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IZA DP No. 15899

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JANUARY 2023



ISSN: 2365-9793

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# ABSTRACT

## Addressing Vaccine Hesitancy Using Local Ambassadors: A Randomized Controlled Trial in Indonesia*

In settings where resistance and rampant misinformation against vaccines exist, the prospect of containing infectious diseases remains a challenge. Can delivery of information regarding the benefits of vaccination through personal home visits by local ambassadors increase vaccine uptake? We conduct a door-to-door randomized information campaign targeted towards COVID-19 unvaccinated individuals in rural Indonesia. We recruited ambassadors from local villages tasked to deliver information about COVID-19 vaccines and promote vaccination through one-on-one meetings, using an interpersonal behavioral change communication approach. To investigate which type of ambassador—health cadres, influential individuals, and laypersons—is the most effective, we randomly vary the type of ambassador that delivers the information at the village level. We find that the overall vaccination take-up is quite moderate and that there are no differences in vaccination outcomes across the treatment groups. These results highlight the challenge of boosting vaccine uptake in late stages of a pandemic.

**JEL Classification:** I1, I12, I18, I20, I3

**Keywords:** misinformation, health behaviors, vaccine hesitancy, Indonesia, COVID-19

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* We are grateful to Elghafiky Bimardhika, Hamdan Bintara, Raka Fadilla, Vida Parady, Lovina Putri, Temy Ramadan, Leli Rachmawati, Arya Swarnata, and a team of enumerators for excellent assistance. We thank Joseph Marshan, Firman Witoelar, and seminar participants at AHESS in Brisbane, Australian National University, BIDS conference in Dhaka, and University of Indonesia for comments. We thank Monash Business School and J-PAL for funding support. The study is pre-registered on the AEA RCT Registry (AEARCTR-0008601). We received IRB approval from Monash University and the University of Indonesia.

# 1 Introduction

Vaccination is one of the most effective preventive health behaviors against infectious and other diseases. For example, a recent study estimates that vaccines prevented 20 million excess deaths attributed to the COVID-19 pandemic (Watson et al., 2022). However, confidence toward vaccines has been low in recent years (De Figueiredo et al., 2020), even during the COVID-19 pandemic when vaccines were touted as a key tool toward controlling it (Solís Arce et al., 2021). As of June 2022 (when the present study took place) only 61 countries had achieved the WHO goal of 70% full-vaccination rate.[1] In addition to supply and accessibility issues (Reza et al., 2022; Mobarak et al., 2022), this stagnation can be partly attributed to misinformation about the benefits and risks of vaccination, which has become rampant during the COVID-19 pandemic (WHO, 2020; Bursztyn et al., 2022; Loomba et al., 2021; Islam et al., 2021).

In this paper, we conduct a door-to-door information campaign to promote the COVID-19 vaccine in a setting—rural West Java, Indonesia—where vaccines have become widely available, but vaccination has not reached universal coverage. We use ambassadors from local communities to provide information about the overall benefits and risks of COVID-19 vaccines, using an interpersonal communication approach implemented through in-person meetings. In our setting, this approach is more suitable than virtual-information interventions for three reasons. First, personal visits can reach old people, a vulnerable group that is relatively harder to reach by virtual media. In our study approximately 40% of the respondents are 55 years old and older. Second, an in-person interaction is likely to be more effective than a one-way virtual information transmission in terms of generating empathy and connection (Waytz and Gray, 2018); in particular, it allows ambassadors to clarify some key facts about vaccines. Third, the impact of some forms of virtual interventions, such as text messages, on promoting COVID-19 vaccines has been found to be limited, even in earlier phases of the pandemic (Dai et al., 2021; Rabb et al., 2022).

Previous studies have shown that health workers (Breza et al., 2021), laypersons (Alsan and Eichmeyer, 2021), local leaders (Banerjee et al., 2019) or celebrities (Alatas et al., 2021) can be effective in transmitting information related to COVID-19 or immunization. We therefore recruited three types of local ambassadors (treatment groups) to deliver information regarding the benefits of vaccination through personal home visits: health cadres (community health workers), eminent individuals (selected through nomination by respondents), and laypersons.[2]

[1] https://www.nytimes.com/interactive/2021/world/covid-vaccinations-tracker.html

[2] All ambassadors are locals, that is, they were recruited from their assigned villages. We expect participants to be more receptive of information and encouragement conveyed by individuals that share local traits and characteristics (Alsan and Eichmeyer, 2021; Armand et al., 2022; Bicchieri et al., 2022).

The main goal of this study is to evaluate the relative effectiveness of these three types of ambassadors in boosting vaccine uptake. As specified in the pre-analysis plan, because all ambassadors in this study are locals, we expect that more eminent or knowledgeable individuals within the community, such as nominated or health cadre ambassadors, would be more persuasive in encouraging respondents to get vaccinated compared to laypersons. We do not have a clear hypothesis whether health cadre ambassadors were going to be more effective than the nominated ambassadors.

Our sample consists of 3,254 unvaccinated adult individuals spread across 279 villages in three districts (Bogor, Cirebon and Kuningan) in West Java. Misinformation and vaccine hesitancy are prevalent in West Java (KIC, 2021).[3] As of February 2022 (the start of the baseline survey), more than 360,000 people in West Java were "dropouts"—individuals who had received the first dose but have not taken the second dose within the suggested window period, that is, six months between the first and second dose—meanwhile more than five million people (the highest in Indonesia) were on the verge of becoming "dropouts".[4] To combat hesitancy and accelerate vaccination, the local government involved the police, military, and the National Intelligence Agency (BIN) to run a door-to-door vaccination delivery scheme.[5]

We conducted the baseline survey between February and April 2022 and the endline survey in August and September 2022. We collected rich information in both surveys, such as basic demographic and socio-economic characteristics, knowledge and beliefs related to COVID-19, sources of vaccine hesitancy, news consumption behaviors, sources of information about COVID-19 vaccines, mental health and morbidity status.

We implemented the intervention in June and July 2022. All ambassadors delivered the same information prepared by the research team to each respondent through two personal home visits. In addition to the standard information, we provided respondents' personal information—e.g., age, gender, and reasons for not having taken up vaccine—to the assigned ambassadors so that they could tailor a more personalized approach to each respondent. We estimate treatment effects by comparing various prespecified vaccination outcomes, such as take-up (verified by a physical or digital proof), registration, and intent across treatment (am-

[3]About 4 in 10 individuals who have not taken up the vaccine strongly oppose vaccination and 8 in 10 people do not trust vaccines or believe that a strong immune system is sufficient to protect them against COVID-19 (KIC, 2021).

[4]https://www.tribunnews.com/corona/2022/02/17/belum-disuntik-vaksin-dosis-kedua-360804-warga-jawa-barat-masuk-kategori-drop-out. In total, there were 20 million people on the verge of becoming dropouts in Indonesia. https://katadata.co.id/maesaroh/berita/620e75b87b2f7/telat-vaksin-dosis-kedua-20-juta-orang-terancam-harus-vaksinasi-ulang.

[5]https://news.detik.com/berita-jawa-barat/d-5887206/jurus-polisi-tenangkan-anak-yang-takut-divaksinasi-covid-19-di-bandung; The National Intelligence Agency (BIN) co-organized the door-to-door vaccination program with the Army. https://kumparan.com/kumparannews/bin-jabar-gencarkan-vaksinasi-hingga-ke-pelosok-kejar-target-herd-immunity-1x4XjdAlm36/2.

bassador) groups.

We find three main results. First, the intervention corrected some misconceptions about COVID-19 vaccines. For example, across the treatment groups, we observe a sharp drop in the proportion of individuals reporting fear of side effects (25% to 12%) as the reason for not vaccinating. Second, nominated ambassadors—half of which are village officials—were perceived by participants to be better at delivering the information about vaccines than the other two types of ambassadors.

Third, we find that the overall vaccine take-up, registration, and intent is rather moderate (take-up is about 3.6% and registration 7.8%), and the impact of our intervention on vaccination outcomes does not differ across ambassador groups. This is likely because there is no differential impact of the intervention on knowledge and beliefs about COVID-19 across the groups, suggesting that while nominated ambassadors were perceived as being more effective, the information they transmitted was not better retained and acted upon by participants. Heterogeneity analysis suggests that some subgroups (females and respondents of low socioeconomic status) exhibited stronger vaccine take-up/registration treatment effects of health cadre ambassadors relative to layperson ambassadors.

Our study contributes to the literature that evaluates the role of information campaigns in overcoming misinformation and driving behavioral changes during a global health crisis (Bavel et al., 2020). Earlier studies have documented mixed success of information campaigns using phone/text messages to raise awareness about COVID-19 (Bahety et al., 2021; Siddique et al., 2022) and promote COVID-19 vaccines (Dai et al., 2021; Armand et al., 2021; Rabb et al., 2022), and video messages to promote behaviors that prevent the spreading of COVID-19 (Banerjee et al., 2020; Breza et al., 2021). However, these studies were conducted in the earlier phase of the pandemic; there is limited evidence on whether information interventions can be equally effective if implemented at later stages when vaccination rates are already high, as the targeted population at this stage may be less likely to be receptive to vaccination. One exception is a large-scale information campaign using video messages disseminated through Facebook, which was carried out in the US and France approximately one year after the vaccine became available and which did not find an effect on vaccination decisions (Ho et al., 2022). Our study complements this evidence by considering a different information campaign that leverages local ambassadors and in-person visits, whose main aim is to establish whether the type of ambassador matters for encouraging vaccination uptake.

Our study also relates to the broader literature on preventive health behaviors in developing countries, especially on the role of information provision (Dupas et al., 2011). We observe mixed evidence in this line of research. Previous studies have documented positive (improvement) health behaviors impacts of information provision in various contexts. For instance,

providing information on water quality leads to adoption of safe water technologies (Jalan and Somanathan, 2008; Madajewicz et al., 2007); providing education and information on the risk of HIV/AIDS changes sexual behaviors (Dupas, 2011; Kerwin, 2020); and providing information on child immunization through local ambassadors and public figures increase take-up (Banerjee et al., 2019; Alatas et al., 2021). On the other hand, several studies have also documented limited health behavioral impacts of information provision alone on risk of an infectious disease (Duflo et al., 2015; Yang et al., 2023) and health products (Meredith et al., 2013). We complement this literature by providing evidence on the limited impacts of the identity of ambassadors in a door-to-door campaign aimed to promote free and evidently effective vaccination that can help suppress the spread and mitigate the impacts of an infectious disease. Our results connect to the puzzling, yet policy-relevant phenomenon of the lack of demand for free and effective health products (Ashraf et al., 2010; Cohen and Dupas, 2010; Dupas, 2014).

Lastly, this paper, to our knowledge, is among the first that studies vaccine promotion of COVID-19 vaccines in developing countries. An exception is Mobarak et al. (2022) that study the impacts of supplying vaccines in the context of a major vaccine shortage in remote villages in Sierra Leone. We differ from this study in that sufficient vaccine supply in our context allows us to only focus on influencing the demand side.

The remainder of this paper is structured as follows. Section 2 discusses the background of the COVID-19 pandemic and vaccination progress in Indonesia and West Java. Section 3 describes our research design, including sample selection and treatment. Section 4 describes the data, including descriptive statistics of respondents and ambassadors, and outcomes of interest. Section 5 presents our results. Section 6 concludes.

# 2 Study Background

## 2.1 COVID-19 in Indonesia: Pandemic and Vaccination

Indonesia officially recorded its first COVID-19 cases on March 2020 in the greater Jakarta-West Java region, the main economic hub with a population of about 20 million residents. It marked the beginning of what would become an unprecedented and devastating pandemic that tested the capacity of Indonesia's health facilities and suppressed economic progress. As of April 2022, the Government of Indonesia has reported 6,044,150 confirmed cases of COVID-19 with 156,100 deaths from 510 districts across all 34 provinces (Covid-19, 2022).[6]

[6]These numbers are likely to be underestimated, as there were issues with the COVID-19 testing capacity and disputes over the official number of cases.

The first-phase of COVID-19 vaccination program in Indonesia was rolled out in January 2021.[7] The government provided free vaccine shots to the public regardless of economic level.[8] Eligible individuals may register and schedule their appointment at the nearest health facilities—a public health facility (*Puskesmas*) is available in every sub-district, an administrative level higher than villages—to receive their vaccination.[9]

The Indonesian government aimed to fully vaccinate 75% of the target population or about more than 200 million individuals by the mid-2022. However, as of February 2022 (the start of the baseline survey), about 71% and 45% of the target population had received the first and second dose, respectively. Hesitancy against vaccination partially impeded the progress, especially among those in rural areas (MoH, 2020; LSI, 2021; SMRC, 2021).[10]

## 2.2 West Java

West Java is the largest of 6 provinces of Indonesia's main island, Java, with a total population close to 50 million people and an economy that contributes about 14% to the overall national GDP in 2020.

West Java has been at the center of the pandemic in Indonesia. The first identified COVID-19 patient was found in West Java in March 2020. Since then, it has recorded 707,111 cases (per 18 November 2021), or about 16% of total national cases. Additionally, roughly 10% of Indonesia's COVID-confirmed deaths are contributed by West Java, totaling 14,723 fatality cases, which is the third highest COVID deaths in the country along with Jakarta, Central Java, and East Java.

Following national guidelines to prevent further hospitalizations, deaths, and collapse of the health care system, the local government ramped up its vaccination program. As of November 2021, official numbers recorded that 20 million people in West Java (41% of its population) were fully vaccinated (Barat, 2021). This achievement is quite impressive given the

[7]Following the approval of CoronaVac vaccine—manufactured by Sinovac Biotech, China—after passing clinical trials in Indonesia by the Indonesian Food and Drug Control Agency (BPOM). To encourage early vaccine take-up, the Indonesian Islamic Clerical Council (MUI) granted the halal status for the CoronaVac vaccine.

[8]The government initially intended to have a paid access to vaccine for economically well-off individuals, but the plan was scrapped after public protests https://www.thejakartapost.com/news/2021/07/17/govt-drops-self-paid-covid-19-vaccinations-after-public-outcry.html

[9]While the distribution and storage of vaccines is often challenging, it is not the case for West Java in particular, due to its proximity to the nation capital (Jakarta). West Java is one of the 3 regions that were allocated the most vaccines (https://databoks.katadata.co.id/datapublish/2021/08/02/distribusi-vaksin-covid-19-masih-terpusat-di-jawa).

[10]Local governments and communities have made creative efforts to encourage people to get vaccinated. For example, local village governments in the Java provinces created lottery-based incentives with goats, chickens, and plant seeds as the prizes, while other local governments (e.g., Jakarta) only allow vaccinated people to enter public areas such as shopping centers and malls.

pre-existing vaccine hesitancy in West Java.[11]

# 3 Research Design

## 3.1 Setting

We focus on rural areas as a large proportion of the Indonesian rural population is misinformed and opposes COVID-19 vaccination (LSI, 2021; SMRC, 2021). We chose West Java province for two reasons. First, it has a relatively low vaccination rate despite having adequate supply of COVID-19 vaccines. Second, it has a relatively high vaccine hesitancy rate and misinformation problem (KIC, 2021), which is partly reflected on its high "dropout" rate (that is, high first-dose but low second-dose). Our study areas—Bogor, Kuningan, and Cirebon—were the bottom three districts in West Java in terms of vaccination rate (see Figure A.1). As of mid-November 2021 (when we chose study areas), the first-dose vaccination rate of target population (aged 12+) in Bogor, Kuningan, and Cirebon was on average about 40 %, lower than that of West Java.

**Sample selection.** Our target population consisted of unvaccinated individuals aged 18 plus in the study areas.[12] To select eligible individuals we relied on two sources. First, information provided by village heads or officials on which individuals that had not received vaccination. Enumerators then randomly selected twelve individuals from the list. Second, when the list contained fewer than twelve eligible individuals, enumerators relied on information provided by respondents through a snowball approach, that is, enumerators asked participants for suggestions of the next eligible individuals.

**Sample size.** We interviewed 3,422 eligible individuals from 287 villages at the baseline. However, we had to drop a number of individuals for several reasons: (i) 90 individuals in 8 villages because we could not recruit ambassadors due to oppositions from communities even though we already obtained permissions from village officials prior to the baseline survey,[13]

[11]For example, in 2017, West Java had a diphtheria outbreak—a highly contagious disease that infects nose and throat that is easily preventable with routine vaccination—even though it had been eradicated decades ago. During the outbreak, West Java reported 95 cases and 10 deaths, the second highest number of cases in Indonesia (Harapan et al., 2019). The diphtheria vaccination rate in West Java was 75,6%, far from the recommended 90% rate; this indicates high vaccine hesitancy in the region.

[12]We restricted our sample to individuals aged 18 plus to ensure that they have sufficient knowledge about COVID-19 vaccines and can make informed decisions regarding vaccination without adult supervision.

[13]We conducted balance tests for the original 3,422 respondents in the pre-analysis plan and the results show that the sample is balanced across treatment groups

(ii) 78 individuals who took up vaccine—either first, second, or third dose (booster)—prior to the baseline or intervention implementation. After excluding those individuals, we ended up with 3,254 eligible individuals from 279 villages at the baseline.

**Treatment groups.** In total, our research design involves three treatment groups (see Figure 1). Treatment groups only differ in the type of ambassador that delivers the same information content. Similarly to Sadish et al. (2021) and Siddique et al. (2022), we decided not to have a pure control group—one that does not receive a COVID-19 ambassador intervention—in this study for two reasons. First, we consider excluding villages from receiving information about the COVID-19 vaccine as unethical. Second, it was almost unlikely that we could have a 'pure' control group in this setting because our target population probably had received some form of direct information about COVID-19 vaccines from the government task force officers or even police/military force.

- **Treatment 1 (Health cadres).** For this treatment, we recruited health cadres that operate at the village level. Health cadres, unlike professional health workers (e.g., medical doctors), are volunteers that generally do not have medical or nursing degrees.[14] The enumerators randomly selected a health cadre using a list of available health cadres proposed by the head of health cadres or village officials.

- **Treatment 2 (Nominated).** For this treatment, we leveraged village social networks to recruit a local eminent person as an ambassador. We adopted the recruitment procedure explained in Banerjee et al. (2019). Respondents were asked to nominate three individuals who they perceive as the most respected, trusted, and credible at disseminating health or important information in their village. We then approached and recruited the individual that received the most nominations as an ambassador.

- **Treatment 3 (Layperson).** For this treatment, we coordinated with village officials to have an open recruitment or create a list of candidates for layperson ambassadors. We randomly selected the ambassadors from a list of potential candidates. To distinguish

[14]Health cadres are community volunteers with the primary role to run village health posts (*Posyandu*), an extension to the primary health care centers (*Puskesmas*). Cadres are recruited through two channels : (i) Informally through means of social networks of the existing cadres and (ii) Appointed by the village committee (Gadsden et al., 2022). They are mostly tasked to implement promotive and preventive programs such as child health screening and monitoring, immunization delivery, and various counselling sessions on maternal health on a monthly basis. Cadres may follow up the monthly sessions with individualized home visits to the families if necessary (MoH, 2012). Because of the voluntary nature of work there is no formal financial compensation—usually a monthly financial 'gift' from the village officials, where in a part of Java, they receive up to IDR50,000 (≈ US$4) (Gadsden et al., 2022).

the type of ambassadors between treatment groups, we asked enumerators not to recruit health cadres and village officials to serve as layperson ambassadors.[15]

## 3.2 Intervention

The intervention was implemented in mid-June 2022 (see Figure A.2 for more details on the study timeline). The ambassadors disseminated information and promoted vaccination in two personal 30-minute home visits—a week apart.[16] To help amplify the effects of the information session, the ambassadors also distributed a pamphlet summarizing the most important information delivered during the information session, such as minimal risk of severe side effects from vaccine despite morbidity risk (after consulting a physician) and the importance of vaccines for helping economic recovery (e.g., employers require their employees to get vaccinated) and personal freedom (e.g., unvaccinated travelers cannot airplanes).[17] Responses from the endline survey reveal that 83% of respondents were visited by the ambassadors. This proportion is higher for respondents in the Health Cadres group (91%) than that in the Nominated (81%) and Layperson (75%) groups. Additional details on preparation for the intervention are discussed in Appendix B.

**Information contents.** During the visit an ambassador was instructed to deliver the following information:

- The efficacy of the first and second dose of vaccine and the risks the virus poses to certain subgroups of the population.
- Personal benefits of vaccines from medical (e.g., vaccine protects the recipients from the severe risk of COVID through an immunity enhancing mechanism with minimal side effects) and non-medical point of views (e.g., freedom of mobility).
- Social and economic benefits of vaccines, such as helping protect family from COVID-19 infection.
- Promoting an altruism perspective of vaccination: being vaccinated can help contribute to the improvement of community well-being.

[15] In practice, however, we could not prevent a small number of government officials to work as layperson ambassadors. Our data indicates that the majority of nominated ambassadors (almost 50%) are government/village officials, while the share of health cadres and laypersons that are officials is much smaller (see Table A.5).

[16] The two-week intervention means that the intervention by each ambassador lasted for two weeks, but this does not mean that the intervention period only lasted for two weeks—it can last up to one month depending on the ambassadors' and participants' availability as well as the intervention starting time.

[17] The ambassadors were required to follow strict health protocols during the intervention to minimize the risk of COVID-19 infection, such as mask-wearing. The pamphlet is shown in the Appendix D.

- Practical information, such as how to make an appointment for vaccination and the nearest local vaccination sites.

# 4 Data and Empirical Method

We conducted the baseline survey between February and April 2022. We collected a rich set of information that could predict vaccination outcomes, such as socio-economic and demographic characteristics, sources of hesitancy against COVID-19 vaccines, COVID-19 news consumption behavior, morbidity history, knowledge and beliefs about COVID-19 vaccination. The endline survey was carried out four months after the baseline survey and one month after the intervention. In addition to the same set of information as in the baseline survey, we also collected information on vaccination outcomes (take-up, registration, and intent) and quality of ambassadors and intervention. We re-interviewed 2,801 out of 3,254 respondents, which corresponds to 13.9% attrition rate.[18] Table A.2 shows that sample attrition is not systematically correlated with treatment groups. We find some significant associations between attrition in *Nominated* group and baseline variables in Columns 2 and 3, but the *p*-values of F-tests for interaction terms indicate that we cannot reject the null hypothesis that individuals who attrited from the sample are similar between *Nominated* and *Health Cadres* groups.

## 4.1 Outcomes

We pre-specified the following outcomes in the pre-analysis plan. We follow Anderson (2008) to construct index variables for some outcomes, which are comprised of questions of the similar domain, to address multiple hypothesis problem. Definition of variables is provided in the Appendix C.

### 4.1.1 Primary Outcomes

We consider three vaccination measures as the primary outcomes: vaccination take up, registration, and intent. Vaccine take-up and registration (but had not taken up any dose of vaccines) refer to indicators for having received and registered the first COVID-19 vaccine dose at the endline, respectively, which are verified by official vaccination cards (physical or digital form) issued by the government or other recognized providers.[19] In addition to take-up

[18] Table A.1 shows that about 48% (=216/453) of those attrited from the sample declined to be interviewed.

[19] Some vaccinated respondents could not provide a proof, which is consistent with the information we obtained during the baseline survey—vaccination drives in villages did not always issue any form of vaccination proofs because the drives were administered by political parties or NGOs. Claims of registrations were sometimes unable

and registration, we also consider vaccine intent, a commonly used variable used in studies on COVID-19 vaccination (e.g., Alsan and Eichmeyer, 2021; Campos-Mercade et al., 2021; Chang et al., 2021; Klüver et al., 2021). Vaccine intent—elicited at the baseline and endline surveys—refers to the respondent's self-reported likelihood to receive COVID-19 vaccine. In this paper, we consider vaccine take up or registration—the relatively more objective outcome in this context—as our preferred outcome.

#### 4.1.2 Secondary Outcomes

We hypothesize that the intervention can affect health behaviors through dissemination of scientifically-based information about COVID-19 and vaccines. Moreover, the intervention can also influence mental health well-being through acquisition of information and personal approach by the ambassadors (Sadish et al., 2021; Vlassopoulos et al., 2021). We consider the following outcomes: self-reported compliance to COVID-19 health protocols index, an indicator for having contracted COVID-19 post-intervention, and mental health index. We construct two mental health index variables: (i) the standard mental health well-being index [20] and (ii) the COVID-19 mental health well-being index (Ahorsu et al., 2020).

#### 4.1.3 Intermediate Outcomes

To investigate possible channels through which the intervention affects the vaccination decision, we examine the impacts on some intermediate outcomes, such as an index of perceptions on the ambassadors and intervention, and indices of knowledge and beliefs about COVID-19 and COVID-19 vaccines.

### 4.2 Descriptive Statistics: Participants and Ambassadors

#### 4.2.1 Participants' Characteristics

**Baseline characteristics and balance tests.** Table A.3 presents the summary statistics of baseline characteristics and balance tests between treatment groups. The average respondent is about 48 years old and 58% are female. Our sample comes from low to lower-middle income groups: more than half are unemployed (55%), about 70% only completed primary school or

to be verified, as well.

[20] Questions used to construct this index are taken from the Indonesia Family Life Survey (IFLS) that adapted them from the General Health Questionnaire (GHQ). Responses to these questions are elicited on a 4-point Likert scale, where 1 refers to rarely or not at all ($\leq$ 1 day) and 4 refers to often (5-7 days).

lower, and nearly 80% received social assistance benefits. An average respondent has one type of morbidity (13% $\approx$ 1 out of 8 morbidities)[21] and is hesitant about vaccine (2.5 out of 5-scale).

Columns 5 to 7 show that none of the 42 coefficients across all balance tests are statistically significant at the conventional level and joint orthogonality tests also show overall balance between groups across all baseline variables ($p$-values $> 0.9$). Together, these tests suggest that our randomization is successful in creating balance across treatment groups.[22]

### 4.2.2 Ambassadors' Characteristics

**All ambassadors.** Table A.5 summarizes the characteristics of our ambassadors. We managed to recruit ambassadors in 279 out of the targeted 287 villages (97% success rate). In general, the ambassadors are relatively young, 40 years old, have high-school education, and have taken the second or even the third dose (booster). The share of female ambassadors is disproportionately large among health cadres (90%). Health cadres are more active in community participation than laypersons. Almost half of nominated ambassadors (47%) are government or village officials, significantly larger than the laypersons (7%).

**Nominated ambassadors.** Table A.6 summarizes the nominated ambassadors' characteristics. In total, across the 90 (*nominated ambassadors*) villages, we received 2,545 nominations (for 888 candidate ambassadors or about 9 candidates per village) from 1,150 participants or about 2 nominations per participant.[23] An average successful candidate received more nominations than an average failed (not selected) candidate, 6 vs 2. Having an influential occupation, such as village head/official, is the only factor that matters for selection.

[21] The mean index is constructed by taking average of responses to eight questions on morbidity history, such as diabetes, high blood pressure, cancer, kidney problem, heart problem, liver problem, respiratory problem, and others. Each question equals to 1 if a respondent reports having a morbidity and 0 otherwise. Roughly 1 in 4 respondents reports high blood pressure.

[22] Table A.4 shows that we obtain similar result—balance across baseline characteristics and treatment groups—when we restrict the sample to respondents that were visited by the ambassadors.

[23] The number of participants in the baseline (1,150) that nominated potential ambassadors is higher than the current eligible sample (1,061) because we excluded ineligible participants after the endline survey.

## 4.3 Empirical Method

### 4.3.1 Estimation Specification

To investigate the effects of our treatments on the outcomes of interest, we estimate the following regression specification:

$$Y_i = \alpha + \beta Cadres_i + \gamma Nominated_i + \theta Y_{0i} + \tau \mathbf{X}_{vi} + \epsilon_i \quad (1)$$

where $Y_i$ indicates a range of outcomes of individual $i$ in the endline survey, such as indicators for vaccination take-up and intent to get vaccinated. $Cadres_i$ is an indicator for respondents that are assigned to health cadres ambassadors and $Nominated_i$ is an indicator for respondents that are assigned to nominated ambassadors.[24] $\mathbf{X}_{vi}$ denotes a vector of baseline individual covariates—gender, age, indicator variables (marital status, unemployment status, having primary or lower education, received social assistance benefits, health insurance status), monthly household expenditure per capita, years of schooling, morbidity index—and village $v$ covariates, such as the nearest distance to a health facility (in km) and distance to sub-district capital (in km).[25] Whenever possible we also include baseline value of outcomes $Y_{0i}$ to improve precision of our estimates. We cluster standard errors $\varepsilon_i$ at the randomization level—village level.

Our parameters of interest, $\beta$ and $\gamma$, are the intent-to-treat (ITT) effects of receiving personal approach and information from health cadres and nominated ambassadors, respectively, compared to the layperson ambassadors. In addition, we also investigate which type of non-layperson ambassadors is more effective in promoting vaccination by comparing the effects of health cadres with that of nominated ambassadors, $\beta$ vs. $\gamma$. Finally, we compare the effects of non-layperson (combined health cadres and nominated) ambassadors with that of layperson ambassadors.

### 4.3.2 Hypotheses

Theoretically, shared characteristics, local traits, and identities can influence social proximity, which in turn affects compliance to social norms (Bicchieri et al., 2022). Empirically, studies have shown that social proximity is effective in countering misinformation about COVID-19 (Armand et al., 2022) and promoting COVID-19 vaccination (Giulietti et al., 2021) or flu vac-

[24] *Layperson* is the reference group.

[25] We pre-specified the control variables. We deviate from the pre-analysis plan by excluding childhood immunization because it has many missing observations. We also only include baseline vaccination intent as a control variable in regressions involving vaccination outcomes. The regression results are robust to exclusion of all control variables.

cination (Alsan and Eichmeyer, 2021). In this study, we explore the potential role of social proximity in promoting COVID-19 vaccines through ambassadors. We recruited ambassadors that satisfy two important criteria. First, they are from local villages because they likely share local traits and characteristics with the respondents. Second, they should have received at least first-dose of vaccines because this implies strong trust on the effectiveness of vaccines. Therefore, prior to the study, we anticipated that the ambassadors can nudge respondents to get vaccinated.

Previous studies have documented evidence on the positive health behaviors adoption effects of information campaign delivery by non-laypersons (health cadres and nominated) and laypersons. In this study, as we specified in the pre-analysis plan, because all types of ambassadors are locals, we hypothesize that the more eminent persons in the communities, such as nominated and health cadre ambassadors, are probably more persuasive than laypersons in nudging respondents to get vaccinated. We do not have a clear hypothesis for which type of non-layperson ambassadors was going to be more effective even though in Indonesia, health workers are considered more influential than politicians, religious, and local leaders in promoting COVID-19 vaccination (SMRC, 2021).[26]

# 5 Results

## 5.1 Vaccination Outcomes

Figure 2 presents the proportions of vaccine take-up and registration at the endline (Panel A) and changes of vaccine intent at baseline and endline (Panel B). The vaccine take-up rate at the endline is, on average, 3.57%, and is quite similar across treatment groups. This rate is relatively low compared to the national progress during the study period: an increase of 5 percentage points from 71% in February 2022—the start of the baseline survey—to 76% in September 2022, completion of the endline survey.[27] The registration rate is, on average, 7.8%, and it appears relatively more pronounced in the *Health Cadres* group, 9.2%. In addition, we observe a slight increase in vaccine intent among those who did not take up the vaccine or registered for vaccination, but the change and level appear similar across groups.

Table 1 presents formal statistical tests of treatment differences in the outcomes described above obtained from estimating equation 1. Panel A presents the effects of non-layperson

[26] In this study, our respondents consider their friends, families, and neighbors, as the most helpful source of information for COVID-19 vaccines (Figure A.3.)

[27] As explained in the previous section, the take-up rate in our sample only accounts for those who got vaccinated after the intervention—we excluded individuals who took up vaccines before the baseline and intervention.

(health cadre and nominated) ambassadors. Panel B presents the separate effects of health cadre and nominated ambassadors. Overall, we do not find evidence of treatment effects across outcomes, and the results are robust to exclusion of all control variables (Table A.7).[28]

The estimated vaccine take-up/registration effect of *Health Cadres* is 1.5 pp, which corresponds to a 13% increase over the layperson group, but is not statistically significant (Column 1). The point estimates of the effects on vaccine take-up (Column 2) and vaccine intent are essentially zero (Column 4). Interestingly, all vaccination outcomes of individuals in the nominated ambassadors group are lower—albeit statistically insignificant—than those of the layperson group. Because the effects of health cadre and nominated ambassadors cancel each other, we do not find significant impacts of non-layperson ambassadors (Panel A).

We next attempt to understand the lack of treatment differences on vaccination outcomes and why the null effect is unlikely to be driven by an implementation failure.

## 5.2 Reasons for not Vaccinating

To gain a deeper understanding of the results, we investigate the relationship between the intervention and the degree of misconceptions about COVID-19.[29]

Figure 3 presents the distribution of the main reason reported by respondents for not taking up vaccines in the baseline and endline. In line with some recent national surveys (MoH, 2020; LSI, 2021; SMRC, 2021), we find evidence suggesting that misconceptions and misinformation about COVID-19 vaccines drive hesitancy in our sample, especially at the baseline. Morbidity (the most common reason—45%), fear of side effects, doubts over vaccine, and belief that own health can fight COVID-19 make up almost 80% of the responses at the baseline.[30] Following the intervention, we observe some shifts: (i) a sharp decline in individuals reporting "*Fear of side effects*" (25% to 12%) and (ii) a sharp increase in reports on "*Follow a doctor's advice*" (8% to 19%). Overall, we find a reduction (from 79% to 69%) in all the reasons that indicate misconceptions and misinformation. A Pearson's chi-squared test strongly rejects the null hypothesis that these two samples were drawn from the same distribution ($p < 0.001$). We find this pattern in all treatment groups (Figure A.4); Figure A.5 shows that the distributions of the"reasons for not getting vaccinated" at the endline do not differ between groups

[28] Because the regression results are not sensitive to inclusion of control variables and we do not find evidence of treatment effects across outcomes, we did not implement double LASSO to select control variables as written in the pre-analysis plan.

[29] This analysis was not specified in the pre-analysis plan.

[30] We argue that these reasons indicate misconceptions and misinformation about COVID-19 vaccines because it has been documented that COVID-19 vaccines have limited side effects, are safe for people with existing health conditions, and are highly effective in mitigating adverse effects of COVID-19. For instance, see some summary of facts from Mayo Clinic here https://mayocl.in/3ZwNyL4.

(Chi-squared test; $p > 0.1$).[31]

## 5.3 Perceptions on Ambassadors, Knowledge, and Beliefs

The setting of this experiment—door-to-door campaign targeted to unvaccinated individuals during the COVID-19 pandemic—raises a question as to whether the moderate effect on vaccination rates is due to an implementation failure. For example, ambassadors might have not visited respondents because they were worried about catching COVID-19 from respondents. We present evidence that this was not the case. The endline survey reveals that 83% of respondents were visited by the ambassadors, and nominated ambassadors appear to leave a good impression on respondents.

Table 2 shows that respondents perceived nominated ambassadors to be 0.2 and 0.3 standard deviation better than laypersons and health cadres (Column 1, Panel B), especially in terms of their ability to promote (Column 3) and emphasize the benefits of COVID-19 vaccines (Column 4). This is consistent with recent studies that document evidence on the effective roles of central individuals and public figures in transmitting information about immunization (Alatas et al., 2021; Banerjee et al., 2019).

However, better perceptions on the ability to transmit information do not translate to improvements in the knowledge index (Table 3), the beliefs index about COVID-19 (Table 4), and vaccination outcomes (Table 1). On all these outcomes we do not find significant differences across treatment groups.

## 5.4 Mental Health and Health Behaviors

Onr might expect that the provision of scientific-based COVID-related information content and the personal approach from ambassadors may have impacts on non-vaccination outcomes, such as mental health status and health behaviors. Table 5 shows some suggestive evidence that health cadre ambassadors helped reduce stress triggered by COVID-19 (Column 2), but not mental health in general (Column 1). However, the impacts on health behaviors—measured by compliance behaviors index and indicator for contracting COVID-19 after the intervention—is not statistically distinguishable across treatments (Columns 3 and 4), which is consistent with the findings on knowledge and beliefs about COVID-19.

[31] The distributions at baseline also do not differ between groups.

### 5.5 Heterogeneous Treatment Effects

Next, we investigate whether the overall null treatment effects on vaccination outcomes mask any heterogeneous treatment effects.[32] To explore whether some subgroups responded more to certain type of ambassadors, we estimate the effects of interactions between treatment group indicators and baseline variables. We focus on heterogeneity analysis on our preferred outcome, vaccine take-up/registration.

Table 6 shows some evidence of heterogeneous effects of the *Health Cadres* treatment—relative to *Layperson*—with respect to baseline socio-economic characteristics (index) and gender. Column 1 shows that respondents from low (below-the-median) socio-economic background responded more to health cadre ambassadors. Column 2 shows that seniors did not respond to personal approach by any type of ambassadors, who are, on average, relatively young (40 years of age). Column 3 shows that females responded more to health cadre ambassadors than males. These results can probably be explained by the fact that health cadres are mostly female (90% vs 62% among layperson ambassadors) and are more active in the communities than laypersons (47% vs 38%) (see Table A.5). We, however, do not find heterogeneous responses with respect to vaccine intent (Column 4) and morbidity status (Column 5).

## 6 Conclusion

We report results from a door-to-door information campaign to raise COVID-19 vaccination rates in rural areas of West Java, Indonesia. The study is conducted one and a half years after the first vaccination roll-out. Our main contribution is to provide evidence that the type of ambassador that delivers the information—health cadres, nominated persons, and laypersons—does not seem to matter for the effectiveness of the campaign in this setting.

Previous evidence suggests that the effectiveness of information campaigns hinges on the timing of the intervention. Information campaigns through virtual media (e.g., video messages, text messages, audio recordings) conducted in an earlier stage of the COVID-19 pandemic were successful in raising awareness about COVID-19 (Siddique et al., 2022), promoting preventive health behaviors (Breza et al., 2021), flu vaccination (Alsan and Eichmeyer, 2021) and COVID-19 vaccines (Armand et al., 2021; Dai et al., 2021). On the other hand, a large-scale information campaign using video messages disseminated through Facebook between December 2021 and March 2022 failed to affect vaccination decisions (Ho et al., 2022). We

[32] We omitted some heterogeneity analyses specified in the pre-analysis plan for brevity and because the analyses are not informative.

contribute to this literature by showing evidence that the type of ambassador delivering the information campaign does not matter in this context.

We offer several possible explanations as to why our intervention did not increase COVID-19 vaccine take-up/registration among the targeted population and why the type of ambassador seems not to have mattered.

First, the target population of our study is likely to be very hesitant—our participants had not vaccinated one year after vaccines first became available in January 2021. This is supported by the fact that a high proportion of respondents—60%—rejected a hypothetical idea of cash-for-vaccines offer from the government. Second, we find some indication that individuals in our sample became less concerned about the pandemic over time, as indicated by a drop in the propensity to actively seek information related to COVID-19. Figure A.6 shows a noticeable shift in terms of COVID-19 news consumption: the proportion of our respondents that reported almost-daily consumption of COVID-19 news dropped from 33% at the baseline to 13% at the endline, while monthly news consumption increased from 16% to 40%. This is perhaps not surprising because COVID-19 cases in Indonesia also dropped significantly during that period.[33]

All in all, unlike previous related studies that were conducted in earlier stages of the pandemic, the evidence from our study and Ho et al. (2022) suggests that information campaigns in any form—virtual or in-person—might not be very effective in promoting vaccination among very hesitant individuals, especially when the infectious disease incidence has been falling and the immunization coverage is high. In such circumstances, it may be necessary that more directive policies, such as vaccine mandates may need to be considered.

[33]At the start of the baseline survey, on February $15^{th}$, there were more than 45,891 cases (7-day average), whereas on June $15^{th}$ (start of the intervention), cases dropped sharply to 724 before increasing to 5,280 on August $15^{th}$ (the start of the endline survey).

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# Main Figures and Tables

Figure 1: Study Design

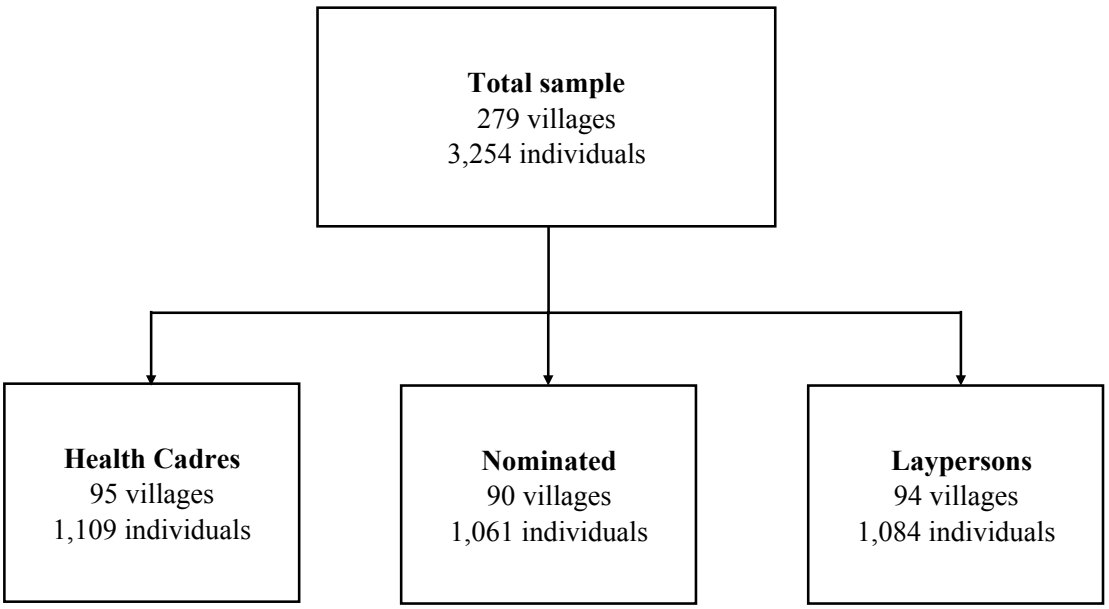
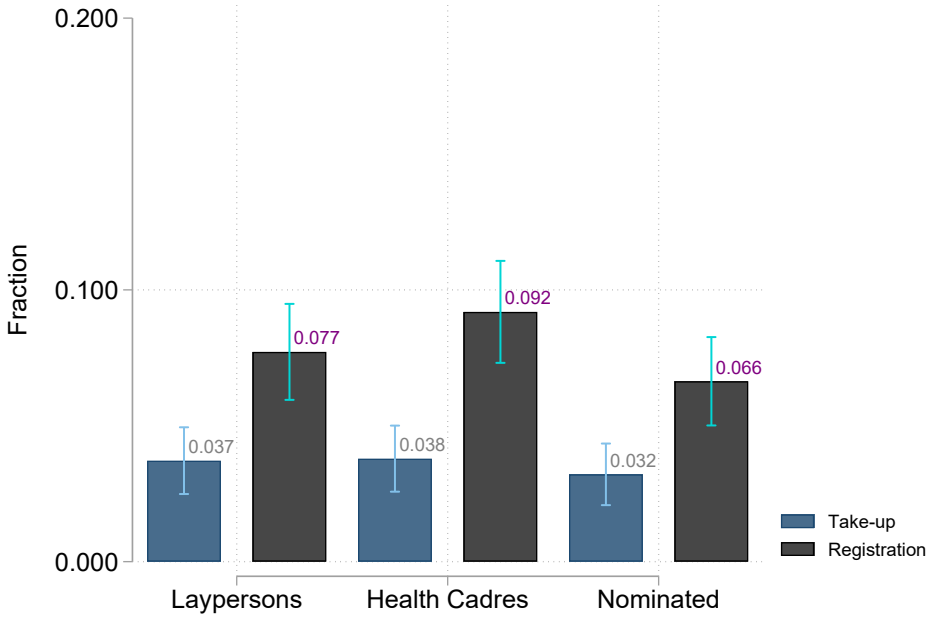
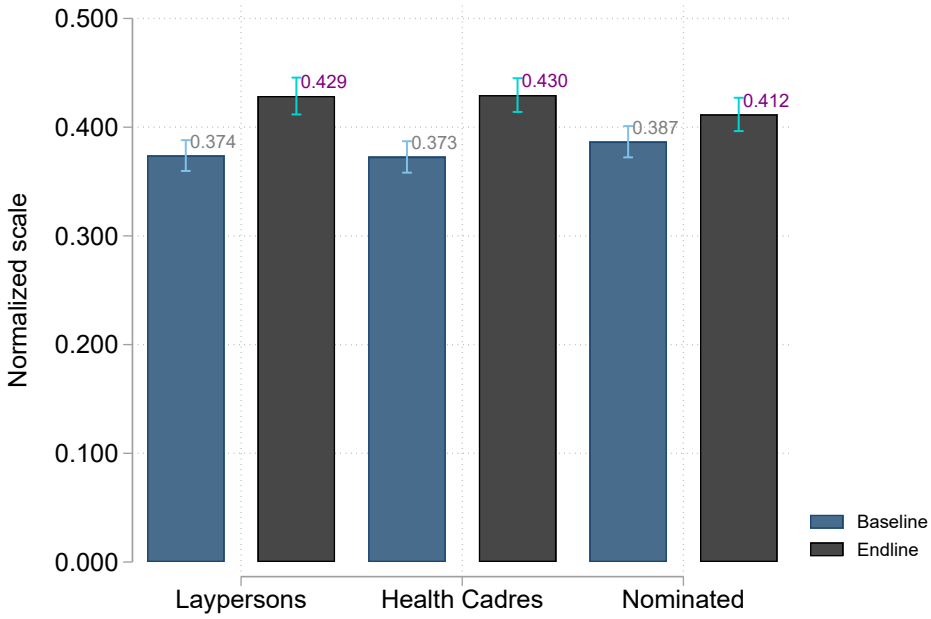


Figure 2: Vaccination Outcomes by Treatment Groups

(a) Vaccine Take-up/Registration at Endline

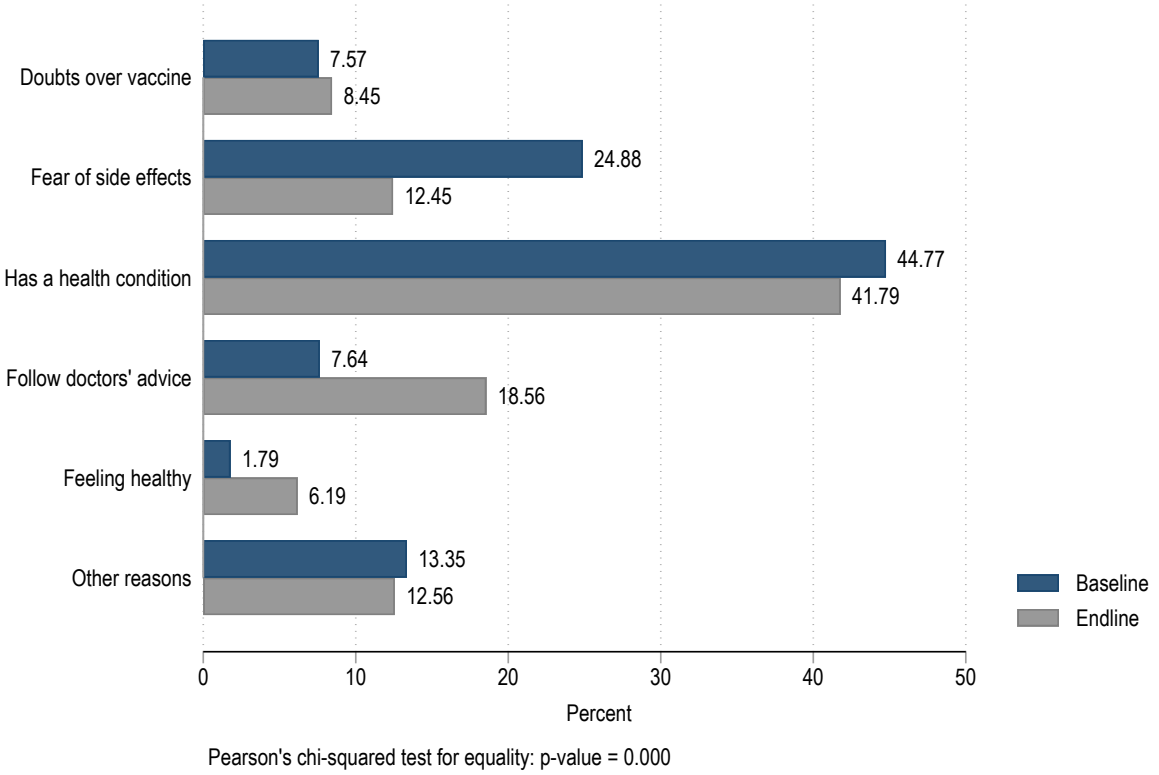



(b) Vaccine Intent at Baseline and Endline




Note: This figure shows means of vaccination outcomes of each ambassador group. Panel (a) shows means of vaccine take-up and registration. Panel (b) shows means of vaccine intent—normalized to have support between 0 and 1—at the baseline and endline.

Figure 3: Reasons for not Getting Vaccinated




Note: This figure shows the distribution of self-reported reasons for why respondents did not get vaccinated at the baseline and endline. *Doubts over vaccine* is an indicator for whether an individual reports having doubts over COVID-19 vaccines effectiveness. *Fear of side effects* is an indicator for whether an individual reports having fear of potentially harmful side effects of COVID-19 vaccines. *Has a health condition* is an indicator for whether an individual reports having a health condition or following doctor's or health worker's advice. *Follow doctors' advice* is an indicator for whether an individual reports receiving advice from her physician not to take-up vaccines. *Feeling healthy* is an indicator for whether an individual reports feeling healthy so she does not need to be vaccinated. *Other reasons* is an indicator for whether an individual reports other reasons such as registration being too complicated and having fear of needles.

Table 1: Effects on Vaccination: Take-up, Registration, and Intent

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Vaccinated or registered | Vaccinated | Registered | Vaccine intent |
| **Panel A** | | | | |
| Non-layperson | –0.001 | –0.003 | 0.003 | –0.008 |
| | (0.025) | (0.013) | (0.022) | (0.016) |
| $R^2$ | 0.020 | 0.015 | 0.036 | 0.072 |
| **Panel B** | | | | |
| Health cadres | 0.015 | –0.000 | 0.016 | 0.003 |
| | (0.029) | (0.015) | (0.026) | (0.018) |
| Nominated | –0.017 | –0.006 | –0.011 | –0.018 |
| | (0.026) | (0.013) | (0.023) | (0.018) |
| N | 2,778 | 2,778 | 2,678 | 2,467 |
| $R^2$ | 0.021 | 0.015 | 0.037 | 0.073 |
| Control mean | 0.111 | 0.037 | 0.077 | 0.429 |
| $p$-value: Health cadres vs Nominated | 0.440 | 0.835 | 0.508 | 0.439 |

Notes: This table reports the results of estimating Equation 1. In Panel A the main treatment group indicator equals 1 for *Health Cadres* and *Nominated* groups and 0 for the *Layperson* group. Dependent variables in Columns 1-3 are indicators for having received vaccination or registered for vaccination, having received vaccination, and registered for vaccination, respectively. COVID-19 vaccine intent—measured using Likert scale and is normalized to have response between 0 and 1—is shown in Column 4. All regressions include control variables described in Section 4.3.1. Standard errors are robust to heteroskedasticity and clustered at the village level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 2: Effects on Perceptions of the Quality of Ambassadors and the Intervention

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | | Perception on [...] | | |
| | Perception (index) | Information session | Ambassador's ability to promote vaccines | Vaccine benefits information |
| **Panel A** | | | | |
| Non-layperson | 0.022 | 0.002 | 0.003 | 0.003 |
| | (0.088) | (0.008) | (0.014) | (0.014) |
| $R^2$ | 0.024 | 0.022 | 0.018 | 0.017 |
| **Panel B** | | | | |
| Health cadres | –0.125 | –0.007 | –0.021 | –0.021 |
| | (0.102) | (0.009) | (0.016) | (0.016) |
| Nominated | 0.192* | 0.012 | 0.032** | 0.030** |
| | (0.098) | (0.009) | (0.015) | (0.015) |
| N | 2,302 | 2,302 | 2,302 | 2,302 |
| $R^2$ | 0.040 | 0.028 | 0.040 | 0.038 |
| Control mean | 0.000 | 0.733 | 0.709 | 0.711 |
| $p$-value: Health cadres vs Nominated | 0.006 | 0.087 | 0.003 | 0.004 |

Notes: This table reports the results of estimating Equation 1. In Panel A the main treatment group indicator equals 1 for *Health Cadres* and *Nominated* groups and 0 for the *Layperson* group. Dependent variable in Columns 1 is an index variable that is standardized with *Layperson* as the reference group. Columns 2-4 present the components of the index variable in Column 1, measured using a Likert scale and normalized to have responses between 0 and 1. All regressions include control variables described in Section 4.3.1. Standard errors are robust to heteroskedasticity and clustered at the village level. * p < 0.10, ** p < 0.05, *** p < 0.01.

Table 3: Effects on Knowledge about COVID-19 and its Vaccines

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Knowledge (index) | Knowledge about COVID (index) | Severity of COVID impacts (index) | Benefits of COVID vaccine (index) | Distinguish COVID fake news & facts (index) |
| **Panel A** | | | | | |
| Non-layperson | 0.022 | 0.017 | –0.029 | 0.054 | 0.059 |
| | (0.063) | (0.052) | (0.084) | (0.064) | (0.064) |
| $R^2$ | 0.029 | 0.026 | 0.028 | 0.070 | 0.029 |
| **Panel B** | | | | | |
| Health cadres | –0.007 | 0.024 | 0.004 | 0.051 | 0.001 |
| | (0.072) | (0.058) | (0.100) | (0.076) | (0.073) |
| Nominated | 0.052 | 0.009 | –0.063 | 0.057 | 0.117 |
| | (0.071) | (0.065) | (0.091) | (0.071) | (0.071) |
| N | 2,778 | 2,778 | 2,778 | 2,778 | 2,777 |
| $R^2$ | 0.030 | 0.026 | 0.029 | 0.070 | 0.031 |
| Control mean | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| $p$-value: Health cadres vs Nominated | 0.647 | 0.918 | 0.691 | 0.694 | 0.144 |

Notes: This table reports the results of estimating Equation 1. In Panel A the main treatment group indicator equals 1 for *Health Cadres* and *Nominated* groups and 0 for the *Layperson* group. Dependent variables in Columns 1-5 are index variables that are standardized with *Layperson* as the reference group. Columns 2-5 are the components of knowledge index variable in Column 1. All regressions include control variables described in Section 4.3.1. Standard errors are robust to heteroskedasticity and clustered at the village level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Effects on Beliefs about COVID-19 and its Vaccines

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Other beliefs (index) | Vulnerability from COVID (index) | Barriers to vaccination (index) | Cue to action for vaccination (index) | Projection about COVID situation (index) |
| **Panel A** | | | | | |
| Non-layperson | –0.021 | –0.096 | 0.051 | –0.045 | –0.057 |
| | (0.067) | (0.068) | (0.068) | (0.067) | (0.068) |
| $R^2$ | 0.014 | 0.032 | 0.027 | 0.033 | 0.023 |
| **Panel B** | | | | | |
| Health cadres | 0.015 | –0.044 | 0.051 | –0.020 | –0.040 |
| | (0.077) | (0.078) | (0.080) | (0.077) | (0.075) |
| Nominated | –0.057 | –0.150* | 0.051 | –0.071 | –0.075 |
| | (0.082) | (0.078) | (0.081) | (0.076) | (0.084) |
| N | 2,778 | 2,778 | 2,778 | 2,777 | 2,777 |
| $R^2$ | 0.015 | 0.034 | 0.027 | 0.034 | 0.023 |
| Control mean | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| $p$-value: Health cadres vs Nominated | 0.678 | 0.139 | 0.754 | 0.620 | 0.665 |

Notes: This table reports the results of estimating Equation 1. In Panel A the main treatment group indicator equals 1 for *Health Cadres* and *Nominated* groups and 0 for the *Layperson* group. Dependent variables in Columns 1-5 are index variables that are standardized with *Layperson* as the reference group. Columns 2-5 are the components of beliefs index variable in Column 1. All regressions include control variables described in Section 4.3.1. Standard errors are robust to heteroskedasticity and clustered at the village level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Effects on Mental Health and Health Behaviors

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Mental health (general) | Mental health (covid) | Compliance (Extensive) | Compliance (Intensive) | COVID after intervention |
| **Panel A** | | | | | |
| Non-layperson | –0.041 | –0.129* | –0.038 | 0.044 | 0.005 |
| | (0.074) | (0.071) | (0.098) | (0.089) | (0.005) |
| $R^2$ | 0.060 | 0.082 | 0.166 | 0.043 | 0.010 |
| **Panel B** | | | | | |
| Health cadres | 0.047 | –0.142* | –0.134 | –0.045 | 0.004 |
| | (0.094) | (0.082) | (0.121) | (0.099) | (0.006) |
| Nominated | –0.131 | –0.116 | 0.060 | 0.131 | 0.005 |
| | (0.079) | (0.081) | (0.104) | (0.113) | (0.006) |
| N | 2,777 | 2,777 | 2,778 | 2,677 | 2,777 |
| $R^2$ | 0.065 | 0.082 | 0.172 | 0.047 | 0.010 |
| Control mean | 0.000 | 0.000 | 0.000 | 0.000 | 0.014 |
| $p$-value: Health cadres vs Nominated | 0.107 | 0.185 | 0.228 | 0.318 | 0.650 |

Notes: This table reports the results of estimating Equation 1. In Panel A the main treatment group indicator equals 1 for *Health Cadres* and *Nominated* groups and 0 for the *Layperson* group. Dependent variables in Columns 1-4 are index variables that are standardized with *Layperson* as the reference group. Column 5 is an indicator variable. All regressions include control variables described in Section 4.3.1. Standard errors are robust to heteroskedasticity and clustered at the village level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Heterogeneous Treatment Effects on Vaccine Take up/Registration

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Baseline [...] | | | | |
| | Socio-economic (index) above median | Age 60+ | Female | Vaccine intent above median | Morbidity (index) above median |
| Health cadres | 0.050 | 0.027 | –0.028 | 0.022 | –0.005 |
| | (0.040) | (0.031) | (0.033) | (0.029) | (0.026) |
| Nominated | –0.018 | –0.018 | –0.029 | –0.007 | –0.022 |
| | (0.033) | (0.026) | (0.031) | (0.027) | (0.026) |
| Health Cadres × [...] | –0.070* | –0.047 | 0.072* | –0.021 | 0.069 |
| | (0.038) | (0.042) | (0.039) | (0.045) | (0.047) |
| Nominated × [...] | 0.003 | 0.004 | 0.021 | –0.027 | 0.017 |
| | (0.032) | (0.039) | (0.032) | (0.035) | (0.044) |
| N | 2,778 | 2,778 | 2,778 | 2,778 | 2,778 |
| $R^2$ | 0.025 | 0.023 | 0.023 | 0.022 | 0.025 |
| Control mean | 0.111 | 0.111 | 0.111 | 0.111 | 0.111 |
| $p$-value: Cadres × [...] vs Nominated × [...] | 0.039 | 0.126 | 0.143 | 0.871 | 0.245 |

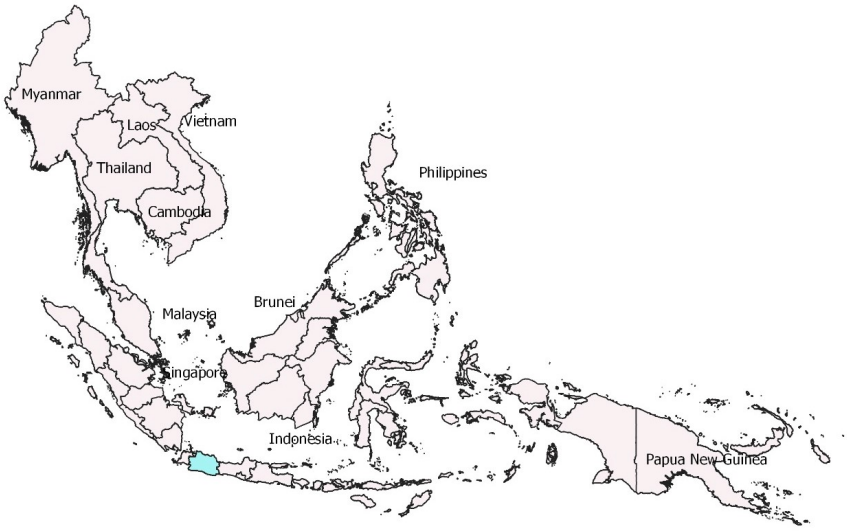
Notes: This table reports OLS estimates from separate regressions of vaccination outcome (take-up/registration) on indicators of treatment group, a baseline variable, and their interaction. Baseline variables in Columns 1-6 are indicators for above the median socio-economic index, seniors (aged 60 years old and older), female, above the median vaccine intent, and above the median morbidity index, respectively. All regressions include control variables described in Section 4.3.1. Standard errors are robust to heteroskedasticity and clustered at the village level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

# APPENDIX

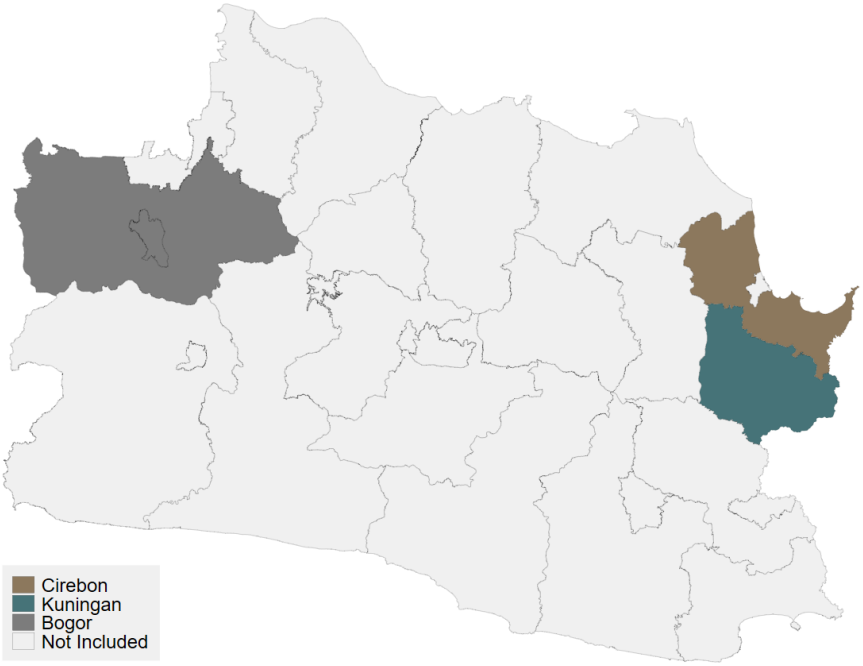
## A Additional Figures and Tables

Figure A.1: Map of Study Areas

(a) Map of Indonesia

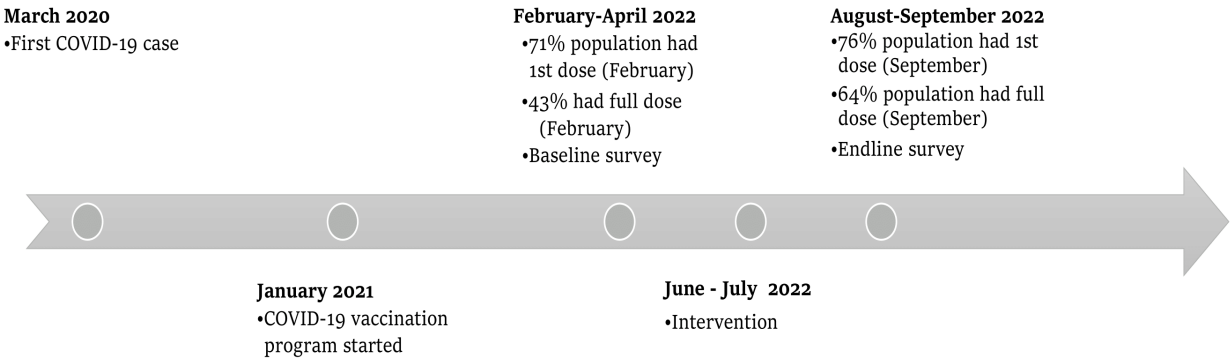



(b) Map of West Java Province



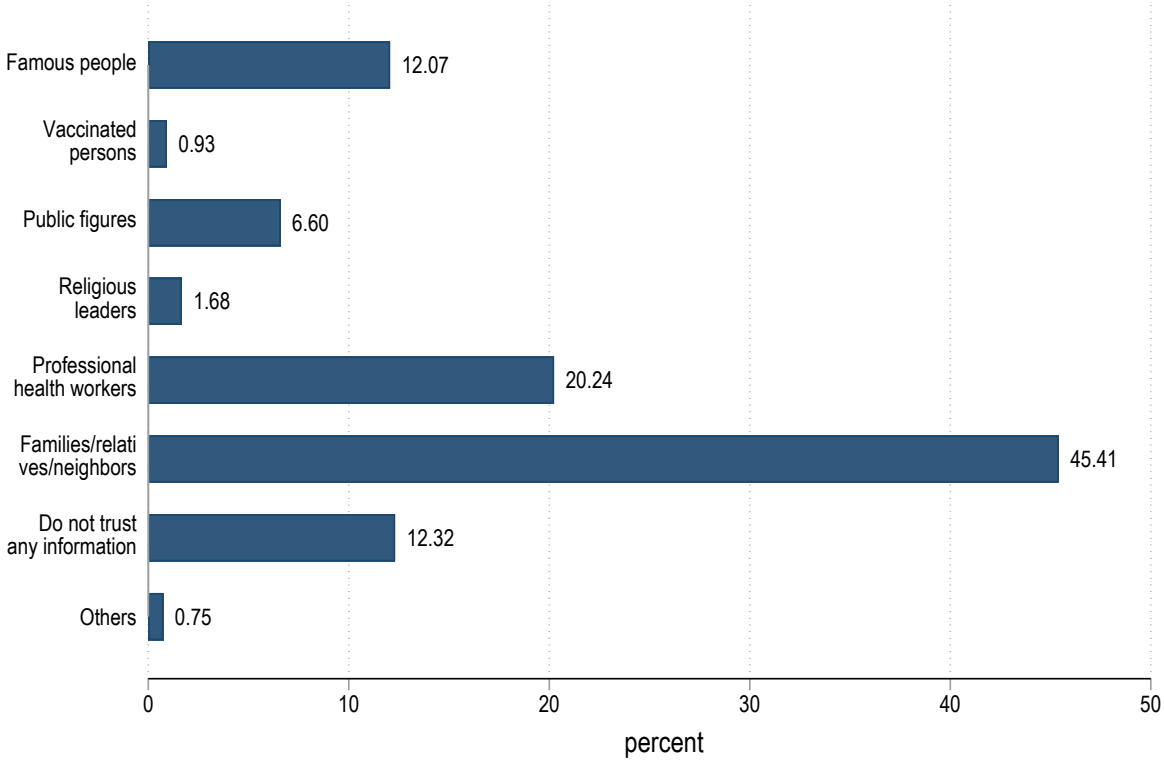

Note: This map shows Indonesia (upper panel—West Java highlighted) and West Java Province (lower panel—Bogor, Cirebon, and Kuningan districts highlighted).

Figure A.2: Study Timeline



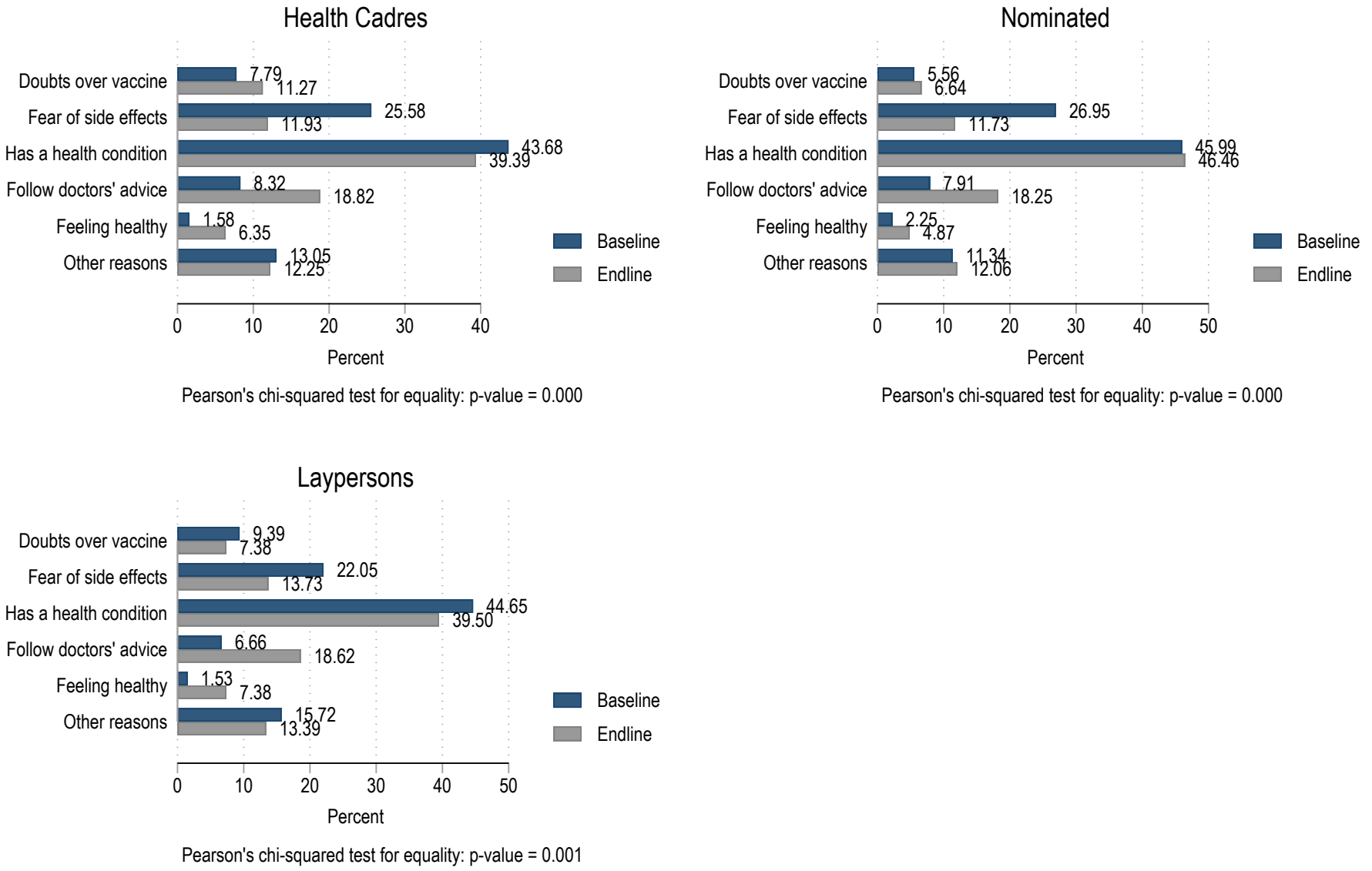

Note: Source for vaccination rate is from https://ourworldindata.org/

Figure A.3: Most Helpful Sources of Information about COVID-19 Vaccines



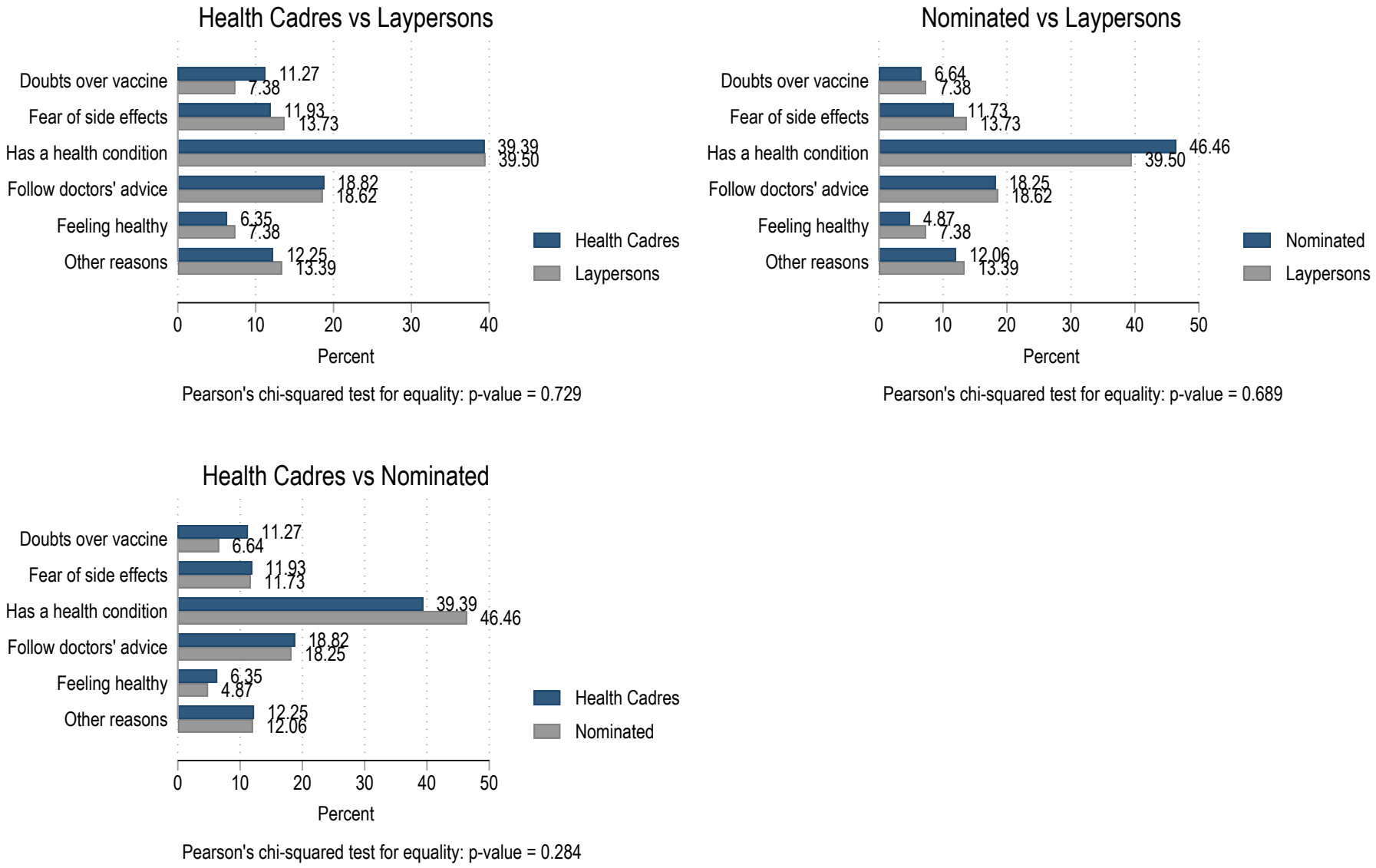

Note: This figure shows the distribution of sources of information on COVID-19 vaccines that are considered most helpful by respondents. Each respondent can give more than one answer, so the responses are not exhaustive and mutually exclusive.

Figure A.4: Reasons for not Getting Vaccinated by Treatment Groups



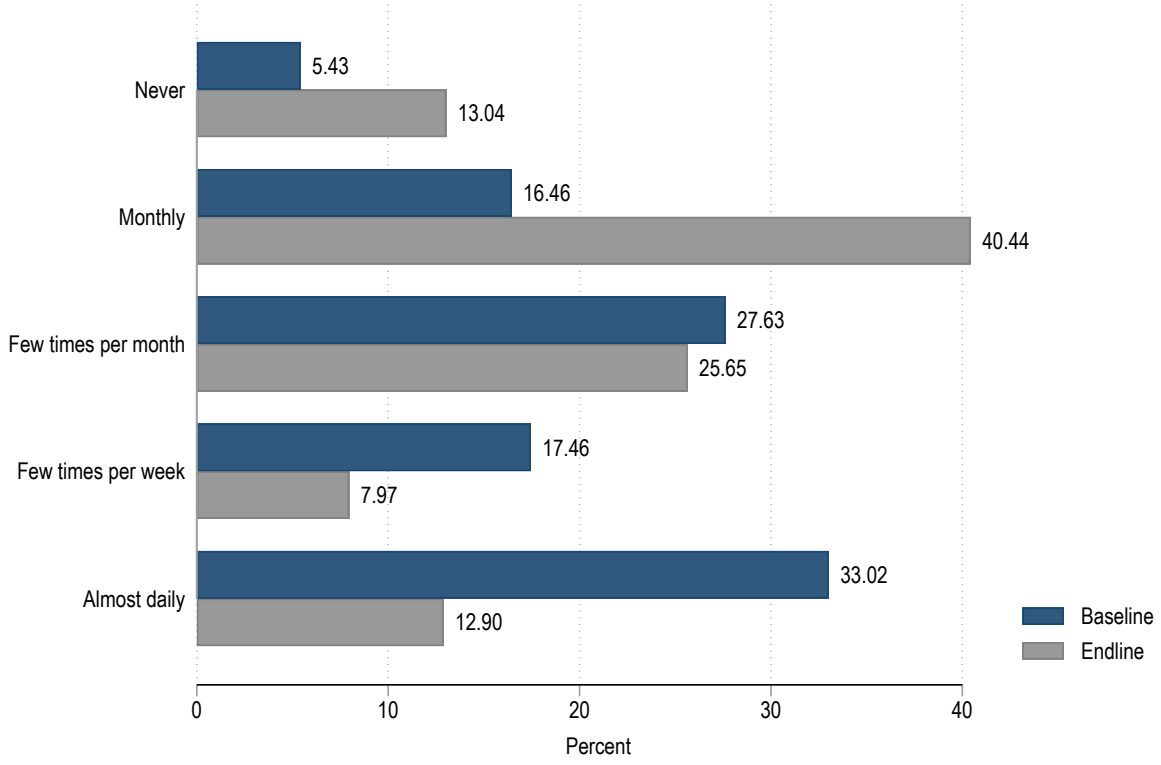

Note: This figure shows the distribution of self-reported reasons for why respondents did not get vaccinated at the baseline and endline by treatment groups.

Figure A.5: Reasons for not Getting Vaccinated at Endline across Treatment Groups




Note: This figure shows the distribution of self-reported reasons for why respondents did not get vaccinated at endline across treatment groups.

Figure A.6: Information Seeking Behaviors: COVID-19 News Consumption




Note: This figure presents the frequency of news consumption about COVID-19 at the baseline and endline.

Table A.1: Attrition Reasons

| | Health cadres | | Nominated | | Layperson | | Total | |
|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Re-interviewed | 950 | 85.66 | 935 | 88.12 | 916 | 84.50 | 2801 | 86.08 |
| Cannot be located | 49 | 4.42 | 45 | 4.24 | 44 | 4.06 | 138 | 4.24 |
| Declined to be re-interviewed | 78 | 7.03 | 59 | 5.56 | 79 | 7.29 | 216 | 6.64 |
| Moved | 14 | 1.26 | 13 | 1.23 | 17 | 1.57 | 44 | 1.35 |
| Dead | 12 | 1.08 | 5 | 0.47 | 23 | 2.12 | 40 | 1.23 |
| Sick | 6 | 0.54 | 4 | 0.38 | 5 | 0.46 | 15 | 0.46 |
| **Total** | **1109** | **100** | **1061** | **100** | **1084** | **100** | **3254** | **100** |

Notes: This table displays information on reasons for attrition between baseline and endline surveys.

Table A.2: Attrition Analysis

| | (1) | (2) | (3) |
|---|---|---|---|
| Health cadres | –0.012 | 0.054 | –0.105 |
| | (0.034) | (0.037) | (0.142) |
| Nominated | –0.036 | 0.048 | –0.142 |
| | (0.032) | (0.035) | (0.121) |
| Health cadres × Vaccine intent | | –0.168 | –0.153 |
| | | (0.109) | (0.106) |
| Nominated × Vaccine intent | | –0.218** | –0.221** |
| | | (0.095) | (0.094) |
| Health cadres × Female | | | 0.009 |
| | | | (0.052) |
| Nominated × Female | | | 0.050 |
| | | | (0.040) |
| Health cadres × Unemployed | | | 0.040 |
| | | | (0.051) |
| Nominated × Unemployed | | | –0.033 |
| | | | (0.039) |
| Health cadres × Age | | | 0.000 |
| | | | (0.002) |
| Nominated × Age | | | 0.001 |
| | | | (0.001) |
| Health cadres × Years of schooling | | | 0.007 |
| | | | (0.008) |
| Nominated × Years of schooling | | | 0.015** |
| | | | (0.007) |
| Health cadres × Monthly hh expenditure per capita | | | 0.000* |
| | | | (0.000) |
| Nominated × Monthly hh expenditure per capita | | | 0.000** |
| | | | (0.000) |
| N | 3,254 | 3,254 | 3,223 |
| $R^2$ | 0.002 | 0.009 | 0.040 |
| $p$-value: F-test of all regressors | 0.477 | 0.146 | 0.000 |
| $p$-value: F-test of all interaction terms | | 0.528 | 0.336 |
| Attrition rate: Pooled | 0.139 | | |
| Attrition rate: Laypersons | 0.155 | | |
| Attrition rate: Health cadres | 0.143 | | |
| Attrition rate: Nominated | 0.119 | | |

Notes: This table reports attrition analysis. Dependent variable is an indicator for attrition. All regressions include interacted baseline variables, but the estimated coefficients are not shown. Standard errors are robust to and clustered at the village level. * p < 0.10, ** p < 0.05, *** p < 0.01.

Table A.3: Baseline Means and Balance Tests

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | | Mean | | | Difference between Groups ($p$-value) | | |
| | N | Layperson | Health Cadres | Nominated | Layperson vs Health Cadres | Layperson vs Nominated | Health Cadres vs Nominated |
| Female | 3254 | 0.565 | 0.585 | 0.595 | 0.474 | 0.290 | 0.729 |
| Age | 3254 | 48.669 | 48.925 | 48.978 | 0.797 | 0.753 | 0.956 |
| Married | 3254 | 0.741 | 0.732 | 0.747 | 0.709 | 0.776 | 0.545 |
| Unemployed | 3250 | 0.551 | 0.562 | 0.534 | 0.721 | 0.556 | 0.318 |
| Primary or lower education | 3254 | 0.709 | 0.692 | 0.697 | 0.519 | 0.639 | 0.871 |
| Had childhood immunization | 2838 | 0.709 | 0.732 | 0.710 | 0.612 | 0.993 | 0.584 |
| Received any social assistance benefits | 3254 | 0.793 | 0.777 | 0.789 | 0.624 | 0.890 | 0.718 |
| Years of schooling | 3248 | 6.040 | 6.291 | 6.221 | 0.313 | 0.448 | 0.786 |
| Monthly HH exp. per capita (IDR '000) | 3231 | 676.803 | 681.258 | 651.800 | 0.873 | 0.361 | 0.235 |
| Has health insurance | 3254 | 0.625 | 0.664 | 0.643 | 0.268 | 0.603 | 0.526 |
| Morbidity index (0–1) | 3250 | 0.134 | 0.131 | 0.130 | 0.737 | 0.618 | 0.882 |
| Vaccine intent (1–5) | 3254 | 2.546 | 2.503 | 2.547 | 0.533 | 0.994 | 0.514 |
| Nearest distance to a health facility (km) | 3254 | 0.560 | 0.594 | 0.549 | 0.841 | 0.939 | 0.770 |
| Distance to subdistrict (km) | 3254 | 3.267 | 3.093 | 3.434 | 0.625 | 0.672 | 0.353 |
| $p$-value: Joint orthogonality test | | | | | 0.959 | 0.816 | 0.914 |

Notes: This table reports means of baseline respondents' characteristics and results from regressions of each baseline variable (rows) on indicators for *Health Cadres*, *Nominated*, and *Layperson* groups. Column 1 reports total non-missing observations for each variable. Columns 2-4 report the mean of each variable for *Layperson*, *Health Cadres*, and *Nominated*, respectively. Columns 5-7 report $p$-values of coefficient from regressions of each variable on *Health Cadres* vs *Layperson* indicator (Column 5), on *Nominated* vs *Layperson* indicator (Column 6), and on *Health Cadres* vs *Nominated* indicator (Column 7). Standard errors are robust to heteroskedasticity and clustered at the village level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.4: Baseline Means and Balance Tests: Only Respondents Visited by Ambassadors

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | | Mean | | | Difference between Groups ($p$-value) | | |
| | N | Layperson | Health Cadres | Nominated | Layperson vs Health Cadres | Layperson vs Nominated | Health Cadres vs Nominated |
| Female | 2415 | 0.561 | 0.597 | 0.616 | 0.279 | 0.097 | 0.552 |
| Age | 2415 | 48.303 | 49.002 | 49.248 | 0.462 | 0.345 | 0.804 |
| Married | 2415 | 0.751 | 0.739 | 0.734 | 0.611 | 0.508 | 0.845 |
| Unemployed | 2413 | 0.536 | 0.567 | 0.550 | 0.354 | 0.685 | 0.602 |
| Primary or lower education | 2415 | 0.700 | 0.692 | 0.695 | 0.790 | 0.883 | 0.918 |
| Had childhood immunization | 2130 | 0.718 | 0.739 | 0.708 | 0.669 | 0.844 | 0.470 |
| Received any social assistance benefits | 2415 | 0.780 | 0.768 | 0.798 | 0.751 | 0.617 | 0.389 |
| Years of schooling | 2413 | 6.270 | 6.375 | 6.305 | 0.703 | 0.898 | 0.802 |
| Monthly HH exp. per capita (IDR '000) | 2405 | 675.355 | 659.106 | 639.014 | 0.616 | 0.290 | 0.455 |
| Has health insurance | 2415 | 0.624 | 0.664 | 0.656 | 0.305 | 0.385 | 0.825 |
| Morbidity index (0–1) | 2412 | 0.133 | 0.132 | 0.132 | 0.913 | 0.890 | 0.981 |
| Vaccine intent (1–5) | 2415 | 2.522 | 2.488 | 2.525 | 0.667 | 0.972 | 0.613 |
| Nearest distance to a health facility (km) | 2415 | 0.657 | 0.604 | 0.541 | 0.785 | 0.530 | 0.708 |
| Distance to subdistrict (km) | 2415 | 3.349 | 3.057 | 3.541 | 0.460 | 0.679 | 0.225 |
| $p$-value: Joint orthogonality test | | | | | 0.983 | 0.776 | 0.956 |

Notes: Sample is restricted to respondents visited by ambassadors and who remained in the study. This table reports means of baseline respondents' characteristics and results from regressions of each baseline variable (rows) on indicators for *Health Cadres*, *Nominated*, and *Layperson* groups. Column 1 reports total non-missing observations for each variable. Columns 2-4 report the mean of each variable for *Layperson*, *Health Cadres*, and *Nominated*, respectively. Columns 5-7 report $p$-values of coefficient from regressions of each variable on *Health Cadres* vs *Layperson* indicator (Column 5), on *Nominated* vs *Layperson* indicator (Column 6), and on *Health Cadres* vs *Nominated* indicator (Column 7). Standard errors are robust to heteroskedasticity and clustered at the village level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.5: Ambassadors' Characteristics

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | | Mean | | | Difference between Groups ($p$-value) | | |
| | N | Layperson | Health Cadres | Nominated | Layperson vs Health Cadres | Layperson vs Nominated | Health Cadres vs Nominated |
| Age | 270 | 37.587 | 40.656 | 39.906 | 0.022 | 0.080 | 0.553 |
| Female | 279 | 0.617 | 0.895 | 0.344 | 0.000 | 0.000 | 0.000 |
| Monthly HH exp. per capita (IDR '000) | 244 | 2173.494 | 2446.988 | 2480.769 | 0.222 | 0.146 | 0.879 |
| Secondary or higher education | 239 | 0.864 | 0.880 | 0.893 | 0.771 | 0.580 | 0.786 |
| Trust vaccine preventing death | 279 | 0.911 | 0.888 | 0.893 | 0.372 | 0.495 | 0.873 |
| Community participation | 279 | 0.387 | 0.470 | 0.433 | 0.037 | 0.265 | 0.287 |
| **Vaccination status** | | | | | | | |
| $2^{nd}$ dose | 279 | 0.479 | 0.516 | 0.422 | 0.613 | 0.444 | 0.204 |
| $3^{rd}$ dose | 279 | 0.489 | 0.453 | 0.556 | 0.615 | 0.372 | 0.163 |
| $1^{st}$ dose | 279 | 0.032 | 0.032 | 0.022 | 0.990 | 0.687 | 0.695 |
| **Occupation** | | | | | | | |
| Government village official | 255 | 0.081 | 0.135 | 0.475 | 0.257 | 0.000 | 0.000 |
| Community worker volunteer | 255 | 0.023 | 0.135 | 0.025 | 0.006 | 0.942 | 0.007 |
| Employee | 255 | 0.465 | 0.146 | 0.275 | 0.000 | 0.011 | 0.042 |
| Housewife | 255 | 0.372 | 0.562 | 0.213 | 0.012 | 0.023 | 0.000 |
| Unemployed student | 255 | 0.058 | 0.022 | 0.013 | 0.234 | 0.109 | 0.621 |
| **Total** | 279 | 94 | 95 | 90 | | | |

Notes: This table reports means of baseline ambassadors' characteristics and results from regressions of each baseline variable (rows) on indicators for *Health Cadres*, *Nominated*, and *Layperson* groups. *Community participation* is re-scaled (between 0 and 1) from a 4-point Likert scale, where 1 refers to never and 4 always. *Trust vaccine preventing death* is re-scaled (between 0 and 1) from a 5-point Likert scale, where 1 refers to strongly disagree and 5 strongly agree. Column 1 reports total non-missing observations for each variable. Columns 2-4 report the mean of each variable for *Layperson*, *Health Cadres*, and *Nominated*, respectively. Columns 5-7 report $p$-values of coefficient from regressions of each variable on *Health Cadres* vs *Layperson* indicator (Column 5), on *Nominated* vs *Layperson* indicator (Column 6), and *Health Cadres* vs *Nominated* indicator (Column 7). Standard errors are robust to heteroskedasticity and clustered at the village level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.6: Nominated Ambassadors' Relationship and Interaction with Participants

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | | Mean | | |
| | N | Selected | Unselected | Difference ($p$-value) |
| **Length of relationship** | | | | |
| <5 years | 2545 | 0.066 | 0.063 | 0.830 |
| 5–9 years | 2545 | 0.349 | 0.294 | 0.105 |
| 10–19 years | 2545 | 0.237 | 0.267 | 0.328 |
| >20 years | 2545 | 0.348 | 0.377 | 0.475 |
| **Relationship type** | | | | |
| Father/Mother | 2545 | 0.004 | 0.001 | 0.324 |
| Brother/Sister | 2545 | 0.000 | 0.005 | 0.002 |
| Other relatives | 2545 | 0.016 | 0.020 | 0.555 |
| Neighbor | 2545 | 0.009 | 0.033 | 0.017 |
| Friend | 2545 | 0.005 | 0.010 | 0.419 |
| Members in the same organization | 2545 | 0.077 | 0.113 | 0.157 |
| Co-worker | 2545 | 0.004 | 0.001 | 0.395 |
| Public figure | 2545 | 0.037 | 0.047 | 0.695 |
| Teacher | 2545 | 0.000 | 0.003 | 0.158 |
| Religious leader | 2545 | 0.002 | 0.042 | 0.001 |
| Health worker/cadre | 2545 | 0.025 | 0.104 | 0.000 |
| Head/village apparatus | 2545 | 0.458 | 0.202 | 0.000 |
| Hamlet head | 2545 | 0.291 | 0.300 | 0.873 |
| Others | 2545 | 0.073 | 0.119 | 0.202 |
| **Popular non-health topic of discussion** | | | | |
| Personal affairs | 2545 | 0.405 | 0.399 | 0.865 |
| Financial issues | 2545 | 0.012 | 0.008 | 0.277 |
| Work issues | 2545 | 0.103 | 0.126 | 0.412 |
| Nothing specific | 2545 | 0.412 | 0.409 | 0.948 |
| **Total nominations** | | 561 | 1984 | |
| **Total ambassadors** | | 90 | 688 | |

Notes: This table reports means of characteristics of selected (Column 2) and unselected (Column 3) and results from regressions of each variable (rows) on indicator of selected vs unselected. Column 1 reports total non-missing observations for each variable. Standard errors are robust to and clustered at the village level. * p < 0.10, ** p < 0.05, *** p < 0.01.

Table A.7: Effects on Vaccination: Take-up, Registration, and Intent (without Control Variables)

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Vaccinated or registered | Vaccinated | Registered | Vaccine intention |
| **Panel A** | | | | |
| Non-layperson | –0.000 | –0.002 | 0.002 | –0.008 |
| | (0.025) | (0.013) | (0.022) | (0.017) |
| $R^2$ | 0.000 | 0.000 | 0.000 | 0.000 |
| **Panel B** | | | | |
| Health cadres | 0.015 | 0.001 | 0.015 | 0.001 |
| | (0.029) | (0.015) | (0.026) | (0.019) |
| Nominated | –0.015 | –0.005 | –0.011 | –0.017 |
| | (0.026) | (0.014) | (0.024) | (0.019) |
| N | 2,799 | 2,799 | 2,699 | 2,487 |
| $R^2$ | 0.002 | 0.000 | 0.002 | 0.001 |
| Control mean | 0.111 | 0.037 | 0.077 | 0.429 |
| $p$-value: Health cadres vs Nominated | 0.477 | 0.870 | 0.552 | 0.551 |

Notes: This table reports the results of estimating Equation 1. In Panel A the main treatment group indicator equals 1 for *Health Cadres* and *Nominated* groups and 0 for the *Layperson* group. Dependent variables in Columns 1-3 are indicators for having received vaccination or registered for vaccination, having received vaccination, and registered for vaccination, respectively. COVID-19 vaccine intent—measured using Likert scale and is normalized to have response between 0 and 1—is shown in Column 4. All regressions include control variables described in Section 4.3.1. Standard errors are robust to heteroskedasticity and clustered at the village level. * p < 0.10, ** p < 0.05, *** p < 0.01.

# B Intervention Preparation

Recruitment of the ambassadors started in mid-April 2022. The ambassadors' communication skills and style are critical for the success of the intervention. Consistent, compassionate, empathetic, and honest information delivery is key to convince people to get vaccinated (Bavel et al., 2020), especially because vaccine-hesitant individuals are more concerned about their rights to vaccinate than public safety (Rossen et al., 2019). To this end, we hired a behavioral communication specialist—a professor in communication studies at the University of Indonesia—to give training on effective communication and help develop a training module and pocket book for the ambassadors.[34] We used two approaches to develop our communication strategy: MINDSPACE approach and Social and Behavior Change Communication (SBCC). We use the MINDSPACE approach Dolan et al. (2010)—using principles from nudge theory (Thaler and Sunstein, 2008)—to develop the structure of key messages to be delivered by the ambassadors.[35] To ensure that our materials connect to the local context, we conducted a Focus Group Discussion (FGD) in a village in West Java in January 2022 to test our intervention procedure, key messages, and strategies.

**Ambassadors' guideline** Prior to the visit, the vaccine ambassador will attend training to increase the knowledge and skills of the vaccine ambassador regarding the outreach that will be carried out. The training was conducted twice, namely online and offline training. Online training will be conducted via Zoom. While offline training will be conducted in the area of each vaccine ambassador managed by the Field Officer. All information related to training can be communicated to the Field Officer.

At the end of the training, the vaccine ambassador will receive several items from the field officer to support outreach activities, namely:

- Medical mask
- Hand sanitizer
- Log book
- Pamphlet
- List of target participants

[34] We also hired an infectious disease specialist to disseminate scientific knowledge about COVID-19 and COVID-19 vaccines, such as how vaccines work, its benefits, risks, and potential side effects.

[35] Specifically, we used the following MINDSPACE nudging principles that have been documented to work relatively well in tackling vaccine hesitancy in recent studies (Reñosa et al., 2021): (i) make information salient, (ii) change the messenger (in this study, use the ambassadors), (iii) change the way outcomes are framed, (iv) invoke social norms, and (v) encourage emotional effects.

Table B.1: Timeline of the ambassadors' activity

| No | Activity | June | | | |
|---|---|---|---|---|---|
| | | I | II | III | IV |
| 1 | Ambassador : Online training | ✓ | | | |
| 2 | Ambassador : Offline training | ✓ | ✓ | | |
| 3 | Home visit 1 | | | ✓ | |
| 4 | Home visit 2 | | | | ✓ |

Vaccine ambassadors work in one village area. Each ambassador will reach about 12 households in her village area, where in that household there is at least one person who has not received the first or second dose of COVID-19 vaccination. Outreach is carried out through home visits to provide education to people who have not been vaccinated (participants) and one family member who lives in the same household as the participant.

The visits were carried out twice, with a distance between visits of at least 1 week. The first visit was conducted to provide education regarding the benefits of vaccines so that participants are motivated to benefit from the vaccination program. The second visit was carried out as a repeat visit with the aim of strengthening the participants' commitment. Home visits were used to build Duta's understanding of the participants and to establish two-way conversations.

For this, Ambassadors need to practice an interpersonal communication (KAP) approach by being a good listener and end the home visit by asking for commitments from participants according to their abilities and agreements made during the conversation ("locking commitments"), especially on the first visit. Home visits must observe strict health protocols and avoid physical overcrowding to minimize the risk of spreading COVID-19.

Home visits are at least 30 minutes long, depending on the interaction and discussion process that occurs. Duta will visit a maximum of three (3) households per day. The visit was carried out at the time agreed upon between the ambassador and the participants. The time of the visit will vary from one household to another, but in principle the visit is done when the participant is not working or busy with other matters.

Lastly, we also developed a guide book for the ambassadors which contains all the relevant information on Covid and Covid vaccination, practical tips, FAQs and how to answer participants' question, etc. Ambassadors are encourage to consult with this guide book when preparing for the home visit.

# C Variable description

| Variable | Description |
|---|---|
| Female | Indicator variable for females. |
| Older people | Indicator variable for respondents aged 60 and older. |
| Married | Indicator variable for being married. |
| Unemployed | Indicator variable for being unemployed. |
| Primary or lower education | Indicator variable for having completed primary education or lower. |
| Social assistance | Indicator variable for receiving any social assistance program in the past year. |
| Childhood immunization | Indicator variable for having received any immunization during childhood. |
| Morbidity index | Index variables constructed from responses to questions regarding health status, i.e., indicators for having diabetes, high blood pressure, cancer, kidney issues, heart issues, liver issues, respiratory issues, and other illness. We take the average of all responses to construct the index variable, which lies between 0 and 1. |
| Health insurance | Indicator variable for enrolling in a health insurance scheme. |
| **Outcomes** | |
| *Primary* | |
| Vaccine take-up | Indicator variable for having received first COVID-19 vaccine dose at the endline survey. |
| Vaccine intent | Re-scaled variable (between 0 and 1) from a Likert scale variable where 1 refers to strong opposition and 5 refers to strong support. |
| Vaccine registration | Indicator variable for having registered for vaccination among those who had not been vaccinated. |
| *Secondary* | |

| | |
|---|---|
| General mental health | Index variable constructed from responses to questions regarding mental health status in the past week. Questions used to construct this index are taken from the Indonesia Family Life Survey (IFLS) that adapted them from the General Health Questionnaire (GHQ). Responses to these questions are elicited on a 4-point Likert scale, where 1 refers to rarely or not at all ($\leq$ 1 day) and 4 refers to often (5-7 days). |
| Mental health (attributed to COVID) | Index variable constructed from responses to mental health attributed to COVID-19. Responses are elicited on a 5-point Likert scale where 1 refers to strongly disagree and 5 refers to strongly agree. |
| *Intermediate* | |
| Perceived quality of the ambassadors and intervention | Index variable constructed from responses to questions regarding quality of the information session, how convincing the vaccine ambassador in providing information, and the quality of information regarding the benefits of COVID-19 vaccine. |
| Knowledge about COVID-19 and the vaccine | Index variables constructed from responses to questions regarding knowledge about COVID-19: general knowledge about COVID-19, severity of COVID-19 impacts, benefits of COVID-19 vaccines, and facts about COVID-19. Responses are elicited on a 5-point Likert scale (1 strongly disagree, 5 strongly agree). |
| Beliefs about COVID-19 and the vaccine | Index variables constructed from responses to questions regarding beliefs about COVID-19: vulnerability to catching COVID, barriers to COVID-19 vaccine, cue to action for vaccination (e.g., "I will get vaccinated if I acquire sufficient information about its efficacy from physicians and health workers") and future projections (e.g., "I am confident I am not going to catch COVID-19, so I do not need to get vaccinated"). Responses are elicited on a 5-point Likert scale (1 strongly disagree, 5 strongly agree). |
| Index of compliance to health protocols (Intensive) | Index variable constructed from responses to survey questions regarding compliance to COVID-19 health protocols, such as handwashing, mask-wearing, and maintaining physical distance. We assign 1 if one responds 'yes' to each question and take the average value of all responses. |

| | |
|---|---|
| Index of compliance to health protocols (Extensive) | We create this index variable from survey questions regarding compliance to COVID-19 health protocols such as hand-washing, mask-wearing, and maintaining physical distance (e.g "When you travel outside the house do you follow these health procotols?". Responses are elicited on a 4 point Likert scale (1 Never, 4 Always). |
| **Heterogeneity** | |
| Socio economic (index) | Index constructed from four variables: indicators for high income (above median), being unemployed, higher educational attainment (completed primary school), and beneficiary of any social assistance program in the past year. Higher index indicates better socio-economic condition, so we flipped the sign of indicators for unemployment and beneficiary of social assistance program. We then create an indicator for high socio-economic characteristics which equals to 1 if socio-economic index is above the median value. |
| High morbidity index | Indicator for whether morbidity index is above the median value. |
| High vaccine intent | Indicator for whether vaccine intent is above the median value. |
| **Reasons for not vaccinating** | |
| Doubts over vaccine | Indicator for whether an individual reports having doubts over COVID-19 vaccines effectiveness. |
| Fear of side effects | Indicator for whether an individual reports having fear of potentially harmful side effects of COVID-19 vaccines. |
| Has a health condition | Indicator for whether an individual reports having health condition |
| Follow doctors' advice | Indicator for whether an individual reports receiving advice from her physician not to take-up vaccines. |
| Feeling healthy | Indicator for whether an individual reports feeling healthy so she does not need to be vaccinated. |
| Other reasons | Indicator for whether an individual reports other reasons such as registration being too complicated and having fear of needles |

# D Pamphlet

The pamphlet—delivered during the second visit of the intervention—captures all the main points of the intervention and reinforce ambassadors' message to the participants.

1. Personal Benefits of Vaccines
    - Vaccines protect us from the dangers of COVID-19. The COVID-19 vaccine builds immunity to protect someone from contracting COVID-19.
    - Patients with comorbidity can still be vaccinated against COVID-19.
    - Severe vaccine side effects are very rare
    - Vaccination gives us greater freedom of mobility
2. Social Benefits of Vaccines
    - Vaccination protects families/relatives/colleagues who are vulnerable to contracting COVID-19
3. Benefits of Vaccines for Recovery in Social and Economic Activities
    - Vaccination provides protection when carrying out social activities
    - Vaccination helps the village's economic recovery
    - Vaccination in accordance with the spirit of mutual cooperation
4. Recommendations for Vaccines according to Social Values
    - To leverage the effect of social norms and make it more salient to respondents, we show that many of family members, relatives and friends have been vaccinated (as of early February 2022, 90% of Indonesians have been vaccinated).[36].
    - Vaccination is recommended by government officials, traditional/community including religious leaders

[36]Note that the denominator of this statistics is the eligible/target population. Using total population as the denominator—which is commonly used to measure global vaccination rate—the vaccination rate is unsurprisingly lower, 7 in 10 people

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**9 dari 10** orang Indonesia sudah mendapatkan vaksin COVID-19 agar terhindar dari risiko keparahan penyakit, risiko dirawat di RS dan risiko kematian.

## "Saya punya penyakit penyerta"

Jika Anda punya penyakit penyerta, seperti darah tinggi, pernafasan, diabetes, atau jantung, Anda tetap dapat divaksin setelah konsultasi dengan tenaga kesehatan. Justru kalau tidak divaksin, tubuh akan lebih lemah dan rentan dari penyakit akibat COVID-19.

## "Saya takut efek samping vaksin"

Tidak semua orang yang sudah divaksin akan mengalami efek samping vaksin. Umumnya efek samping ini ringan, dan akan hilang sendiri. Efek samping menunjukkan bahwa vaksin sedang membangun daya tahan tubuh supaya bisa mengusir virus yang masuk, jadi kita tidak sakit, atau sakit parah bahkan meninggal.

## Yuk Segera Vaksin Dengan Lengkap!

Dengan mendapatkan vaksin lengkap, kita lindungi diri sendiri, orang-orang yang kita sayangi, dan orang lain di sekitar kita.

Vaksin tidak menyebabkan kematian, justru mencegah kita dari kesakitan lebih parah dan kematian.
**Segera vaksin dengan lengkap. Pandemi belum berakhir!**

## “Saya lansia, di rumah saja, kenapa perlu di vaksin”

Daya tahan tubuh lansia tidak sebaik orang berusia muda, sehingga perlu divaksin. Lansia tetap bisa tertular dari orang sekelilingnya

## Mau gotong royong keluar dari pandemi? Vaksin yuk...

Mereka yang sudah divaksin dapat kembali beraktivitas seperti sebelum masa pandemi.
Yuk vaksin sebagai ikhtiar
untuk keluar dari pandemi COVID-19.

“Satu kali vaksin tidak cukup. Lengkapi dengan dosis kedua sebelum 6 bulan setelah dosis pertama agar vaksin efektif.”

Nama Duta: .....

No HP Duta: .....

Nama Warga: .....

Komitmen Warga: .....

.....

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