


Reaching Ambulatory Older Adults with Educational Tools: Comparative Efficacy and Cost of Varied Outreach Modalities in Primary Care



N. LaVine¹, K. Emmert², J. Itty², D. Martins-Welch¹, M. Carney^{1,2}, A. Block³, L. Burgess², A. E. Volandes^{4,5,6}, S. N. Zupanc⁷, S. Jacome², V. Gromova², A. D. Davis⁶, P. Schwartz⁶, A. Alvarez-Suarez², and Edith Burns^{1,2} 

¹Department of Medicine, Zucker School of Medicine at Hofstra Northwell, Hempstead, NY, USA; ²Institute for Health Systems Science, Feinstein Institutes for Medical Research, Manhasset, NY, USA; ³New York Medical College School of Health Sciences and Practice, Westchester, NY, USA; ⁴Harvard Medical School, Boston, MA, USA; ⁵Department of Medicine, Massachusetts General Hospital, Boston, MA, USA; ⁶ACP Decisions, Boston, MA, USA; ⁷Department of Psychosocial Oncology and Palliative Care, Dana-Farber Cancer Institute, Boston, MA, USA.

BACKGROUND: Providing patients with access to health information that can be obtained outside of an office visit is an important part of education, yet little is known about the effectiveness of outreach modalities to connect older adults to online educational tools. The objective was to identify the effectiveness and cost of outreach modalities providing online information about advance care planning (ACP) for older adults.

METHODS: Six different outreach modalities were utilized to connect patients to online educational tools (ACP video decision aids). Participants were 13,582 patients aged 65 and older of 185 primary care providers with appointments over a 30-month period within a large health system in the greater New York City area. Main outcome measures were number of online video views and costs per outreach for each modality.

KEY RESULTS: There were 1150 video views for 21,407 remote outreach events. Text messages, sent to the largest volume of patients (8869), had the highest outcome rate (9.6%) and were the most economical (\$0.09). Characterization of phone calls demonstrated 21.7% engagement in the topic of ACP but resulted in minimal video views (<1%) and incurred the highest cost per outreach (\$2.88). In-office handouts had negligible results (<1%).

CONCLUSIONS: Text was the most cost-effective modality to connect older adults to an online educational tool in this pragmatic trial, though overall efficacy of all modalities was low.

KEY WORDS: outreach; health education; older adults.

J Gen Intern Med

DOI: 10.1007/s11606-022-07808-7

© The Author(s), under exclusive licence to Society of General Internal Medicine 2022

This project has not been presented in any other arena.

Received December 10, 2021

Accepted September 13, 2022

INTRODUCTION

Patient engagement in matters affecting their health care is heavily dependent on the patient's understanding of their health status. Consequently, the education they receive has the potential to directly impact their health outcomes. While care teams frequently educate patients on a variety of topics ranging from chronic disease management, preventive care, and behaviors affecting health, these discussions traditionally occur during face-to-face care visits.¹

Primary care visits for older adults typically encompass discussions around many health topics in a limited amount of time, creating a time constraint.^{2,3} Improving patient access to educational materials outside the office is essential in enhancing knowledge and facilitating efficient discussions with primary care teams. Information can be provided to patients in a number of ways outside of a visit: educational handouts, direct discussion, or through information technology. Video decision aids, readily shared through web-based links, are one method of providing education to patients and have been shown to be beneficial in improving advance care planning (ACP) discussions,⁴⁻⁸ including the identification of a health care proxy and advance directives, as well as other health topics in the ambulatory setting.⁹

While providing information to patients remotely has been an effective approach to remind them about upcoming appointments or tests,^{10,11} less is known about the most effective way to connect patients to educational information in between episodes of care, particularly among older adults. The ability to engage patients in remote health education is particularly relevant to recent global events, where the COVID-19 pandemic curtailed in-person visits and forced care teams to consider alternatives to office-centric methods for patient education. Identifying how best to engage older adults in remote evidence-based health education is especially important given the number of competing health topics relevant to this population,² and the rise of social media as a source of (sometimes unreliable) health-related information.¹²

In this manuscript we report the efficacy and cost of different outreach modalities to connect older adults with an educational website on ACP. This was part of a larger study looking at the combined use of provider ACP communication training and patient engagement with ACP website-based video decision aids and their combined influence on documentation of goals of care conversations in older adults.¹³

METHODS

Context: General Approach and Patient Populations

This pragmatic trial was conducted from December 15, 2020, to June 14, 2021, in adult primary care practices (Family Medicine, Geriatrics Medicine, and Internal Medicine) within a large multispecialty health system in the greater New York City metropolitan area. The project was reviewed by the Institutional Review Board and determined to be exempt and not fall under the category of research. The patients of 185 primary care providers who had previously completed ACP communication skills training were identified for the project. The targeted patient population were adults aged 65 and above with a telehealth or in-person visit with one of these providers within the study period above.

Intervention: Outreach Modalities and Sampling

We attempted six different outreach modalities to connect patients to the educational tool, an online video decision aid library accessible through the ACP Decisions website (www.acpdecisions.org). The ACP Decisions video library covers ACP topics such as health care proxy, definitions of ACP, and goals of care. The videos are available in over 25 languages.

Outreach modalities included remote (phone call, direct mail, email, and text message) and in-person approaches (office and provider handouts at visits) (Table 1). Outreach modalities were not mutually exclusive; i.e., patients could be contacted by more than one approach.

Remote outreach modalities included phone call, direct mail, email, and automated text message, in both English

and Spanish. For each of these modalities, patients were provided with information to access the ACP Decisions website. The primary outcome was number of video views tracked on the ACP Decisions website per outreach modality. Each outreach modality was associated with a unique link which allowed the research team to identify the outreach modality for each video view, though this was not associated with unique individuals. As this was a pragmatic trial, different outreach modalities were added during progression of the study based on available staff, resources, and evaluation of response rates.

Phone calls were made by research team members and conducted in English or Spanish based on patient preference documented in the electronic medical record (EMR). Reaching minority patients was a priority. As phone calls required the most resources, patients with upcoming appointments were prioritized for this outreach modality with an oversampling of minority patients (e.g., African American, Hispanic, Asian). If patients answered the phone and expressed interest, they were provided information on how to access video decision aids through the ACP Decisions Website.

For mail and email, a list of patients with upcoming appointments were identified and sorted by chronological order (starting with the nearest appointments). Mail contained an introduction to ACP, the ACP Decisions URL code, and a QR code with basic instructions to scan to access the videos for further information. Emails were sent once to individuals with an email address listed in the electronic medical record and contained an introduction to ACP and a one-click hyperlink that provided direct access to the videos. Once the research team learned of the ability to send text messages (low resource intensity) and observed a greater response to the first round of texts, mail and email efforts were transitioned to text outreach to conserve resources.

Text messages with a direct hyperlink to ACP videos were sent to all eligible patients with a mobile phone number listed in EMR. These text messages were sent to each patient six times with a 2-week interval between each message. The first 3 rounds of messages were sent in English, and the last 3 rounds contained English text followed by Spanish text.

In-person outreach efforts were comprised of English and Spanish handouts supplied to practices and providers. Handouts included basic information about ACP and a QR code for direct video access. Handouts were supplied to each practice for desk staff (both a pack of paper handouts and a PDF to

Table 1 Outreach Modality Attempts and Efficacy

	Outreach modality	Eligible patient pool	Outreach attempts (unique patients)	Outcome Met (ACP video views)	Outcome rate (outcome/attempt)
Remote outreach	Text	9760	8869	853	9.6%
	Mail	13582	3885	178	4.6%
	Email	10215	5043	55	1.1%
	Phone call	13582	3610	27	0.7%
	Front desk handout	4661	n/a	3	0.06%
In-person outreach	Provider handout	4123	n/a	34	0.8%

Table 2 Phone Call Characteristics

Total phone calls	Number (total=3610)	Percentage
Engaged in ACP discussion	785	21.7%
Need more info about ACP	480	13.3%
Interested in speaking with PCP	305	8.4%
Unengaged in ACP discussion	2825	78.2%
Could not reach	2370	65.7%
Refused or passively declined	299	8.3%
Not interested in ACP	111	3.1%
Not interested in speaking with PCP	3	0.1%
Deceased	36	1%
Other	6	0.2%

print additional copies) for use at check in/out (“Front Desk Handout”). Individual providers were supplied with a PDF containing a unique QR code (“Provider Handout”) to print and share with patients at their discretion. Once handouts were supplied, no further monitoring or oversight of this modality was provided due to limited resources. Patients eligible for handouts (Front Desk or Provider) were all patients who arrived for in-person appointments at the select clinic locations supplied with these handouts.

Phone Call Characteristics

Further characterization of phone call conversations is detailed in Table 2. Phone calls were categorized as “Engaged” if the patient indicated they would like more information about ACP, or if they planned to speak with their primary care provider about ACP. If they expressed interest, patients were provided information on how to access video decision aids through the ACP Decisions website. “Unengaged” calls included the following: patient could not be reached by phone, the patient declined further discussion, or the patient expressed that they were not interested in ACP information or in speaking with their primary care provider (PCP) about ACP (Table 2).

Outcome Measures

The primary outcome of interest was video views of online content on the ACP Decisions website. A video view was counted if this patient clicked play and watched more than 1% of the video content. The efficacy of each outreach modality was determined by the number of video views per outreach attempt (Table 1). Although video views were not traceable to

a unique individual, the team was able to link each video view to the specific outreach modality using codes unique to each modality (see below).

Analysis

Quantitative results of outreach modalities are described in text and tables. Cost of each outreach modality was estimated and considered in relationship to the effectiveness of each approach (i.e., % of positive outcomes).

The cost to perform each unit of the four remote outreach modalities (phone, mail, email, and text message) was calculated with consideration of both labor and capital cost associated with each (Table 3). Estimates of the average annual cost of IT and phone system per workstation, and the average salary per position involved in outreach were provided by the finance department. Research supervisors estimated the staff time to perform each outreach modality. A Labor Cost was determined by identifying an average salary of team members responsible for each outreach modality (research assistants, social workers, or research coordinators) and multiplying by the time taken to engage in each remote outreach. All other expenses were included as a Capital Cost — both estimated material capital costs (e.g., stamps, envelopes, paper, ink) and estimated tech capital costs estimated IT/phone costs (the average cost of a phone system per employee divided by the number of hours the system was used for the task).

The total cost per modality was calculated using the number of unique outreach events (cost per unit × outreach events). This was divided by the number of successful outreach attempts per modality to arrive at the cost per successful outreach (Table 4)

RESULTS

A total of 13,582 patients cared for by 185 primary care physicians, nurse practitioners, and social workers within the health system were identified for potential outreach efforts. The average age of identified patients was 76 years old, and 65% were female. Ten percent (1382) had a preferred language other than English; 5% (692) identified Spanish as their preferred language. Eight percent (1097) identified their ethnicity as Hispanic or Latino. Reported race was 63% (8543) white, 11% (1476) Black, 6% (790) Asian, 12% (1563) other, and 9% (1144) declined.

Table 3 Cost Calculation Per Outreach Modality

Outreach modality	Labor costs		Capital costs (Tech)		Capital cost (materials)/unit	Total cost/outreach unit
	Hours/unit	Rate*/hour	Hour/unit	Rate/hour		
Text	N/A		N/A		\$ 0.09	\$ 0.09
Mail	0.07	\$ 21.97	N/A		\$ 0.60	\$ 2.11
Email	0.07	\$ 24.94	0.07	\$ 0.64	\$ 0.04	\$ 1.71
Phone	0.08	\$ 33.31	0.08	\$ 0.64	\$ 0.05	\$ 2.88

*Labor costs varied by the role of the individual performing the labor: hourly labor rate is an average salary cost aggregate of those team members who performed task

Table 4 Cost Analysis by Successful Outreach

	Total cost per outreach attempt	Unique outreach events	Total cost per modality*	Successful outreach attempts	Cost per successful outreach
Formula	A	B	A×B=C	D	E=C/D
Text	\$ 0.09	53214*	\$4789	853	\$5.61
Mail	\$ 2.11	3885	\$8197	178	\$46.05
Email	\$ 1.71	5043	\$8624	55	\$156.80
Phone	\$ 2.88	3610	\$10397	27	\$385.07

*8869 patients were sent six text messages each

Outreach Efficacy

The outcome rate for each modality is listed in Table 1. There were 21,407 remote outreach events (an average of 1.5 per person). There were a total of 1150 video views by all modalities described and listed in the table. Of these, text messages had the highest yield (9.6%) followed by direct mail (4.6%) (Table 1). Email yielded a 1.1% outcome rate; 24.8% of patients did not have an active email address on file. Text messages were sent to the largest number of patients (8869). Most text message video views occurred with the first round of messages (43.4% views), with diminishing engagement in rounds 2 and 3 (31.1% and 5.9% respectively). Phone calls yielded the lowest percentage of video views, with only a 0.7% outcome rate. Notably, 65.7% of patients were unable to be reached via phone call. While phone calls resulted in minimal video views, 21.7% of calls engaged patients in an ACP discussion (Table 2). Almost 13% of those included in this outreach modality expressed the wish to learn more about ACP and an additional 8% indicated they planned to seek more information from their primary provider.

For in-person outreach, there were 4661 patients eligible to receive the Front Desk Handout, and 4123 eligible to receive the Provider Handout (i.e., number of patients with arrived clinic visits). There were negligible numbers of video views associated with each of these outreach modalities (3 and 34, respectively), both <1% effective.

Outreach Cost

The cost calculation components for each remote outreach modality are shown in Table 3, with the cost calculation per successful outreach event in Table 4. Phone calls yielded the lowest proportion of video views (0.7%) and incurred the highest cost (\$2.88 per outreach or \$385.07/successful outcome). At \$0.09 (\$5.61/successful outcome), text messages appeared to be the most economical, reaching the largest volume of people with small upfront effort. As in-person outreach modalities had very low outcomes (<1%), cost analysis was not performed. Text messaging (\$5.61 per successful outreach) was over 8 times more cost effective than telephone, and over 60 times more cost effective than email per successful outreach (Table 4 and Fig. 1).

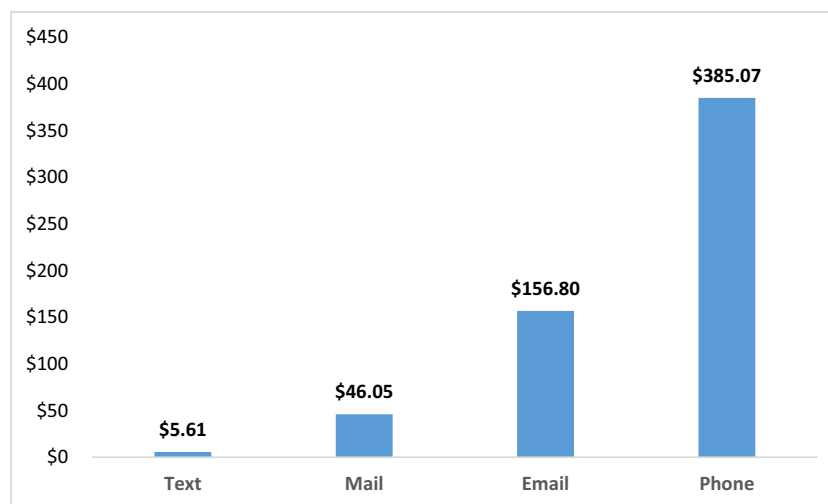


Figure 1 Comparative cost per successful outreach.

DISCUSSION

Evaluation of outreach modalities to connect older adults with an online educational tool regarding ACP demonstrates varying effectiveness in this study. Overall outcome rates were low (<10%), regardless of modality.

Despite serving as the traditional locus for health-related information dissemination and education, in-person outreach efforts at practice locations had negligible results, with less than 1% of visits linked to video views. Although we were unable to track the actual number of handouts provided to patients (reliance on office staff, providers at multiple locations), the number of viewings tied to these sources was inconsequential. For the Provider Handouts, this may be due to time constraints and competing clinical priorities within a visit, or providers bypassing video aids and relying on face-to-face communication during the visit. Front Desk handouts may have been likewise limited by competing administrative demands, or a pivot away from providing paper handouts to patients during the COVID pandemic.

Interestingly, text-based links to the video decision tool resulted in the highest rate of views (9.6%), followed by direct mail (4.6%) and email (1.1%). As a video view required navigation to the ACP decisions website, those outreach modalities that provided a direct link (either a hyperlink (text message, email) or a QR code (direct mail)) were likely easier for patients to navigate. Of these two options, hyperlinks may have been easier for patients to navigate as they did not require the additional step of scanning the QR code. Phone calls provided verbal instructions on how to manually access the website, a more cumbersome process, with more steps and prone to errors, which may have decreased the effectiveness of phone calls to direct patients to an online educational tool. Although outcomes were low for phone calls, secondary categorization showed 21.7% of patients were interested in engaging in further ACP discussion. This is consistent with previously described studies showing older adults' preferences for phone calls (>50%) as a means of providing health education.¹⁴ However, the cost of phone outreach may be prohibitive in many settings.

Although prior research has indicated that older adults have less interest in electronic modalities of outreach,^{14,15} our study demonstrated a higher-than-expected engagement with text-based communication among older adults, reflecting a possible increase in technology comfort for this group. As of February 2021, 85% of US adults owned a smart phone, an increase of 36% since 2014.¹⁶ For adults aged 65 and above, 61% reported smartphone ownership in 2021, with a significant increase over the past few years in this age group.¹⁷ Importantly, smartphone ownership is similar across different race/ethnicities: 85, 83, and 85% of White, Black, and Hispanic (of any race) individuals respectively report owning a smartphone.¹⁶ Our data suggests that smart phone-based communication (via text messaging) may be an important avenue

by which to communicate health information with older adults.

Prior studies have examined patient-reported preferences for health education among older adults, as well as self-reported comfort with digital activities.^{9,14,15} Gordon and Hornbrook describe older adult preferences for obtaining health information, with 54% preferring phone calls, and only 24.5% preferring watching an online video.¹⁸ Weber reports health-related internet use plays a minor role compared to medical providers, family/friends, and brochures in older adults.¹⁹ To our knowledge, no prior studies have assessed actual uptake of different outreach modalities in older adults, and thus, these results address a gap in the literature. Within our large, heterogeneous patient population situated in the greater metropolitan New York area, text messages had a strong uptake compared to other modalities at 9.6% and were the most cost-effective outreach modality for contact in this study.

Limitations

This study has several limitations. As video views were linked to the outreach modality and not the individual patient, we were unable to assess the impact of multiple outreach modalities on unique patients. If patients experienced both in-person and remote outreach, they may have been more likely to engage in video views. Additionally, while multiple avenues of outreach were examined, the use of patient portal messages was not evaluated in this study. For in-person outreach, we were unable to actively promote and monitor the handout process. This may have limited the success of this outreach modality but is representative of the average primary care climate where such monitoring would not be available. Although the cost analysis was thorough, the time it took for each action was estimated in aggregate by the research team rather than using a formal timer. While the older adult patient population involved was racially and ethnically heterogeneous, the geographic location and population density may make it more likely to engage with communication technology and thus not be generalizable to other (non-urban) populations. Finally, based on the pragmatic nature of this trial, it is not possible to comment on or compare the quality or duration of engagement among the outreach modalities. Future studies should evaluate whether text messaging for other health topics, or a combination of modalities, yields similar or greater results, or whether this was unique to ACP information.

Conclusions

This study provides insight into the effectiveness and cost of educational outreach modalities to older adults in the primary care setting. While text-based communication with a single hyperlink was the most cost-effective modality to reach older adults in this pragmatic trial, particularly for a web-based educational tool, there was low overall efficacy for each of the modalities studied. Future outreach with multiple,

concurrent modalities and innovative educational methods may prove more effective and warrant further investigation.

Acknowledgements: The authors wish to acknowledge Jody-Ann McLeggon, Andrea Benintendi, Andrea Yacoub, and Jessica Mongelli for their support of this project.

Corresponding Author: Edith Burns, Institute for Health Systems Science, Feinstein Institutes for Medical Research, Manhasset, NY, USA (e-mail: eburns4@northwell.edu).

Funding This project was funded by National Institutes of Health: 3UH3AG060626-03S1.

Declarations:

Conflict of Interest: Dr. Angelo Volandes has a financial interest in ACP Decisions, a non-profit organization developing advance care planning video decision support tools. Dr. Volandes' interests were reviewed and are managed by MGH and Mass General Brigham in accordance with their conflict-of-interest policies. No other authors have disclosures to report.

REFERENCES

1. **Lorig KR, Holman H.** Self-management education: history, definition, outcomes, and mechanisms. *Ann Behav Med.* 2003;26(1):1-7.
2. **Tai-Seale M, McGuire TG, Zhang W.** Time allocation in primary care office visits. *Health Serv Res.* 2007;42(5):1871-94.
3. **Caverly TJ, Hayward RA.** Dealing with the lack of time for detailed shared decision-making in primary care: everyday shared decision-making. *J Gen Intern Med.* 2020;35(10):3045-3049.
4. **Gazarian PK, Cronin J, Dalto JL, et al.** A systematic evaluation of advance care planning patient educational resources. *Geriatr Nurs.* 2019;40(2):174-180.
5. **Volandes AE, Paasche-Orlow MK, Davis AD, Eubanks R, El-Jawahri A, Seitz R.** Use of video decision aids to promote advance care planning in Hilo, Hawai'i. *J Gen Intern Med.* 2016;31(9):1035-40.
6. **Volandes AE, Paasche-Orlow MK, Mitchell SL, et al.** Randomized controlled trial of a video decision support tool for cardiopulmonary resuscitation decision making in advanced cancer. *J Clin Oncol.* 2013;31(3):380-6.
7. **Volandes AE, Ferguson LA, Davis AD, et al.** Assessing end-of-life preferences for advanced dementia in rural patients using an educational video: a randomized controlled trial. *J Palliat Med.* 2011;14(2):169-77.
8. **Volandes AE, Barry MJ, Chang Y, Paasche-Orlow MK.** Improving decision making at the end of life with video images. *Med Decis Making.* 2010;30(1):29-34.
9. **Arterburn DE, Westbrook EO, Bogart TA, Sepucha KR, Bock SN, Weppner WG.** Randomized trial of a video-based patient decision aid for bariatric surgery. *Obesity (Silver Spring).* 2011;19(8):1669-75.
10. **Mehta SJ, Day SC, Norris AH, Sung J, Reitz C, Wollack C, Snider CK, Shaw PA, Asch DA.** Behavioral interventions to improve population health outreach for hepatitis C screening: randomized clinical trial. *BMJ.* 2021;373:n1022.
11. **Campbell KJ, Blackburn BE, Erickson JA, Pelt CE, Anderson LA, Peters CL, Gililand JM.** Evaluating the utility of using text messages to communicate with patients during the COVID-19 pandemic. *J Am Acad Orthop Surg Glob Res Rev.* 2021;5(6):e21.00042.
12. **Boyer C, Gaudinat A, Hanbury A, et al.** Accessing reliable health information on the Web: a review of the HON approach. *Stud Health Technol Inform.* 2017;245:1004-1008.
13. **Volandes AE, Zupanc SN, Paasche-Orlow MK, et al.** Association of an advance care planning video and communication intervention with documentation of advance care planning among older adults: A Non-randomized Controlled Trial. *JAMA Network Open.* 2022;5(2):e220354.
14. **Gordon NP, Hornbrook MC.** Older adults' readiness to engage with eHealth patient education and self-care resources: a cross-sectional survey. *BMC Health Serv Res.* 2018;18(1):220.
15. **Arcury TA, Sandberg JC, Melius KP, et al.** Older adult internet use and eHealth literacy. *J Appl Gerontol.* 2020;39(2):141-150.
16. **Pew Research Center.** Who Owns Cellphones and Smart Phones? Available at: <https://www.pewresearch.org/internet/fact-sheet/mobile/#who-owns-cellphones-and-smartphones>. Accessed 14 June 2021.
17. **AARP.** 2020 Tech and the 50+ Survey. Available at: <https://www.aarp.org/research/topics/technology/info-2019/2020-technology-trends-older-americans.html>. Accessed 6 July 2021.
18. **Gordon NP, Hornbrook MC.** Differences in access to and preferences for using patient portals and other eHealth technologies based on race, ethnicity, and age: a database and survey study of seniors in a large health plan. *J Med Internet Res.* 2016;18(3):e50.
19. **Weber W, Reinhardt A, Rossmann C.** Lifestyle segmentation to explain the online health information-seeking behavior of older adults: representative telephone survey. *J Med Internet Res.* 2020;22(6):e15099.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.