Discussions around public health, literacy, and health outcomes have taken on a heightened level of urgency as public interest surrounding these topics has skyrocketed since the beginning of the COVID-19 pandemic and the rampant misinformation and disinformation that came with it.

People in the United States suffer from a lack of vital literacies that help individuals navigate healthy, informed living. As this has become better documented, organizations ranging from social media companies to the Office of the Surgeon General (OSG) have attempted to connect with the public and stem the flow of medical misinformation and disinformation.

In an attempt to reroute the trajectory of the United States' relationship to information, the OSG (2021) released a statement in line with existing U.S. plans highlighting the need to educate residents on strategies for identifying reliable sources and building trust with government agencies. Implicit within this call is the need to increase print literacy— a foundational skill for navigating the information landscape— and reestablish community bonds.

Here, the link between literacy and health will be examined along with the confounding factor of health misinformation. Identifying this link empowers the push for a more literate, healthy population.
**Misinformation and Disinformation**

Misinformation is false information shared by people who do not intend to mislead others (CDC, 2021). Similarly, disinformation is false information deliberately created and disseminated with malicious intent (CDC, 2021). Mis- and dis-information flourish when there is uncertainty about who and what to trust for information: “In recent years, the rapidly changing information environment has made it easier for misinformation to spread at unprecedented speed and scale, especially on social media and online retail sites, as well as via search engines” (OSG, 2021). History and cultural identities, as well as muddying of information from seemingly official sources, can impact this uncertainty (Kahan, 2015; OSG, 2021). Print literacy, information literacy, and health literacy are key skills needed by populations to keep health misinformation and disinformation from spreading.

**Print Literacy**

In the United States, we are experiencing a cultural shift around information and health. As our understandings of education, health, and community change, so too do our measurements. Terms like literacy are being reexamined and used in a much wider variety of contexts. Generally, the public understands literacy, called print literacy here for clarity, to be the ability of an individual to expressively and receptively make meaning from written numbers (dubbed numeracy in some fields), letters, phonemes, and words across different mediums, such as handwritten, digital, and printed materials (Montoya, 2018).

For the United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute for Statistics, a UN affiliate organization that acts as the official font of international data on education, science, culture and communication, literacy is typified by three characteristics (Montoya, 2018):

- Literacy is about the use people make of it as a means of communication and expression, through a variety of media.
- Literacy is plural, being practiced in particular contexts for particular purposes and using specific languages.
- Literacy involves a continuum of learning measured at different proficiency levels.

**Expanded Literacies**

Colloquially, literacy is used as a shorthand term to denote confidence in navigating any number of subjects (e.g. health, online navigation, or sorting through information) with the ability to connect and comprehend concepts with varying levels of fluidity in a variety of situations, as identified by Montoya (2018). This is the meaning advocates are attempting to evoke when they educate the public on expanded forms of literacy such as information literacy and health literacy, although access to success in the traditional measures of print literacy is an implicit part of each literacy.
Personal Health Literacy, commonly referred to as health literacy, developed through joint efforts of adult literacy specialists and physicians to identify disconnects between available printed health information and patient reading ability, is the degree to which individuals have the ability to find, understand, and use information and services to inform health-related decisions and actions for themselves and others (Zarcadoolas et al., 2005; CDC, 2021). Personal health literacy heavily intersects with information literacy, which is the ability for individuals to recognize when information is needed and have the ability to locate, evaluate for reliability, and use effectively the needed information (Office of Disease Prevention and Health Promotion [ODPHP], 2010, p. 35). Information literacy is lacking when an individual cannot determine a reliable or relevant source from an unreliable or nonrelevant source.

Each literacy type comes with its own set of target skills and has a massive impact on the quality of life people experience. By expanding the scope of what exactly is meant by "literacy", the understanding that literacy is fundamental is maintained and all types of literacy, print or otherwise, are better understood through interrogation of traditional definitions, policies, and actions. Many agencies such as libraries have developed programs and plans as a response to the relative level of literacy within their communities as identified by current research.
Low Literacy Affects All Groups

As of 2013, 21% of U.S. adults were found to have low print literacy skills (Mamedova & Pawlowski, 2019). The same agency found that only 12% of U.S. adults demonstrated proficient health literacy skills and 36% of the adult U.S. population had “Basic or Below Basic” health literacy levels (Vernon et al., 2007; Mamedova & Pawlowski, 2019).

People from all walks of life can have limited health literacy. However, limited health literacy is more likely to be seen in older adults, people who have at least one chronic illness or disability, or live near or below the poverty line. Socioeconomic factors that are influenced by poverty, such as access to insurance or regular medical care, may disproportionately impact health literacy. For example, people who are uninsured and or use Medicaid or Medicare insurance are at higher risk of having low health literacy, resulting in increased medical costs, increased ER visits and hospital admissions, and decreased access to health care. Likewise, populations that identify as a racial or ethnic minority tend to have lower levels of health literacy skills. A variety of systemic factors have historically led to decreased literacies and health outcomes for marginalized populations.

Of all racial/ethnic groups, Hispanic adults have the lowest average health literacy scores, followed by Black and Indigenous/Alaskan Native adults, respectively. Populations that lack a high school degree or GED or who learned to speak and read another language before English also are more likely to experience lower health literacy skills than their peers. In a nationally representative sample, close to half of adults without a high school diploma had low health literacy. Another study found 74% of Spanish-speaking patients have less than adequate health literacy. Comparatively, 7% of English-speaking patients are recognized as having less-than-adequate health literacy.

People with a combination low of health literacy and limited English proficiency are twice as likely to report poor health status, as compared to those without the specified barriers (Agency for Healthcare Research and Quality [AHRQ], 2020; ODPHP, 2020).
It is important to note that, although literacies are not directly related, the demographic markers for those with limited health literacy are nearly identical for those who have limited print literacy (Rea, 2020). Additionally, the demographic markers for these populations are uncomfortably in line with groups that we now know have been and continue to be subject to systemic injustice and marginalization. Regardless of how individuals arrive at a low level of health literacy, the impact has far-reaching quality of life implications for those affected and their communities (AHRQ, 2020; ODPHP, 2020).

**Low Literacy is Expensive**
Low health literacy accounts for hundreds of billions of dollars spent each year on health care that would otherwise be unnecessary, with recent estimates settling around $236 billion (Vernon et al., 2007; Rea, 2020). Conversely, improving health literacy could save between $106 billion and $238 billion each year in health-related costs (Vernon et al., 2007).

**Low Literacy Impacts Health**
Consider how literacies are enmeshed [JC2] - if an individual had limited ability to read, write, or use technology could they read a thermometer to decide if they should go into work? Could they access test results on a digital patient portal, or communicate questions to their doctor? Literacies are interrelated: without even one form of literacy - be it health, information, or print literacy - access to information and health outcomes plummet (ODPHP, 2020). For example, patient education is ineffective if the written health materials provided to the patient do not match with their reading level (ODPHP, 2020).

Studies show that a patient’s level of health literacy impacts their ability to:
- Carry out their treatment plan
- Fill out forms
- Find providers and services
- Share relevant health history
- Understand risk and probability (AHRQ, 2020)

As a result, those with low or no health literacy are more likely to:
- Require emergency care or be hospitalized
- Return to the emergency department after 2 weeks
- Struggle to manage a chronic illness or disability
- Miss needed tests and screenings
- Underuse preventive health care (AHRQ, 2020)
In one study by Wolf et al. (2005) that examined the relationship between literacy and health outcomes in the form of HIV treatment knowledge of patients, of the one-third of the sample population that had limited literacy skills, those individuals were less able to describe key treatment terms or correctly identify medication in their regimen. The authors note, “For correct medication identification, a significant interaction was found between the number of HIV medications and literacy level. Among patients taking only 1–2 HIV medications, 100% of higher literate patients were able to identify their medications, compared to none of the lower literate patients prescribed three or more HIV medications (Wolf et al., 2005).”

**BARRIERS TO INCREASING LITERACY AND IMPROVING HEALTH**

**Mis- and Dis-information**

In the United States, the issue of mis- and dis-information has become so prevalent and has impacted public health to such a degree that organizations of all sizes are enlisting practitioners and the public to help course correct through a joint effort to increase information literacy (CDC, 2021). The OSG (2021) released a statement that misinformation “thrives in the absence of easily accessible, credible information. When people look for information online and see limited or contradictory search results, they may be left confused or misinformed.”

**Bias**

Low literacy skills are pervasive in the U.S., although they frequently go unnoticed. People with low print literacy but fluent verbal skills are able to mask their inability to engage with written health materials, which results in poor health outcomes (Healthy People, 2020). This creates a perception that more people are able to successfully navigate health information than the reality. Additionally, many of the groups identified as more likely to possess low literacy levels have been marginalized, impacting the rate at which literacy interventions are implemented.

**Distrust**

Government agencies, including the Biden Administration, have begun to publicly acknowledge awareness of public mistrust of the government, particularly from historically marginalized groups (CDC, 2021; Alonso-Zaldivar, 2021). When no agreed-upon reliable agencies exist, misinformation flourishes and health suffers. Researcher Dan Kahan identified one issue with untangling misinformation: “science communication professionals must protect citizens from having to choose between knowing what’s known by science and being who they are as members of diverse cultural communities (Kahan, 2015, p. 10).” Best practices have now been adjusted to include “trusted messengers” such as religious leaders, community leaders, and community organizations like libraries to increase the likelihood of reliable information being seen and believed over misinformation (ODHP, 2010; CDC, 2021; Alonso-Zaldivar, 2021).
Shortage of Trained Professionals

Although many community agencies and practitioners do incredible work to help the public access the information they need, they still must receive support to meet the health literacy needs of their community. Health information providers need, at the least, comprehensive and continual training on topics like teaching best practices for their service population, existing tools, and subject matter basics.

CURRENT EFFORTS TO INCREASE LITERACY LEVELS

Government programs
As public concern about low levels of health, information, and print literacy in the U.S. has increased, federal institutions have developed programs targeting health and print illiteracy, with the intention of creating a healthier population. Examples include the Office of Disease Prevention and Health Promotion’ Healthy People 2020, National Action Plan to Increase Health Literacy (n.d.; 2010), and the U.S. COVID-19 Vaccination Program Interim Playbook for Jurisdiction Operations from the Centers for Disease Control and Prevention (2020). The programs rely heavily on community organizations such as libraries to overcome barriers, carry out plans within the programs, and normalize standards. Within the above programs, government agencies have observed the unique role that libraries play in their communities and have looked to them to help improve health outcomes and literacy, as evidenced by dedicated sections, tasks, and specific mentions of libraries within the plans (ODHP, n.d.; ODHP, 2010; CDC, 2020).

Additionally, partnerships between the government and public institutions such as the Communities for Immunity collaboration between the CDC, American Library Association, Network of the National Library of Medicine, and three other institutions have been launched recently in the hopes of quelling surges of COVID-19 cases and increasing vaccination rates through trusted community pillars for information (American Alliance for Museums, 2021).
Libraries Fighting Misinformation

Libraries are a trusted community resource, centered around the value of equal access to information, deeply embedded in their communities. The ODHP’s National Action Plan to Increase Health Literacy (2010) names libraries and library professionals specifically, as critical resources for health information, stating “schools and their libraries play a fundamental role in the development of a health literate population (p. 33).” The plan expands on this and states that “libraries of all types, including public and medical libraries, have become important partners in supporting community-based health literacy efforts and working with health care professionals. Many libraries already support training programs in basic literacy (p. 35).”

Reinforcing government findings, a 2016 PEW research study found that libraries are identified as vital to their communities by two-thirds of people, with 77% of people reporting that public libraries fulfill their resource needs, such as technology services, a safe and welcoming environment for all, and educational opportunities (Horrigan).

The same study found that:

- 37% of people identified libraries as contributing “a lot” to helping people decide what information they can trust— a 13-percentage point leap from the previous year.

- 33% said libraries contribute “a lot” to helping people find reliable health information.

- 80% of people thought libraries should “definitely” offer programs to teach people digital skills.

Mirroring this sentiment, the recent brief from the Office of the Surgeon General declared “media, science, digital, data, and health literacy programs should be implemented across all educational settings, including elementary, secondary, post-secondary and community settings (2021).” Many public libraries are ahead of this call for action, having for years implemented this type of programming, offering “spotting misinformation” sessions and providing online sessions, in hopes of quelling the barrage of misinformation the public receives daily.
Capitalizing on this existing momentum, the Office for Disease Prevention and Health Promotion’s National Action Plan to Increase Health Literacy suggests strategies for libraries to maintain and improve health in their communities. These strategies include:

- Collaborate with information and healthcare professionals to create health information centers in public libraries.
- Maintain a collection of reliable, easy-to-read health and insurance materials in multiple languages and mediums.
- Continue to provide educational opportunities on health and health communication topics for practitioners and the public.
- Continue to provide adult education and English language acquisition programs.
- Actively engage practitioners, community members, consumers, and policymakers in the research process.
- Speed dissemination of health literacy research results to practitioners, communities, policymakers, and researchers in other disciplines.
- Report on findings, such as conditions when evidence-based practices did not work in specific situations or populations.

Libraries are also featured as resources for health care professionals to utilize. Directives for health agencies and practitioners include employing medical and academic libraries as resources for medical research, referring patients to public and medical libraries for accurate and actionable health information, and referring relevant patients to adult education and English language programs, which are commonly hosted by public libraries. One of the final directives in the plan is simply to “work with your library and other community organizations (p. 60).”
Low health literacy is common, difficult to spot, and negatively impacts health outcomes.

Recommendation
Health literacy should receive a significant increase in funding to curb negative health outcomes and waste of existing, but inaccessible, health information tools. Dedicated funding to libraries for literacy programs aiming to increase print, information, and health literacies is essential. Policymakers should take special care to support our public institutions, particularly libraries, health departments and schools, and with the guidance of health professionals to monitor and increase health literacy.

This can be accomplished by funding new and more comprehensive health literacy curricula, offering growth and assessment opportunities for health literacy in real-world situations, and increasing functional literacy in the general population while focusing on at-risk groups.
All of this requires policy support and an adequate budget. Libraries should be offered the funding and be the agency to take the lead on literacy within these initiatives, as they are uniquely positioned as trusted, accessible, and embedded community resources. With this in mind, agencies and government organizations should make every effort to include and value libraries within literacy task forces.

**Rationale**
Currently, many people struggle with health literacy, which leads to poor health and an inability to engage with existing programs that aim to increase health outcomes. If funding and attention is dedicated to initiatives that increase health literacy, more people with low health literacy can be identified and supported; currently funded programs will become more accessible to those with newly increased health literacy. If this occurs, healthcare spending, hospitalizations, and mortality rates may decrease as levels of health literacy increase. This is especially important during COVID, which has seen hospitals and healthcare workers completely overwhelmed. To optimize the use of healthcare resources already available and increase health outcomes, it makes sense to dedicate resources to initiatives that increase health literacy.

**Conclusion**
There are a variety of literacies, of which print and health literacy are deeply intertwined. Lack of and low levels of these literacies can spread misinformation, compounding the already dire issues that come with low literacy skills, such as financial loss and increased mortality rate, for individuals and communities throughout the country. Policymakers, community leaders, educators, and community organizations must determine how to address the issue. Although the research is concerning, solutions do exist within established plans. Progressing towards health, information, and print literacy for everyone in the U.S. will require dedicated, creative, hard work from all stakeholders. Libraries are crucial to this effort.


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