

The Role of Information and Nudges on Advance Directives and End-of-Life Planning: Evidence From a Randomized Trial

Medical Care Research and Review
2023, Vol. 80(3) 283–292
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DOI: 10.1177/10775587231157800
journals.sagepub.com/home/mcr



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Abstract

Despite the substantial personal and economic implications of end-of-life decisions, many individuals fail to document their wishes, which often leads to patient dissatisfaction and unnecessary medical spending. We conducted a randomized trial of 1,200 patients aged 55 years and older to facilitate advance directive (AD) completion and better understand why patients fail to engage in high-value planning. We found that including a physical AD form with paper letters as a nudge to decrease hassle costs increased AD completion by 9.0 percentage points (95% confidence interval [CI] = [4.2, 13.9] percentage points). The intervention was especially effective for individuals aged 70 years and older, as AD completion increased by 17.5 percentage points (95% CI = [5.7, 9.4] percentage points). When compared with the impact of costless electronic reminders, each additional AD completion from the letter interventions costs as little as US\$37. Our findings suggest that simple, inexpensive interventions with paper communication as behavioral nudges can be effective, especially in older populations.

Keywords

advance directives, end-of-life care, behavioral nudges

Introduction

Advance directives (ADs) are underutilized tools that can help individuals better align their wishes with medical treatments. An AD is a legal document regarding an individual's preferences for medical care if he or she is no longer able to make decisions. ADs have been shown to better match patient care and treatments with his or her end-of-life wishes (Brinkman-Stoppelenburg et al., 2014; Detering et al., 2010; Silveira et al., 2010) and lower health care utilization without affecting satisfaction or mortality (Molloy et al., 2000), all while decreasing end-of-life health care spending (Nicholas et al., 2011). Advance care planning (ACP), including having an AD, is also associated with fewer in-hospital deaths and increased use of hospice care (Bischoff et al., 2013). Patients who do not report having end-of-life discussions on average report higher rates of aggressive care, which is in turn associated with worse patient quality of life (Wright et al., 2008). Recent systemic meta-analyses of the literature have suggested that greater take-up of ADs has shown positive patient, physician, and hospital outcomes as well as increased patient and surrogate satisfaction with communication and care (Jimenez et al., 2018; McMahan et al., 2021). However, there are evidence and retrospective reviews on ADs that have been mixed, suggesting that ACP

does not achieve all of its desired outcomes and is not essential for high-value end-of-life care; in particular, some viewpoints suggest that ACP has little effect on improving goal-concordant care or changes in health care utilization (Morrison et al., 2021; Myers et al., 2022). Despite that re-evaluation, the same experts still concur that ACP does improve patient- and family-level outcomes for anxiety, grief, and emotional burdens (Mitchell, 2022; Morrison et al., 2022; Rigby et al., 2022; Sudore et al., 2022). Finally, proponents of ACP argue that ACP is necessary but not sufficient and is simply one part of a toolkit for end-of-life care with “outcomes for all ACP interventions predominantly positive” (McMahan et al., 2021).

This article, submitted to *Medical Care Research and Review* on June 13, 2022, was revised and accepted for publication on January 15, 2023.

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Given these generally encouraging benefits, it is not well understood why many patients fail to engage in ACP and ultimately face care that may be misaligned with stated preferences. A large meta-analysis of U.S. AD usage suggests that roughly two-thirds of adults do not have an AD on file, as well as nearly a third of patients who ultimately require surrogate decision-making (Silveira et al., 2010; Yadav et al., 2017). More than 80% of individuals in the terminal stages of metastatic cancer say they would like to avoid hospitalization and intensive care, yet more than 20% of Medicare deaths occur in hospitals (Higginson & Sen-Gupta, 2000; Jha, 2018). Many families are dissatisfied with communication and decision-making at the end of life (Baker et al., 2000). Multiple studies find no evidence that higher spending leads to improved life expectancy, and terminal patients who forgo aggressive care in favor of palliative care may live longer (Dartmouth Atlas, 2017; Skinner & Wennberg, 2000; Temel et al., 2010).

In addition, with the aging population of the United States, end-of-life decision-making has become increasingly relevant. Demographic changes including declines in fertility rate and increases in life expectancy predict that by 2030, an estimated one in five Americans will be 65 years or older (Anderson et al., 2012; U.S. Census Bureau, n.d.). Previous studies and surveys have shown that almost half of all adults have experience with the terminal illness of close family or friends and that older adults often report giving a great deal of thought to their own wishes for end-of-life medical treatment (Pew Research Center, 2013; Silveira et al., 2010). In a large sample of all individuals dying between 2000 and 2006, around 43% required decision-making about treatment in the final days of life, most of whom were no longer able to make these decisions for themselves (Silveira et al., 2010). End-of-life care is also of substantial economic and financial importance: In the United States, estimates suggest that between 8% and 13% of all medical spending occurs in the last year of life (Aldridge & Kelley, 2015; Emanuel & Emanuel, 1994; French et al., 2017). Care for patients in the last year of life accounts for roughly a quarter of yearly Medicare spending or nearly 4% of the entire federal budget (Hogan et al., 2001), with the burden on patients commonly rising to five or six figures (French et al., 2017; S. Marshall et al., 2010).

Increasing the completion of advanced directives, along with a discussion of its implications with a physician or expert, is an important policy and clinical imperative to improve preference-concordant and cost-effective end-of-life care. As described earlier, ADs more often result in clinical activities that are aligned with patient preferences, and on average cost less, largely to the publicly insured Medicare population. Proposed strategies to improve the completion of advanced directives have included a focus on physician and nurse education, choices set changes, and defaults (Courtright et al., 2017; Dexter et al., 1998; Halpern et al., 2013; Higginson & Sen-Gupta, 2000; Josephs et al., 2018).

In this article, we analyze barriers to the completion of ADs on the patient side and utilize simple interventional strategies

grounded in behavioral economics to increase completion. Studies on behavioral interventions in health show that behavioral nudges may improve health outcomes to a greater extent than a simple financial incentive: lottery-based and team incentives have improved adherence to medication (Kimmel et al., 2012), completion of health risk assessments (Haisley et al., 2012), and weight loss (Volpp et al., 2008). In particular, nudges from sending letters, texts, and messages through patient portals are frequently used and have been effective in increasing cervical cancer screening (Tseng et al., 2001), medication adherence (Schwebel & Larimer, 2018), appointment attendance (Horvath et al., 2011; Schwebel & Larimer, 2018), and most recently, vaccine uptake (Dai et al., 2021; Patel et al., 2023). Previous studies on patient-side interventions in ACP have involved improving patients' knowledge of ADs in China (Wang et al., 2021), using an online tool to guide patients through ACP during the coronavirus pandemic (Auriemma et al., 2020), and educating patients in a small inpatient setting to improve AD completion (Harlow, 2017). We add to the growing behavioral health economics literature on nudges, letters, and reminders, showing in a randomized control trial that interventions with nudges and various communications, especially when tied to physician appointments, are effective in increasing the take-up of beneficial but also potentially frustrating responsibilities such as completing ADs. We evaluate methods to improve AD completion in older adults and investigate whether information or hassle costs are a greater patient barrier to AD completion. We also recognize that completion of the form alone is not enough; proper usage of ACP involves conversations, discussions, and decisions between the patient and the physician. Our intervention encourages the patient to not just fill out the AD but also to have a conversation with their primary care physician at their next check-up.

Finally, our primary methods are transferrable to other contexts. Although the recent literature on ADs as being a strongly recommended intervention is mixed, our results show that a small actionable nudge attached to letters is effective, and can be applied in other settings of high-value care such as preventive care and immunizations (Maciosek et al., 2017).

New Contribution

We add to the literature on behavioral nudges, especially those that include actionable reminders, are effective at increasing the take-up of interventions, as we show in the area of advance care planning. We ask whether the information or hassle costs in finding, printing, and filling out forms are major barriers to advance care planning and test whether behavioral nudges can improve AD take-up among older adults. We define a hassle cost as a non-monetary effort and inconvenience a patient incurs in setting up or maintaining a service or item, in this case, the AD. Examples in other fields include canceling a contract (Lambrecht & Tucker, 2011), filling up a refillable bottle (G. Marshall, 2015), or using a price-match guarantee (Hviid & Shaffer, 1999). Other articles have focused on provider education and nudges for AD

Table 1. Intervention Description and Sample Size by Study Arm.

Description of study arms	N	Electronic reminder + Paper letter?	AD form included?	Informational brochures?
1. Control Arm	168	None	None	None
2. Electronic Reminder Only	207	Electronic Only	None	None
3. Electronic Reminder + Paper Letter	210	Electronic + Paper	None	None
4. Electronic Reminder + Paper Letter + Traditional AD Form	212	Electronic + Paper	Traditional (9 pages)	None
5. Electronic Reminder + Paper Letter + AD Short Form	202	Electronic + Paper	Short (3 pages)	None
6. Electronic Reminder + Paper Letter + AD Short Form + Informational Brochures	201	Electronic + Paper	Short (3 pages)	Yes

Note. AD = advance directive.

completion, and we add to those that focus on the patient side by being the first to combine an informational intervention with behavioral nudges from letters. We show that simple, cost-effective strategies grounded in behavioral economics can be used to increase the completion of ADs, helping individuals to align their preferences with medical treatments, utilization, and spending at end of life.

Method

We conducted a pilot intervention to evaluate various approaches to improve AD completion and then used its findings to design our main intervention. Our pilot intervention tested the role of information through the use of electronic reminders and in-person “AD Drives.” Informed by our pilot findings, we focused on lowering hassle costs through behavioral nudges in our main trial, mailing paper letters including AD forms to patients’ homes. After pooling arms with similar interventions and completion rates, we used linear regression to obtain point estimates after controlling for demographic covariates.

Pilot Design

We collaborated with a large nonprofit health system in the Pacific Northwest, focusing on primary care clinics in the state of Oregon. We conducted a pilot intervention focusing on increasing AD knowledge and information through electronic reminders with a “digital prescription” to online educational materials and in-person “AD Drives” to inform patients about end-of-life care and help validate, fill out, and upload ADs. Our target population were patients aged 65 years or older, with no AD on file.

In July 2018, we selected one of two pilot clinics to host an in-person “AD Drive,” where patients had the opportunity to learn about AD, with the other clinic serving as a control. The drives were held in an open-house style with no appointment needed, for several hours on three different days. Patients were randomized into four groups with different

electronic communications to complete ADs: (a) notification of the in-person AD Drives happening in their clinic the following week, (b) a “digital prescription” of an 11-min video and information on ADs and end-of-life planning, (c) both the AD Drive notification and video information, or (d) generic reminder for AD completion only (see Supplemental Appendix for the breakdown of the interventions and treatment assignment). Patients who qualified but did not have an email on record were sent a paper letter randomized into two groups: (a) notification of the in-person AD Drives or (b) generic reminder for AD completion only. The primary outcome was AD completion, with secondary outcomes focused on AD choices such as health care proxies, end-of-life instructions, and preferences for life-prolonging treatment or feeding tubes.

Main Study Design

Based on learning from our pilot investigation, we designed a follow-up intervention to focus on lowering hassle costs in multiple ways: (a) including the AD forms themselves in the letters, (b) shortening the included AD forms, and (c) focusing on physical (non-electronic) letters through the mail. In addition, we sent letter reminders to patients 2 weeks in advance of primary care visits. This approach, like the one recently used to increase flu vaccination rates (Patel et al., 2023), helped patients in two ways: (a) individuals would be primed to complete health forms for their upcoming appointment and (b) patients would have an easy way to give the forms to physicians in-person, in addition to the option of uploading the documents electronically.

Individual patients aged 55 years or older at six clinics with upcoming primary care appointments (in the next 2 weeks) who did not have an AD on file were randomized into one of six treatment arms in Table 1. We sent letters and communications in English to patients from December 2019 to March 2020 for a total enrollment of 1,200 individuals (see Figure 1). Patients who did not have an email on record (roughly 30% of the patient population) were not included in the intervention.

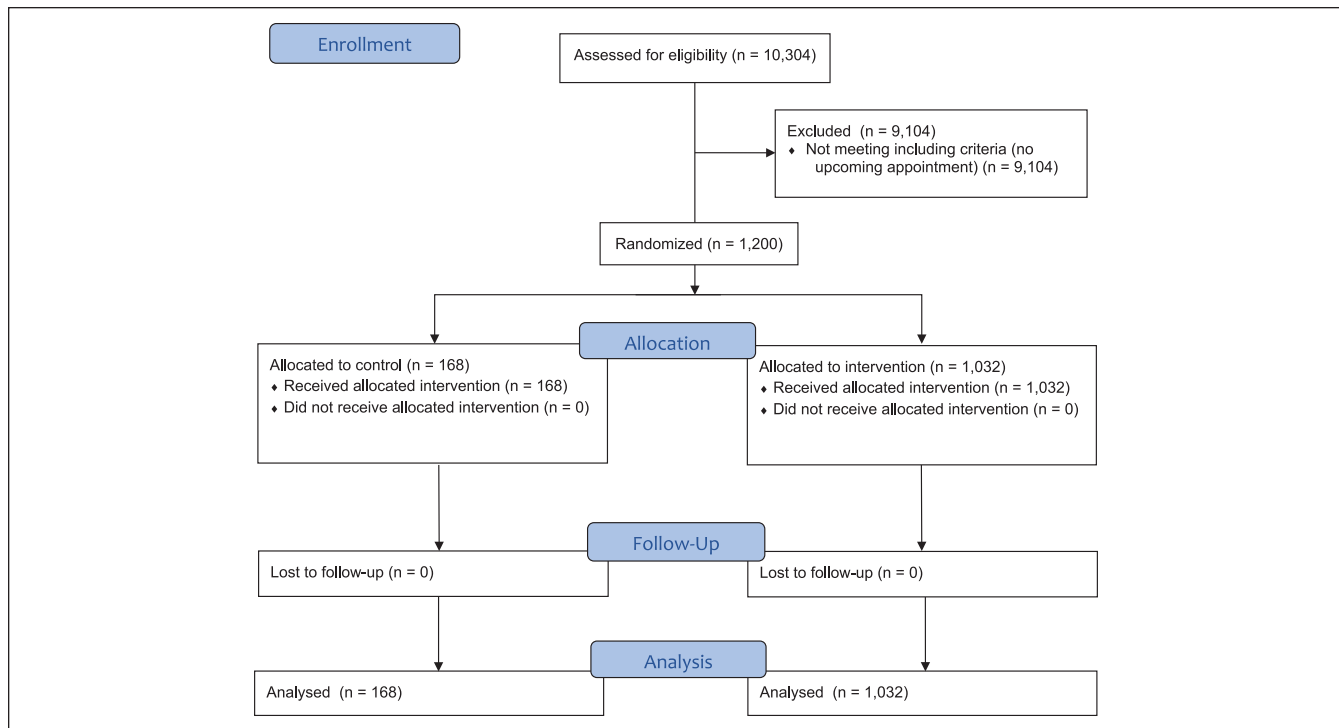


Figure 1. Consolidated Standards of Reporting Trials (CONSORT) Flow Diagram for Intervention Enrollment Selection.

Table 2. Characteristics of Study Population.

Characteristic	Total	Control	Electronic reminder	Paper letter	Letter + AD form
N	1,200	168	207	210	615
Mean Age (SD)	65.1 (8.3)	65.0 (8.0)	65.2 (8.6)	65.1 (8.3)	65.1 (8.2)
Proportion Female (SD)	0.46 (0.50)	0.45 (0.50)	0.41 (0.49)	0.52 (0.50)	0.46 (0.50)
Proportion Black (SD)	0.04 (0.20)	0.04 (0.19)	0.03 (0.17)	0.03 (0.18)	0.05 (0.21)
Proportion Asian (SD)	0.10 (0.30)	0.17 (0.37)	0.07 (0.26)	0.10 (0.30)	0.10 (0.30)
Proportion Hispanic (SD)	0.04 (0.19)	0.04 (0.20)	0.04 (0.19)	0.05 (0.22)	0.03 (0.18)
Proportion Married (SD)	0.64 (0.48)	0.64 (0.48)	0.62 (0.49)	0.67 (0.47)	0.64 (0.48)
Proportion on Medicare (SD)	0.48 (0.50)	0.46 (0.50)	0.45 (0.50)	0.47 (0.50)	0.49 (0.50)
Proportion on Medicaid (SD)	0.11 (0.32)	0.08 (0.28)	0.12 (0.33)	0.10 (0.31)	0.12 (0.33)
Proportion on Commercial Insurance (SD)	0.48 (0.50)	0.51 (0.50)	0.50 (0.50)	0.52 (0.50)	0.46 (0.50)

Note. AD = advance directive.

Our intervention was split into six separate arms, including one control arm and five treatment arms with different forms of communication to test behavioral nudges and informational interventions. All individuals in the intervention arms received an electronic reminder suggesting the patient bring a completed AD to their upcoming appointment, roughly 2 weeks in advance of the scheduled appointment. A letter reminder was also physically mailed to the patient in the same time period (2 weeks prior to the appointment) for individuals assigned to Arms 3 to 6. In addition, two Oregon AD forms, the nine-page traditional AD form and the three-page short form AD, were used to test hassle costs in the form of its inclusion removing the need to search for and

print the document and also the length of the form. The traditional AD form was enclosed with the reminder in Arm 4 and the short-form AD was enclosed with the reminder in Arms 5 and 6. Finally, Arm 6 enclosed three informational brochures: (a) how to select a health care proxy, (b) a guide to end-of-life choices and resuscitation, and (c) a guide to feeding tubes. All communication materials are included in the Supplemental Appendix. Patients had the ability to upload their completed AD electronically before their visit via a patient portal or discuss and submit their completed AD form at their upcoming primary care visit. Demographics and other characteristics of the study population by treatment arm are in Table 2.

Our primary outcome was AD completion. We pool intervention arms with similar mechanisms (e.g., included paper AD) in cases where we did not observe significant differences in completion between arms. Furthermore, we stratify our results by age defined as a younger population aged 55 to 69 years and an older population aged 70 years and older. We chose age 70 as a cut-off to choose a smaller, but still substantially older subpopulation; subgroup results do not substantially change if other age cut-offs are used.

Our implementing partner indicated that a change as small as a 5 percentage point increase in AD completion would be of clinical and policy relevance and a large enough impact to inform a potential change in policy and larger rollout of the intervention at their organization. Assuming that in the randomly selected group of individuals that did not receive the intervention, 1.5% of patients without an AD would upload one during the study period, based on the previous pilot intervention, we selected our sample size to have the power to detect a 5 percentage point change in the primary outcome (two-sided $\alpha = .05$ at 80% power). As prespecified, we used a multivariate linear regression approach to obtain our results, with arms randomized on an individual basis; all regressions control for demographic covariates (age, gender, race, ethnicity, and marital status). All statistical analyses were conducted using Stata version 15.0 (StataCorp, College Station, TX, USA).

Ethical Considerations and Pre-Registration

This study was conducted under the institutional review board review of our partner health system with IRB registration IDs 2018000241 and 2019000377. The study was pre-registered before data collection and followed a pre-analysis plan in the American Economic Association Registry with identifiers AEARCTR-0003038 and AEARCTR-0004212 and adheres to Consolidated Standards of Reporting Trials (CONSORT) and International Committee of Medical Journal Editors (ICJME) guidelines of randomized trials.

Results

Pilot Results

In our pilot interventions, we found no significant results for the AD Drive, the “digital prescription,” or a combination of the two (see Supplemental Material). Our initial intervention suggested that information alone has little impact on AD take-up without additional nudges. Both the video and the drive interventions resulted in a null effect for our patient population, although a larger AD completion effect for the letter intervention sample (3.8% increase in completion) suggested that physical letters were a better form of communication for this population.

Main Study Results

Of the 1,200 total patients, 168 were assigned to the control (Arm 1), 207 to the electronic reminder (Arm 2), 210 to the

letter only (Arm 3), and the remaining 615 to an arm with a letter and AD form (Arms 4–6). In the control arm, three (1.8%) out of 168 patients uploaded an AD, while in the intervention arms, a total of 94 individuals uploaded ADs out of 1,032 (9.1%, see Supplementary Table S4 in Supplement for details by arm). Before our intervention, using data from the electronic medical records, we found that 5.8% of patients aged more than 55 years at our selected clinics had completed an AD.

We saw positive and significant effects for the letter interventions, with the paper letter and any AD form increasing AD completion by 9.0 percentage points relative to the control group (95% confidence interval [CI], [4.2, 13.9] percentage points; $p < .001$; see Table 3 and Figure 2). For these results, we pooled Arms 4 to 6 as a single category consisting of interventions with the AD form as the behavioral nudge, as we did not see significant differences in completion between those arms (difference in form and additional information had no statistical effect; see Supplementary Table S5 and Supplementary Figure S1 in Supplement for results comparing each arm). Patients who received paper letter reminders tied to future primary care appointments, without the AD form, saw a 5.3 percentage point increase (95% CI, [0.1, 9.7] percentage points; $p = .018$) in AD completion. Adding more interventions improved take-up; the paper letter was more effective than just the electronic intervention and adding the AD forms to the paper letter improved take-up over the paper letter alone. Finally, we saw that the electronic reminder only intervention had a positive, but small and not statistically significant effect, with all letter interventions having significantly greater effects.

Age and AD Completion

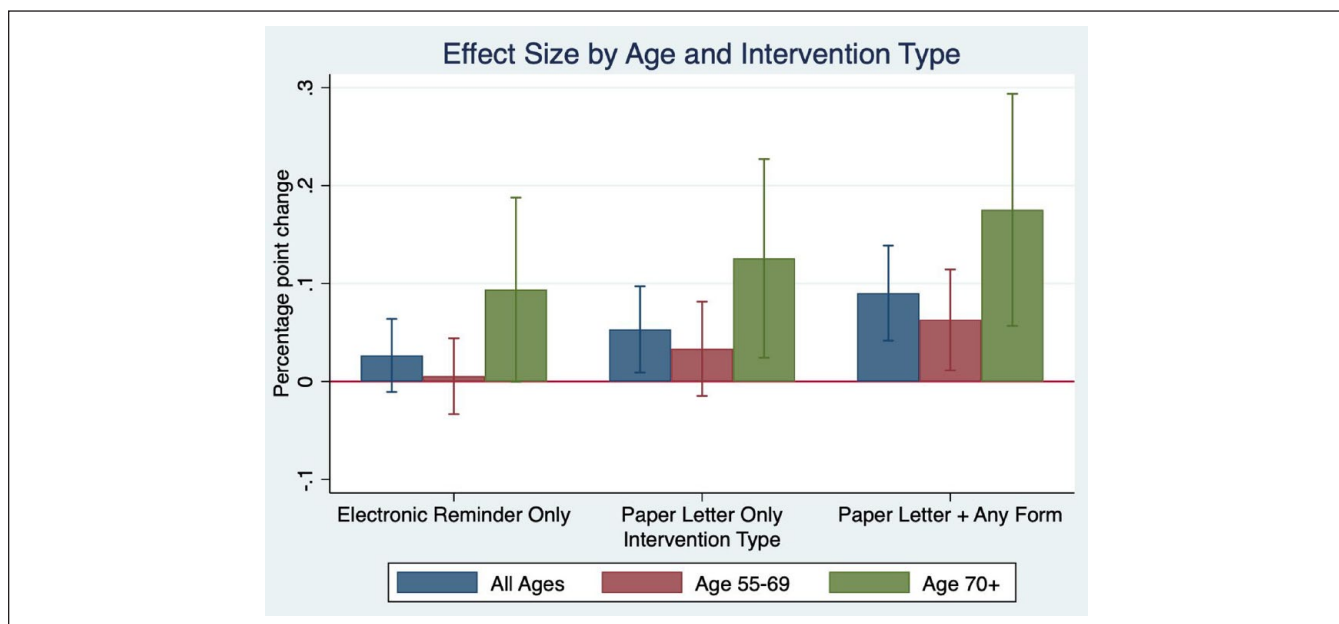
We expect that older patients have put more consideration into end-of-life care and decision-making and hypothesized they may be more likely to take up the intervention. We divided our sample into a younger subset of individuals between the ages of 55 and 69 and an older subset of individuals aged 70 and older.

Table 3 and Figure 2 also show outcomes by age. Older individuals were more likely to respond to any type of intervention, including electronic communication, which had no effect at all on the younger cohort. Both younger and older individuals increased completion rates in response to the paper letter and to an even greater extent when the AD form was included. The effect of the letter and form combined was particularly strong with the age 70 and older population, with a 17.5 percentage point increase in AD completion (95% CI, [5.7, 29.4] percentage points; $p = .004$). We found that even the weakest intervention of the electronic reminder had a greater effect on the age 70 and older population than the strongest intervention of the letter and included AD form for the age 55 to 69 cohort, suggesting that the older populations were more receptive to any type of intervention or nudge to complete ADs and engage in end-of-life planning.

Table 3. Main Treatment Effect by Intervention Group and Age.

Intervention	All ages	Ages 55–69	Age 70+
Electronic Reminder Only (Arm 2)	0.0266 (0.0190) [375]	0.00537 (0.0196) [271]	0.0937* (0.0474) [104]
Paper Letter Only (Arm 3)	0.0532** (0.0224) [378]	0.0334 (0.0245) [278]	0.126** (0.0511) [100]
Paper Letter + Any Form (Arms 4–6)	0.0902*** (0.0247) [783]	0.0629** (0.0263) [580]	0.175*** (0.0600) [203]

Note. Standard errors in parentheses (* $p < .10$, ** $p < .05$, *** $p < .01$) with number of observations in brackets below. Treatment effects of the main intervention, divided by age subgroups. All estimates control for demographic covariates.

**Figure 2.** Pooled Treatment Effects Compared With no Intervention, Separated by Age Cohort. All Results Control for Demographic Controls

Cost-Effectiveness

Table 4 compares our physical letter interventions to the costless intervention of electronic reminders. We conduct a back-of-the-envelope calculation to serve as a rough indicator of the magnitude of the cost. Our calculation is done linearly by simply dividing the intervention cost per person by the estimated difference in the effect between the letter and electronic reminder interventions. Our calculations suggest that the most cost-effective interventions (paper letter only, paper letter with short AD form) cost only \$37 per additional AD upload. If letters were targeted based on non-response to electronic reminders, or to patients aged 70+ who were more likely to respond, the per-patient cost would likely be even lower. To put these numbers into perspective, other studies find a significant difference in inpatient charges of

individuals with and without ADs of more than US\$60,000 (Chambers et al., 1994). Even if these savings estimates are exaggerated (Emanuel, 1996; Emanuel & Emanuel, 1994), increases in both patient and family satisfaction, as well as evidence for decreased resource use and hospitalizations with ACP likely justify the relatively small cost of the intervention (Dixon et al., 2015; Molloy et al., 2000).

Discussion

Our results show that inexpensive, quickly implementable nudges can increase AD completion, particularly in older individuals. Sending letters with AD forms included increased AD completion by 9 percentage points over the control group for the entire study population and by 17.5 percentage points for individuals older than 70 years of age. We

Table 4. Cost Effectiveness Compared With Electronic Intervention.

	Effect size	Cost per person	Cost per individual effect
Paper Letter Only (Arm 3)	0.0290 (0.0234)	US\$1.07	US\$36.90
Paper Letter + Long AD Form (Arm 4)	0.0696*** (0.0268)	US\$4.92	US\$70.69
Paper Letter + Short AD Form (Arm 5)	0.0692** (0.0272)	US\$2.63	US\$38.01
Paper Letter + Short AD Form + Information (Arm 6)	0.0480* (0.0251)	US\$4.92	US\$102.50
Paper Letter + Any Form (Arms 4–6)	0.0621*** (0.0234)	US\$4.16	US\$66.94

Note. Basic cost-effectiveness analysis for the physical interventions (Arms 3–6), comparing treatment arms with the costless electronic intervention of the second arm. Costs are calculated by dividing the cost of the letters per person by the effect size. The cost per person for the aggregate of the behavioral interventions is a weighted average of the three types of intervention. AD = advance directive. Standard errors in parentheses (* $p < .10$, ** $p < .05$, *** $p < .01$).

also showed that this intervention was cost-effective, costing as little as US\$37 per the completed AD, factoring in material and shipping costs. These results suggest that hassle costs may be a significant barrier to ACP and more important than simply increasing information, as most of the increase in take-up occurred with the addition of the reminder and included a paper letter. The null effect of the AD Drives and “digital prescriptions” in the pilot, and the lack of incremental impact of the informational brochure arm in the main study, suggest that information frictions alone do not play a major role in whether patients choose to complete an AD.

Our study adds to the literature by showing that behavioral nudges can also be effective in the context of planning for end-of-life care and increase take-up of underutilized but beneficial policies such as AD. Previous work showed that reminding physicians to talk about ACP can improve AD completion (Dexter et al., 1998)—we find that reminding patients themselves, especially with a behavioral nudge, is also effective. Previous studies have shown that as individuals age, they are more likely to have completed AD (Rao et al., 2014; Resnick et al., 2009; Wilson et al., 2013; Yadav et al., 2017); our study adds to this by suggesting that older adults are also more easily swayed to complete ADs through behavioral interventions.

One concern is that due to the onset of the Covid-19 pandemic, individuals at the end of the subsequent study may have been more likely to upload ADs due to additional fear of death concerns. While we do not have data on when our communications were sent out, we have data on when each (if any) AD was uploaded. We find that few AD were uploaded in December 2019 or March 2020 at the beginning and end of our study with an even distribution in between. Therefore, we believe that it is unlikely that Covid-19 significantly affected uploads. Our sample also may not be representative of other populations. Our population in Oregon was significantly whiter and wealthier than the nation as a whole, and we only sent out our letters in English. Our results in a setting with few racial minorities may not carry over in

other environments, knowing there are racial disparities in end-of-life care access (palliative care, hospice care, and nursing homes) and in preferences (Garrido et al., 2014; Wachterman & Sommers, 2021). Given that racial minorities may undergo more futile services, the inability of our article to further break down results by race and ethnicity is a limitation. The population we study may also be more tech-savvy than average, as we only targeted individuals with email addresses to whom we could send electronic reminders. However, we did find from our pilot intervention that more than 70% of all patients older than 65 years at these rural Oregon clinics have emails on record, so email is common, even among older patients.

While the recent literature on ACP and AD shows some mixed results (Morrison et al., 2021; Sudore et al., 2022), experts agree that AD are part of a set of tools in advanced care planning that can make end-of-life care better for patients, their families, and potentially lower costs (Jimenez et al., 2018; Prendergast, 2001; Tulskey, 2005). Our study demonstrates concrete and cost-effective methods to increase AD completion. Our results suggest that a simple nudge—sending patients a letter reminder and physical copy of the form in advance of their medical appointment—has a significant and substantial effect on AD completion, especially for older individuals. We demonstrate that both the method of outreach and the specific materials included play an important role in determining the success of an intervention. Small, relatively inexpensive nudges can have a significant impact on end-of-life care and ADs. In addition, our nudges are simple, low-cost letter reminders that can be replicated outside the AD space such as reminders for other high-value care like vaccinations.

Acknowledgments

We thank Amir Ali, Nainan Hei, Stephen Perez, Callie Scott, and Michelle Yip for support with survey design, intervention execution, and data. We gratefully acknowledge funding from J-PAL North America’s Health Care Delivery Initiative. The views expressed in this article are the authors’ and should not be interpreted as those of

the Congressional Budget Office or Amazon. This article has not been subject to CBO's regular review and editing process. The authors' main contributions to this research were completed prior to joining the Congressional Budget Office and Amazon.

Author Contributions

All authors have read and approved of the submission of this manuscript. All authors contributed to the study concept and design. N.H. and A.R. contributed to the acquisition, analysis, and interpretation of data. N.H. and A.R. drafted the manuscript. All authors contributed to critical revisions of the manuscript for important intellectual content. N.H. and A.R. were responsible for statistical analysis. B.H. obtained funding and provided study supervision.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: J-PAL North America provided financial support (sponsor awards S4636 and S4986). The sponsor had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; or decision to submit the manuscript for publication.

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Supplemental Material

Supplemental material for this article is available online.

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