

**Oral Abstract Plenary #1: Abstracts Related to  
COVID**

**Monday, November 1<sup>st</sup>, 12:30 pm—1:30 pm ET**

**COVID-19 vaccination information must pay  
attention to health literacy: readability of official  
COVID-19 public health information**

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### Background

Throughout the coronavirus (COVID-19) pandemic there has been limited attention to the information needs of people with lower health literacy and from culturally and linguistically diverse backgrounds. In April 2020, research showed that the majority of government COVID-19 information developed internationally exceeded the recommended 8th grade reading level rendering this information too difficult for people with average reading ability to understand, let alone those with lower health literacy. Since then, the mass global vaccination campaign has begun and there has been an abundance of new information to communicate.

### Objectives

To conduct updated assessments of COVID-19 public health information (physical distancing and mask wearing) with an additional focus on vaccination. It includes an assessment of 'easy-read' resources, now developed by some jurisdictions.

### Methods

Between March and April 2021, we purposively selected consumer-facing information about vaccination, physical distancing and face masks for COVID-19 from government websites of three countries, three international Public Health Agencies, and three Australian states. We also searched each site for resources labelled as 'easy-read.' Readability was assessed using the Simple Measure of Gobbledygook

(SMOG), which estimates grade reading level (range 5 to 18). We used the Patient Education Materials Assessment Tool (PEMAT) to assess understandability and actionability. Two researchers independently scored each PEMAT item (n=23; 1 -agree, 0 -disagree or NA -not applicable), with discrepancies resolved by discussion. Total score is a proportion of all agree responses. A score of <sup>3</sup>70% is considered adequate.

### Results

All standard content exceeded an 8th grade reading level. The mean grade reading level was 12.17 (SD=1.5) ranging from 9 to 18; Table 1. The mean grade reading level of vaccination information (m=13.3, SD=1.5) was significantly higher than physical distancing (m=12.0, SD=1.3; p=0.038), and mask information (m=10.7, SD=1.3, p<0.001; Table 1). Twelve of the 21 easy-read content (55%) exceeded an 8th grade reading level. The mean grade reading level of easy-read content was 9.4 (SD=0.8) for vaccination, 7.3 (SD=0.6) for physical distancing, and 7.8 (SD=1.3) for masks. These differences were not significant (p=0.06).

Most standard content had adequate understandability scores using the PEMAT tool (n=20/24, 83.3%). Mean understandability scores were 75.1% (SD=20.8) for vaccination, 85.0% (SD=15.9) for physical distancing, and 89.6% (SD=6.0) for masks. These differences were not significant (p=0.074). Less than half the standard content (n=14/24, 46%) had adequate actionability. All easy-read content (n=12) met the threshold for understandability, while only 3 (25%) met the actionability threshold.

### Conclusions

Twelve months since the pandemic onset, much COVID-19 public health information still performs poorly on readability metrics, and on measures of 'actionability'. Easy-read content was written at a lower reading grade and had good understandability, demonstrating it is possible to explain COVID-19 topics in plain language. However, they were few in number, difficult to locate and poorly signposted.

### Implications

Our research suggests that even when new health information resources are developed, as is the case for COVID-19, few of these adequately meet the information needs of people with limited health literacy. Plain language resources should be prioritized as COVID-19 information continues to emerge.

\* Table 1. Readability, understandability, and actionability of official COVID-19 public health information is available upon request

**eHealth Literacy and the Digital Divide After COVID-19: The Impact of eHealth Literacy on Patient Telehealth Preferences**

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**Background**

In the setting of the pandemic, telehealth emerged as a ubiquitous communication tool for providers and patients. The shift to telemedicine has highlighted two ongoing equity challenges with rapid technology adoption: access to technology and internet connectivity and digital literacy. This is the first study identifying the relationship between phone versus video patient telehealth preferences and eHealth literacy. We aim to examine the factors influencing patient preferences surrounding telehealth and the barriers patients face in using phone and video technology for healthcare visits.

**Methods**

The study design is a cross-sectional observational study of adult inpatients at the University of Chicago Medicine. Binary variables were analyzed using chi-squared tests to determine the differences in telehealth use by age and eHealth literacy level. A multivariate logistic regression model estimated the impact of eHealth literacy on patient willingness to use telehealth video technology, adjusting for age, gender, race and education.

**Results**

Of 205 participants, the median age was 57 years, 65% were African American, half were female, and one third were college graduates. Less than half had adequate eHealth literacy, as defined by the eHEALS Literacy Scale, and 20% did not have Wi-Fi access at home.

We observed a 400-700% increase in telehealth use after the pandemic (Figure 1). The percentage of participants who reported having a health appointment over video increased from 6.9% to 52.5% after March 2020. The percentage of participants who reported having a health appointment over phone increased from 14.6% to 64.4%.

Participants with low eHealth literacy were less likely to report being interested or willing to do video telehealth appointments (22/60 [36.67%] low literacy versus

109/145 [75.2%] adequate literacy, P < 0.001). In contrast, there were no significant difference in interest in phone telehealth appointments by eHealth literacy level (41/60 [68.3%] versus 115/145 [79.3%], P = 0.094). Participants cited lack of knowledge/confidence (30%), access to technology (22%) and access to Wi-Fi (21%) as barriers to using video for healthcare visits.

Adequate eHealth literacy significantly increased participants' interest in future telehealth use. We estimate a 335% increase in the odds of being interested in video telehealth appointments for participants with adequate eHealth literacy, adjusting for age, sex, race and education (P < 0.05).

**Conclusion**

We observed a large "digital push" during COVID-19 with widespread adoption of telehealth services. However, telehealth adoption gaps for video technology persisted across age and health literacy levels. Patients with low eHealth literacy reported significant preferences for phone over video technology for telehealth appointments. Phone visits can improve access for patients with low technology access or low digital literacy, but phone visits decrease quality of care when visual assessment is needed. This work emphasizes that as health systems accelerate telehealth expansion, identifying patients with low eHealth literacy will be important in order to narrow the digital divide.

Table 1.

Table 1: Demographic Effects on Telehealth Willingness			
Variables	Odds Ratio	Standard Error	p-value
Adequate eHealth literacy	4.35***	[1.51]	0.000
Age < 65	3.22***	[1.06]	0.000
Female	0.93	[0.31]	0.831
Black	0.86	[0.29]	0.655
College graduate	1.39	[0.49]	0.348

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Figure 1.

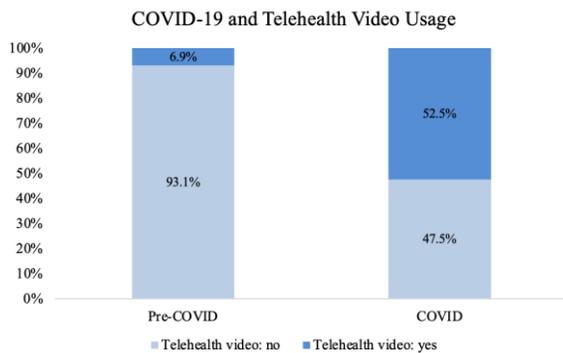


Figure 1. Percentage of patients reporting telehealth video technology usage before the COVID-19 pandemic (before March 2020) and during or after the COVID-19 pandemic (after March 2020).

## Using Health Literacy to Improve COVID-19 Health Messaging: Lessons from the COVID-19 Communications Project

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### Background

The rapid developments of public health safety protocols, scientific discoveries, and vaccination technologies during the COVID-19 pandemic have increased the need for effective public health messaging. Public health officials and government agencies are tasked with communicating up-to-date and evolving health information to the public. Given the rapid developments in public health practices, scientific innovations, and epidemiological trends, developing health-literate, relevant and compelling health messages is critical for public awareness of the pandemic and necessary health precautions.

### Objective

To identify and define areas of improvement for COVID-19 health messaging.

### Methods

This study was completed in two phases. In the first phase, we reviewed existing public health messages to identify local, state, national, and international COVID-19 public health messages to be used in surveys and semi-structured interviews. Then we enrolled English-speakers, ≥18 years from two regions of Missouri representing rural and urban underserved populations and health professionals in an online interview process. Using a semi-structured interview process, participants

were asked to review these public health messages and provide feedback. Using data from qualitative thematic analysis, the research team created new COVID-19 health messages based on participant feedback. For the second phase, we re-contacted original participants to complete a short survey about their thoughts on the newly created messages.

### Results

In phase one, 67 participants completed interviews, with 31 participants from the rural Southeast Missouri “Bootheel,” 27 from the urban St. Louis metro region, and 9 healthcare providers from the St. Louis metro region. All participants suggested incorporating the best practices for health literacy and communication into messaging, including using plain language, using color and design to highlight key points, and integrating an emotional appeal. Participants across the sample gave similar suggestions to improve future messaging. Participants’ suggestions broadly reflected their attachment to main COVID-19 protocols (e.g., wearing masks), their desire for personal choice, and the need for clear, trustworthy, and easily accessible source information. In the second phase of the study, the vast majority of participants (n=54) responded positively to the new messages and responded that the messages integrated their feedback from phase one.

### Conclusion

Our analysis of participants’ responses highlights the importance of incorporating health literacy into public health messaging, including plain language, the use of color and design to highlight key points, and emotional appeal. Suggestions made by participants in all samples demonstrate the broad applicability of quality health messaging. These findings indicate areas of improvement for future health messaging critical for stakeholders across the country to address the COVID-19 pandemic and other public health crises.

### Implications

The messages created by the research team in response to participants’ feedback can serve as exemplar COVID-19 health messaging and can inform future public health messages to advance health literacy research.

## The mediating effect of health literacy on COVID-19 vaccine confidence among a diverse sample of urban adults

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### Background

Low confidence in vaccines is associated with decreased rates of immunization and vaccine-preventable illness. High uptake of the available COVID-19 vaccines is of critical importance to reduce morbidity and mortality related to COVID-19 infection and to facilitate control of the pandemic. Factors influencing vaccine confidence are poorly understood, but may inform policies and programs aimed at reducing the number of unvaccinated individuals.

### Research Question

Using mediation analysis, we sought to determine if health literacy mediated the influence of race, ethnicity, education, and other demographic variables on vaccine confidence.

### Methods

To better understand factors related to attitudes about COVID-19 vaccination, we analyzed responses from adults participating in an observational study conducted in Boston and Chicago during the COVID-19 global pandemic. We used *path analyses* to evaluate health literacy as a mediator of the relationship between demographic variables and the Vaccine Confidence Index (VCI), a scale using a ratio of statements with which a participant expresses agreement or disagreement. VCI scores range from 0.25-4.0; a higher score indicates a higher likelihood of vaccine acceptance.

**Results:** We analyzed a sample ( $N = 273$ ) with mean age 49 years, 63% female, 40% identified as non-Hispanic Black, and 24% identified as Hispanic. Participants had a mean VCI score of 2.40, median 2.29, and standard deviation 0.97. Compared to non-Black and non-Hispanic participants (mostly Asian and White), Black and Hispanic participants had lower levels of vaccine confidence (-0.78, 95% bootstrapped CI -1.02 to -0.56; -0.55, 95% bootstrapped CI -0.78 to -0.28, respectively). Health

literacy mediated the effect of the relationship between the VCI and race and ethnicity (mediated effects -0.19 for both groups). Compared to participants who had completed four years of college, participants with a 12<sup>th</sup> grade education or less scored 0.73 points lower on the VCI (95% CI -0.95 to -0.50) and participants who had completed some college or an associate's or technical-school degree scored 0.71 points lower on the VCI (95% CI -1.05 to -0.40). The relationship between educational level and VCI was also mediated by health literacy (-0.27 for 12<sup>th</sup> grade or less; -0.14 for some college/associate's/technical degree).

### Conclusions/Implications

Health literacy was a partial mediator of the relationship between race, ethnicity, and education with the VCI as the dependent variable. These data suggest that health literacy is an important factor underlying attitudes towards vaccination that should be a target for public health educational initiatives.

### Keywords

Adult immunization, health disparities, vaccine hesitancy, health literacy, COVID-19