each municipality to the control group (T0) and the remaining households across three equal-sized treatment arms (T1–T3). We sent one reminder per household (47,398 in total), selecting the person randomly in multi-person households. We used an external mailing firm to send the letters in four equal-sized randomly selected waves (October

13th, October 20th, October 27th, and November 3rd, 2021).

**Data.** Participants and their home addresses were extracted from the Population Information System. We observed contacts to primary and specialized healthcare and drug prescriptions for 1/2021–5/2022 from the following administrative registers: the Register of Primary Health Care Visits, the Care Register for Health Care, and the Kanta Prescription Center. Moreover, the dataset included Statistics Finland’s FOLK modules (basic, family, and income) containing individual characteristics from 2020. Our populated pre-analysis plan discusses in detail how we cleaned and constructed the analysis data. Our primary outcomes were curative nurse and GP visits in public PHC. The follow-up was six months starting from the first wave of reminders. Table 1 reports descriptive statistics.

**Statistical analysis.** Following Athey and Imbens (2017), we analyzed the experiment using Neyman’s repeated sampling approach and first computed stratum-specific average treatment effects (ATEs) as a difference in means between the treated and the controls within each municipality. Stratum-specific variance estimates were computed by summing (over the two groups) the outcome variance of a group divided by its sample size. The overall ATE (variance) was estimated by averaging the within-stratum estimates weighted by the stratum share (the square of stratum share). Moreover, the following regression model tests for treatment effect heterogeneity:

$$y_i = \alpha + \beta_1 Treat_i + \beta_2 Group_i + \beta_3 Treat_i \times Group_i + \varepsilon_i, \quad (1)$$

where *Group* is an indicator variable for, e.g., having income above the median, and *Treat* is an indicator for being treated. Intercept  $\alpha$  then shows the control group mean among the bottom 50% and  $\beta_3$  is the difference in effects between the two treated groups. Standard errors are heteroskedasticity-robust.

Table 1: Descriptive Statistics.

Variable	Treatment			
	Control (T0)	Base (T1)	Copayment 1 (T2)	Copayment 2 (T3)
<u>A. Prior health care use</u>				
Primary care nurse visits	1.022	0.998	1.006	1.044
Primary care GP visits	0.919	0.920	0.915	0.917
Private outpatient doctor visits	0.085	0.083	0.079	0.083
Prescriptions from public sector	6.042	5.995	5.999	6.013
Prescriptions from private sector	1.419	1.441	1.378	1.405
Referrals from health centers	0.162	0.168	0.171	0.154
Referrals from private clinics	0.087	0.090	0.084	0.089
<u>B. Sociodemographic covariates</u>				
Age	68.943	69.039	68.916	69.016
Is male	44.31%	44.74%	44.62%	44.06%
Has Finnish background	96.67%	96.47%	96.61%	96.79%
Native language Finnish	96.46%	96.29%	96.22%	96.62%
In relationship	40.61%	40.04%	40.48%	41.46%
Widowed	17.62%	18.52%	18.08%	17.79%
Children living at home	9.28%	9.65%	9.75%	9.03%
<u>C. Socioeconomic covariates</u>				
Living in an apartment	40.14%	39.40%	39.56%	39.50%
Degree from tertiary education	11.80%	11.55%	11.40%	11.28%
Pensioner	65.43%	65.35%	65.02%	65.56%
Disposable income	23.051	22.786	23.016	23.116
Equivalized disposable income	26.350	26.069	26.264	26.454
Unemployed for at least one day	9.87%	9.87%	10.20%	9.80%
Unemployd for at least 197 days	4.36%	4.61%	4.53%	4.26%
Received social assistance	3.97%	3.87%	3.82%	3.53%
Received sickness allowance	2.58%	2.72%	2.55%	2.92%
Observations	94,796	15,800	15,800	15,798

*Notes:* We report means for continuous covariates and shares as percentages for binary covariates. Health care use is measured by the annualized number of contacts in 1/2021–6/2021, prior to the law reform in 7/2021 and our trial starting in 10/2021. Covariates in Panel B and Panel C are measured at the end of 2020, and their sample sizes are slightly lower than reported in the table due to missing values in 0.1% of the rows. Income is measured in thousands.

## 4 Results

Table 2 contains the main results. We find that neither receiving any reminder nor information about the copayment abolition affected our primary outcomes. The effect estimates on annualized nurse and GP visits are statistically insignificant and close to zero, the largest relative change being 0.7% in absolute value. When receiving any reminder is the intervention, our confidence intervals do not include effects larger than +3.8% for nurse visits and +2.5% for GP visits. The effect estimates on the indicator of having any such visits are also insignificant and mostly close to zero. Curative nurse and GP visits accumulated similarly in the reminder group (T1+T2+T3) and the controls (T0) around sending the reminders (Appendix Figure A4). The main findings are robust to excluding a small group of individuals (4.4% of the trial population) with a disproportionately large service use (“high-users”; Appendix Table A1).

Table 3 examines treatment effect heterogeneity in annualized visits using Model 1, comparing the controls (T0) to the reminder group (T1+T2+T3). We stratify the population by i) the median equivalized family disposable income, ii) the median age, iii) the indicator of having any pre-trial curative nurse or GP visits in public PHC, and iv) the indicator of residing in a municipality that has outsourced public PHC. The effect on nurse visits is larger for those who had curative pre-trial public PHC visits, which is statistically significant when not adjusted for multiple testing (likely insignificant if adjusted). Other estimates are insignificant, as well as all the estimates on having any visits (Appendix Table A2). These results are further supported by our data-driven analysis of heterogeneity using machine learning tools, reported in our populated PAP (Haaga et al., 2022). Thus, we find no heterogeneity in the null average effects.

## 5 Conclusion

We found that neither reminders in general nor information on the copayment abolition increased PHC utilization, with no evidence of treatment effect heterogeneity. These findings suggest that informational outreach programs may not be effective in inducing curative primary care nurse or



GP visits in a PHC system characterized by gatekeeping.

Table 2: Main Results on Nurse and GP Visits.

	Annualized visits		Has any visit	
	Nurse visits	GP visits	Nurse visits	GP visits
<b>A. No vs. any reminder</b>				
Reference group mean	1.054	0.891	25.590	28.039
Estimate	0.001	0.003	0.091	0.192
Std. error	0.020	0.010	0.243	0.251
Confidence interval	[-0.038, 0.040]	[-0.017, 0.022]	[-0.386, 0.567]	[-0.300, 0.684]
Change (%)	0.099	0.314	0.355	0.685
Std. mean difference	0.000	0.002	0.002	0.004
<b>B. Base vs. copayment reminder</b>				
Reference group mean	1.050	0.895	25.608	28.557
Estimate	0.007	-0.002	0.110	-0.487
Std. error	0.033	0.017	0.421	0.436
Confidence interval	[-0.058, 0.072]	[-0.036, 0.032]	[-0.715, 0.934]	[-1.341, 0.367]
Change (%)	0.687	-0.197	0.429	-1.705
Std. mean difference	0.002	-0.001	0.003	-0.011

*Notes:* We analyze the trial using Neyman's repeated sampling approach and take into account the stratified randomization at the municipal level, following Athey and Imbens (2017). The follow-up is six months. The reference group is the group mentioned first in panel titles. Nurse and GP visits are curative outpatient visits to public primary care. Sample sizes (persons): no reminder (T0) 94.796; any reminder (T1+T2+T3) 47.398; base reminder (T1) 15.800; copayment reminder (T2+T3) 31.598.

Table 3: Heterogeneity Tests, T0 vs. T1+T2+T3, Annualized Visits.

	Income $\geq$ median	Age $\geq$ median	Pre-trial visits	Outsourced
A. Nurse visits				
Intercept	1.244 [0.018]	0.717 [0.013]	0.525 [0.009]	1.141 [0.014]
TREAT	-0.008 [0.032]	-0.021 [0.023]	-0.040 [0.014]	0.018 [0.025]
GROUP	-0.377 [0.023]	0.646 [0.023]	1.396 [0.027]	-0.329 [0.024]
TREAT:GROUP	0.015 [0.040]	0.040 [0.039]	0.110 [0.049]	-0.067 [0.039]
P-value	0.709	0.308	0.024	0.088
Change (G=0)	-0.60%	-2.92%	-7.68%	1.62%
Change (G=1)	0.85%	1.40%	3.61%	-5.99%
B. GP visits				
Intercept	1.041 [0.009]	0.646 [0.007]	0.514 [0.005]	0.956 [0.007]
TREAT	0.002 [0.016]	0.006 [0.013]	0.007 [0.009]	0.000 [0.012]
GROUP	-0.298 [0.012]	0.469 [0.012]	0.994 [0.013]	-0.248 [0.012]
TREAT:GROUP	0.000 [0.020]	-0.007 [0.020]	-0.010 [0.023]	0.012 [0.021]
P-value	0.988	0.730	0.654	0.586
Change (G=0)	0.23%	0.99%	1.45%	0.04%
Change (G=1)	0.36%	-0.05%	-0.18%	1.71%

*Notes:* We compare the controls (T0) to the reminder group (T1+T2+T3), the former being the reference group. We use Model 1 and focus on curative nurse and GP visits in public primary care. Heteroskedasticity-robust standard errors in square brackets. *Pre-trial visits* is an indicator for having any curative nurse or GP visits in 1/2021–6/2021, before the law change and our trial. The other *GROUP* variables are indicators for having age or equalized family disposable income above the median and for residing in a municipality where the public primary care is outsourced (Lahti, Iitti, and Kärkölä). The follow-up is six months. P-value is reported for the term *TREAT:GROUP*. The percentage changes show the CATEs relative to the untreated observations in a given subgroup.

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## A Appendix

Table A1: Public Primary Care: Annualized Number of Contacts, Excluding High-Users.

	Annualized visits		Has any visit	
	Nurse visits	GP visits	Nurse visits	GP visits
<b>A. No vs. any reminder</b>				
Reference group mean	0.734	0.734	23.814	26.418
Estimate	0.012	0.003	0.173	0.218
Std. error	0.009	0.008	0.243	0.253
Confidence interval	[-0.006, 0.030]	[-0.013, 0.018]	[-0.303, 0.649]	[-0.277, 0.713]
Change (%)	1.621	0.404	0.727	0.826
Std. mean difference	0.008	0.002	0.004	0.005
<b>B. Base vs. copayment reminder</b>				
Reference group mean	0.744	0.745	23.900	26.992
Estimate	0.002	-0.012	0.118	-0.542
Std. error	0.016	0.014	0.421	0.439
Confidence interval	[-0.029, 0.033]	[-0.039, 0.015]	[-0.707, 0.943]	[-1.402, 0.317]
Change (%)	0.231	-1.631	0.495	-2.010
Std. mean difference	0.001	-0.009	0.003	-0.012

*Notes:* To define the high-users, we first compute the 99th percentiles with respect to the number of 1) curative nurse and 2) GP visits in public primary care, and 3) public and 4) private sector prescriptions in the 6-month follow-up. High-users had a utilization of at least the 99th percentile score in one or more of these four dimensions. We analyze the trial using Neyman's repeated sampling approach and take into account the stratified randomization at the municipal level, following Athey and Imbens (2017). The follow-up is six months. The reference group is the group mentioned first in panel titles. Nurse and GP visits are curative outpatient visits to public primary care. Sample sizes (persons): no reminder (T0) 90,505; any reminder (T1+T2+T3) 45,307; base reminder (T1) 15,075; copayment reminder (T2+T3) 30,232.

Table A2: Heterogeneity Tests, T0 vs. T1+T2+T3, Has Any Visit.

	Income $\geq$ median	Age $\geq$ median	Pre-trial visits	Outsourced
A. Nurse visits				
Intercept	0.289 [0.002]	0.186 [0.002]	0.158 [0.002]	0.278 [0.002]
TREAT	-0.002 [0.004]	-0.000 [0.003]	-0.002 [0.003]	0.002 [0.003]
GROUP	-0.065 [0.003]	0.133 [0.003]	0.258 [0.003]	-0.084 [0.003]
TREAT:GROUP	0.005 [0.005]	0.002 [0.005]	0.007 [0.005]	-0.003 [0.005]
P-value	0.305	0.634	0.185	0.553
Change (G=0)	-0.59%	-0.22%	-1.00%	0.65%
Change (G=1)	1.49%	0.59%	1.28%	-0.68%
B. GP visits				
Intercept	0.321 [0.002]	0.210 [0.002]	0.182 [0.002]	0.298 [0.002]
TREAT	0.000 [0.004]	0.003 [0.003]	0.003 [0.003]	0.002 [0.003]
GROUP	-0.081 [0.003]	0.135 [0.003]	0.260 [0.003]	-0.067 [0.003]
TREAT:GROUP	0.003 [0.005]	-0.002 [0.005]	-0.003 [0.005]	0.001 [0.006]
P-value	0.584	0.676	0.552	0.851
Change (G=0)	0.15%	1.43%	1.84%	0.62%
Change (G=1)	1.35%	0.27%	0.04%	1.25%

*Notes:* We compare the controls (T0) to the reminder group (T1+T2+T3), the former being the reference group. We use Model 1 and focus on curative nurse and GP visits in public primary care. Heteroskedasticity-robust standard errors in square brackets. *Pre-trial visits* is an indicator for having any curative nurse or GP visits in 1/2021–6/2021, before the law change and our trial. The other *GROUP* variables are indicators for having age or equalized family disposable income above the median and for residing in a municipality where the public primary care is outsourced (Lahti, Iitti, and Kärkölä). The follow-up is six months. P-value is reported for the term *TREAT:GROUP*. The percentage changes show the CATEs relative to the untreated observations in a given subgroup.

Dear recipient

Many non-Covid health care contacts have been missed during the Covid-19 pandemic in Finland. If care is not sought at the right time, there is a risk of further deterioration of health. Diagnosing and treating diseases may be delayed. Chronic conditions may worsen.

With this letter, we want to remind you and your household members that you can contact your local health center to treat potential health problems.

The public primary care provider of your area of residence is South Karelia Social and Health Care District (Eksote). If you feel the need to treat health problems, you can contact a healthcare professional by calling Eksote's telephone service 05 352 7260 or by using electronic health services ([www.hyvis.fi](http://www.hyvis.fi) or [www.omaolo.fi](http://www.omaolo.fi)). The telephone service is open 7-16 on weekdays, but in the near future the service will be open 7-20. The need for an appointment is assessed by the professional.

The letter is part of an informational outreach campaign by Finnish Institute for Health and Welfare (THL) targeted for those aged 55 or more. THL is not responsible for providing health care services nor booking appointments. Extra information about the letter can be received by calling THL: 029 524 6185 (9-16 on weekdays).

The recipients were chosen based on birth year extracted from the Population Information System. If your household has more than one individual aged 55 or more, we randomized the recipient for economical and environmental reasons. Please share the content of the letter with your household members.

[www.thl.fi](http://www.thl.fi)

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Figure A1: Base Letter (T1) in South Karelia.





Dear recipient

Many non-Covid health care contacts have been missed during the Covid-19 pandemic in Finland. If care is not sought at the right time, there is a risk of further deterioration of health. Diagnosing and treating diseases may be delayed. Chronic conditions may worsen.

With this letter, we want to remind you and your household members that you can contact your local health center to treat potential health problems. We also want to inform you about the reformed Act on Client Charges in Healthcare and Social Welfare which has affected primary care copayments. **Due to the new law, all primary care nurse visits have become free of charge in Finland from July 1st, 2021.**

The public primary care provider of your area of residence is South Karelia Social and Health Care District (Eksote). If you feel the need to treat health problems, you can contact a healthcare professional by calling Eksote's telephone service 05 352 7260 or by using electronic health services ([www.hyvis.fi](http://www.hyvis.fi) or [www.omaolo.fi](http://www.omaolo.fi)). The telephone service is open 7-16 on weekdays, but in the near future the service will be open 7-20. The need for an appointment is then assessed by the professional.

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Figure A2: Copayment Treatment Variant No. 1 (T2) in South Karelia.

Dear recipient

Many non-Covid health care contacts have been missed during the Covid-19 pandemic in Finland. If care is not sought at the right time, there is a risk of further deterioration of health. Diagnosing and treating diseases may be delayed. Chronic conditions may worsen.

With this letter, we want to remind you and your household members that you can contact your local health center to treat potential health problems. We also want to inform you about the reformed Act on Client Charges in Healthcare and Social Welfare which has affected primary care copayments. **Due to the new law, all primary care nurse visits have become free of charge in Finland from July 1st, 2021.** Primary care GP visit copayments remain unchanged: 20.60 euros per visit (or, alternatively, an annual copayment of 41.20 euros).

The public primary care provider of your area of residence is South Karelia Social and Health Care District (Eksote). If you feel the need to treat health problems, you can contact a healthcare professional by calling Eksote's telephone service 05 352 7260 or by using electronic health services ([www.hyvis.fi](http://www.hyvis.fi) or [www.omaolo.fi](http://www.omaolo.fi)). The telephone service is open 7-16 on weekdays, but in the near future the service will be open 7-20. The need for an appointment is then assessed by the professional.

The letter is part of an informational outreach campaign by Finnish Institute for Health and Welfare (THL) targeted for those aged 55 or more. THL is not responsible for providing health care services nor booking appointments. Extra information about the letter can be received by calling THL: 029 524 6185 (9-16 on weekdays).

The recipients were chosen based on birth year extracted from the Population Information System. If your household has more than one individual aged 55 or more, we randomized the recipient for economical and environmental reasons. Please share the content of the letter with your household members.

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Figure A3: Copayment Treatment Variant No. 2 (T3) in South Karelia.

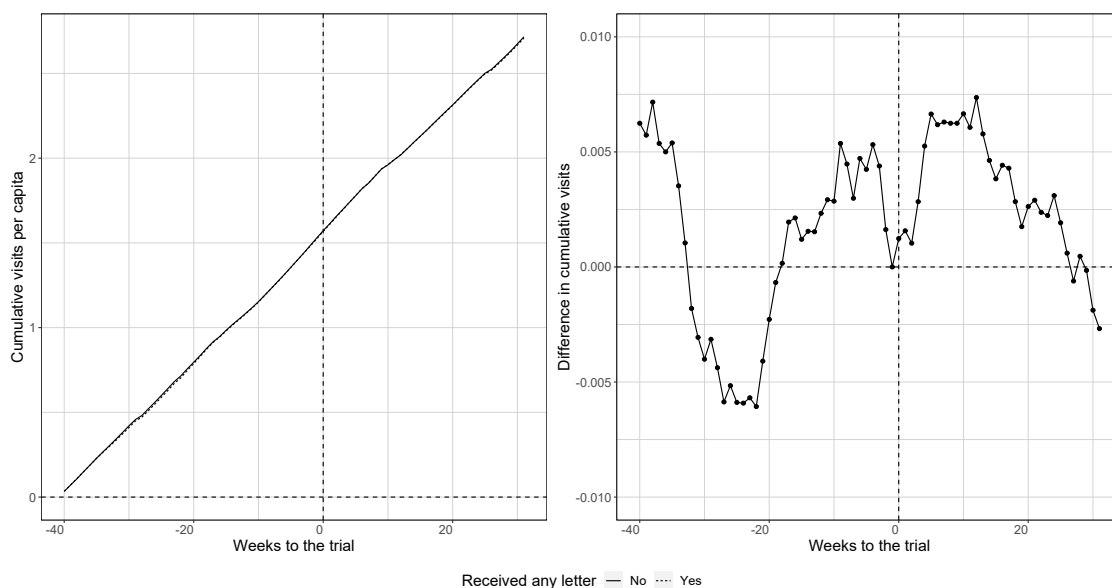


Figure A4: Public Primary Care: the Accumulation of Nurse and GP Visits over Time.

*Notes:* On the left, we plot the number of cumulative curative nurse and GP visits per capita by treatment group (T0 vs. T1+T2+T3), the reference period being the week  $-40$  before the start of the trial. On the right, we zoom to the corresponding difference between the letter group and the comparisons. Negative values imply that the cumulative primary care use at a given point in time was larger in the comparison group.