Adult Education Quarterly
2018, Vol. 68(4) 297–315

DOI: 10.1177/0741713618783487
journals.sagepub.com/home/aeq
SAGE

# Health Literacy and Adults With Low Basic Skills

**Iris Feinberg[1], Elizabeth L. Tighe[1], Daphne Greenberg[1], and Michelle Mavreles[1]**

**Abstract**

The purpose of this research was to analyze oral communication patterns between patients with varying degrees of individual health literacy (how patients access, understand, and use health information) and their health providers. We analyzed a secondary data set of 68 patient–nurse provider audiotaped clinic encounters using REALM (Rapid Estimate of Adult Literacy in Medicine, a health literacy measure), correlations, and quantile regression to look at the use of provider dialogue components: closed-ended questions, open-ended questions, data gathering—biomedical, education/counseling—biomedical, data gathering—lifestyle/psychosocial, education and counseling—lifestyle/psychosocial, and checking for understanding. Patients with lower health literacy levels were asked more closed-ended biomedical and lifestyle/psychosocial questions than those with higher literacy levels. Providers did not check for understanding with patients at any health literacy level. Implications for health literacy and adult education in the medical setting, adult classroom, and community organizations are described.

**Keywords**

health literacy, basic skills, collaborative education

Adults with low literacy are often challenged by oral communication with health providers; they may have poor prior experiences in communicating with health providers or may not know how to ask for clarification or assurance (McCaffery, Smith, & Wolf, 2010). The language of medicine is challenging, and adults with low literacy may struggle due to lack of knowledge about health terms, intercultural communication

[1]Georgia State University, Atlanta, GA, USA

**Corresponding Author:**
Iris Feinberg, Adult Literacy Research Center, Georgia State University, One Park Place, Suite 519, Atlanta, GA 30303, USA.
Email: ifeinberg2@gsu.edu

issues, and language skills (Roter, 2011). This context-specific literacy is called health literacy; individual health literacy is defined as the ability to access, understand, and use health information to make appropriate health decisions (Institute of Medicine, 2004). Adults with low educational attainment are likely to have low health literacy and less likely to know about preventive health measures, manage sick behaviors, and seek health information; they are also more likely to miscommunicate with their health providers (McCray, 2005). A direct association exists between low health literacy and poor health (Paasche-Orlow & Wolf, 2007).

Understanding and recall of biomedical, therapeutic, lifestyle, and psychosocial information are critical factors to therapy adherence (Ley, 1989); however, 40% to 80% of medical information provided orally by providers is immediately forgotten and almost half of what is remembered is incorrect (Keeble & Cobbe, 2002). Providers' skills in delivering oral information affect how much and what the patient understands; these skills are also critical to both teaching self-care skills and developing a partnership with the patient, both critical components of patient engagement (Schulman-Green et al., 2012). Many patients with low health literacy do not ask questions or initiate dialogue with their health providers; thus, provider communication skills are integral to keeping the patient engaged during the clinical encounter (Ishikawa & Yano, 2008; McCaffery et al., 2010; Street, Gordon, Ward, Krupat, & Kravitz, 2005).

Health literacy is complex and multifaceted. Individual factors and the social context act together to explain individual health literacy levels; therefore, the entire social ecological model (SEM) framework in which people live and health literacy occurs should be considered. Figure 1 illustrates this system. The discrete rectangles of the model are not meant to be static—there is fluidity between the factors, which have different implications for health literacy in different contexts. As can be seen, health literacy is not simply based on an individual's skill or literacy level but is broader and includes interactions between an individual and the demands of his or her environment. Part of this environment is created by those who deliver health information (i.e., health professionals and health systems). Information must be accessible, understandable, and meaningful for individuals to use it, navigate the health system, and better control their health behaviors (Berkman, Sheridan, Donahue, Halpern, & Crotty, 2011; DeWalt, Berkman, Sheridan, Lohr, & Pignone, 2004; Parnell, 2014). There is an interactional aspect of health literacy that may be challenging for adults with low literacy skills due to how the health system uses medical jargon, regulatory requirements, and a direct communication style that increases health literacy demands on patients (Epstein et al., 2005; Fagerlin, Zikmund-Fisher, & Ubel, 2011). As indicated in Figure 1, factors at the individual level of the SEM affect how people accumulate and use health information throughout their lives. There are both nonmodifiable factors (biology and genetics) and modifiable factors. It is thought that beliefs, values, attitudes, and experiences stem from language, educational attainment, literacy, and socioeconomic status. The next level of the SEM, the Interpersonal, focuses on relationships with close others and includes family, partners, close friends, and culture, which have a direct and indirect bearing on how people view health information and practice health behaviors (Andrulis & Brach, 2007). The next SEM level is the Community,

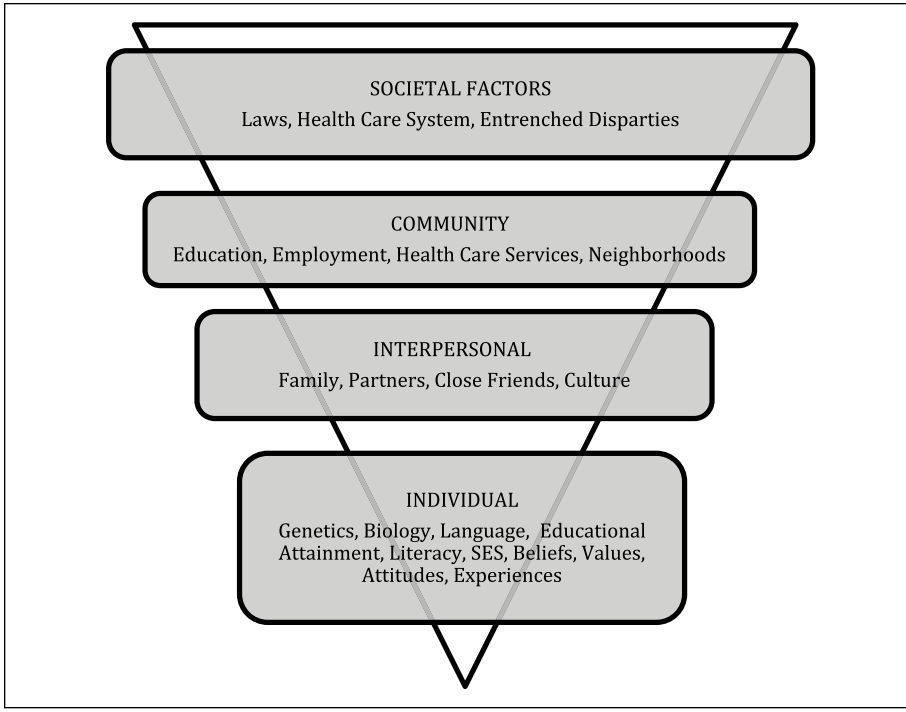


**Figure 1.** Social ecological model and individual health literacy.

which includes employment, education, health care services, and neighborhoods. Adults who are employed are more likely to afford insurance and medical care and interact more often with the health system (Driscoll & Bernstein, 2012). Formal and informal education help increase the acquisition, understanding, and use of health literacy skills. The most distal level of the SEM are societal factors and includes laws, the health care system itself, and entrenched disparities.

## Low-Skilled Adults and Type 2 Diabetes

This study focuses on clinic encounters between nurses and patients with type 2 diabetes (T2D). T2D is a chronic disease that affects almost 10% of the U.S. adult population with a total estimated cost of $245 billion in 2012 (Yang et al., 2013). Lack of adherence to self-care plans increases the likelihood of disease complications such as kidney failure, blindness, and disabling neuropathy (Inzuchhi et al., 2015). T2D self-management is complicated, involving daily blood sugar testing, medication, dietary restrictions, and exercise; communication between the provider and the patient is critical for patient understanding of and compliance with care plans (Powers et al., 2015). To increase adherence to T2D care plans, providers can increase education for patients,

build strong patient–provider relationships, and co-create treatment plans (Pillay et al., 2015; Powers et al., 2015).

A complication for many with T2D is low health literacy, a predictor of adverse health outcomes in chronic disease management (Gazmararian, Williams, Peel, & Baker, 2003; Schillinger et al., 2002). Understanding complex health information can be problematic for T2D patients with low health literacy due to low basic reading and numeracy skills (Baker, 2006; Kutner, Greenberg, Jin, & Paulsen, 2006). They may have trouble understanding and remembering oral information from encounters with health providers, especially when conversations are complex and involve dissimilar conversational domains like data gathering, education and counseling, new medication and testing information, and decision making (Schillinger et al., 2002). Patients can also have difficulty understanding a provider's words and intent due to heightened anxiety (Kutner et al., 2006).

Ongoing T2D care is provided by a team including endocrinologists, diabetes nurse educators, and podiatrists. In many settings, the diabetes nurse educator is responsible for making sure that the patient understands and can implement his or her self-care regimen. Many T2D patients have poor adherence to self-care plans due to communication barriers, which include having low literacy levels, understanding instructions, knowing how to describe symptoms, or communicating lifestyle concerns (Shahady, 2011; Skovlund & Peyrot, 2005). The nurse must understand biomedical and lifestyle/psychosocial issues and must have strong communication skills to gather information and educate/counsel patients of all literacy levels. Self-report studies indicate that effective and health-literate nurse communication can lead to patient behavior change; however, there is limited research that directly observes effective health-literate communication skills (Mulder, Lokhorst, Rutten, & van Woerkum, 2015). Although patient visits are dyadic communication experiences, in this study, we chose to focus specifically on providers because these visits are often driven by the provider who asks questions, collects information, and gives instructions (Cegala & Broz, 2003).

## Theoretical Framework

We look at individual health literacy and adult basic skills through two theoretical frameworks: experiential learning (EL) and instructional scaffolding (IS). Unlike cognitive perspectives that give precedence to information acquisition/recall and behavioral perspectives that do not include subjective experience in learning, EL is more holistic, combining a learner's experience, behavior, perception, and cognition in its approach (Kolb, 1984, chap. 2). IS, or the support given to students during the learning process at the student ability level, is largely based on the concept of the zone of proximal development (ZPD), a construct developed by Vygotsky (Beed, Hawkins, & Roller, 1991). ZPD is the area between what the learner can do and what can be achieved when an expert provides guidance.

The convergence of these theories creates a space in which individual experience and individualized learning become concretized. Much of EL research focuses on students learning from one another, cooperating with one another, and engaging in

semistructured real-world problems and situations (Fenwick, 2001; Merriam, Caffarella, & Baumgartner, 2007). The adult educator enables this kind of learning through facilitation and structure, which allows students to process, reflect, and apply their learning (Kolb, 1984, chap. 2; Merriam et al., 2007). IS provides support that helps the learner identify, understand, and practice new skills to move to a new level of expertise—that is, to move through the ZPD. Together, EL and IS provide a meaningful framework for adult educators and others who educate adults in various contexts by ensuring that adults reflect and learn from their prior experiences, learn new skills within or about that experience, and try what has been learned on the path to becoming more capable and independent (Fenwick, 2001; Merriam et al., 2007).

A significant strength of both EL and IS is their foundational elements that cross contexts, settings, and purposes. One such context is learning about how to take care of one's health in everyday and medical care situations, which directly connects both to learners' past real-life experiences and knowledge (EL) and to a need for support provided by those with more expertise (IS). By analyzing audiotaped clinic visits, we were interested in discovering if different dialogic components created facilitators or barriers to communication. Our research questions focused on the following:

1. What is the relationship between components of provider dialogue (closed-ended questions, open-ended questions, data gathering—biomedical, education/counseling—biomedical, data gathering—lifestyle/psychosocial, education and counseling—lifestyle/psychosocial, checking for understanding) and patient health literacy levels?
2. Are components of provider dialogue predictive of varying health literacy levels?

## Method

We received a secondary data set with audiotaped mp4 files corresponding to one clinic visit for each of 68 patient–nurse dyads: T2D patient ($n = 68$) and nurse ($n = 5$). The data set was part of a larger study performed in a diabetes clinic in a large southeastern city public hospital. The hospital and diabetes clinic provide services for primarily uninsured and underserved patients; virtually all have low socioeconomic status. Patients are overrepresented in subgroups for which low literacy is likely: elderly, minorities, those who did not complete high school, nonnative English speakers, and those living below the poverty line (Harvey, Regenstein, & Jones, 2004).

The secondary data set contained patient age, sex, educational attainment, and health literacy score. Health literacy was measured using the Rapid Estimate of Adult Literacy in Medicine (REALM), a 66-word reading list of medical terms that is a screening tool to assist providers in identifying patients with limited reading skills (Davis et al., 1993). The word list begins with "fat" and includes words like "pregnancy," "antibiotics," and "osteoporosis," ending with the word "impetigo." Scores range from 0 to 18 (third-grade or below reading level), 19 to 44 (fourth- to sixth-grade reading level), 45 to 60 (seventh- to eighth-grade reading level), and 61 to 66 (high school and above reading level).

## Medical Coding Dialogue

Audio records of clinic visits were coded using the Roter Interaction Analysis System (RIAS). RIAS codes medical dialogue directly from audiotapes rather than from written transcription. This systematic coding is characterized by high reliability and consistency when performed by trained coders (Pearson correlations of random coder dyads in double-blind coding generally average between .80 and 1.0 for patient and physician categories); RIAS studies have demonstrated high levels of both predictive and concurrent validity (Roter, 2015). Used widely in the United States and internationally, the system provides access to both psychosocial and task-oriented components of patient and provider dialogue by analyzing dialogue components (Roter & Halll, 1998). Working directly from the spoken record, RIAS coders look at both task-oriented information (data gathering and education/counseling) and affective behaviors (rapport and responsiveness, activation, and partnership building) and code these categories and related subcategories as continuous scales. We analyzed the following RIAS coded dialogue components.

*Closed-Ended Questions (CLOSED).* Closed-ended questions can be answered by either yes or no or with a specific piece of information. They are provider-centric, are part of information gathering and help the provider maintain control of the office visit (Roter, 2011; Roter & Hall, 1998; Salmon & Young, 2011). Closed-ended questions provide simplistic responses to what might be complex issues. An example is "Did you bring your medicine list with you today?"

*Open-Ended Questions (OPEN).* Open-ended questions encourage fuller answers by engaging respondent's knowledge and feelings. Answers could be in list format, a few words, or a few sentences. This question type is part of information gathering, but it is patient-centric and can change the course of the office visit (Roter, 2011; Roter & Hall, 1998; Salmon & Young, 2011). Open-ended questions allow for more complex answers than closed-ended questions. An example is "What are you planning to do when you leave the doctor's office today?"

*Data Gathering—Biomedical (DG/BIO).* These could be closed- or open-ended questions that collect information from patients relating to medications, diagnostic tests, visits with other health providers, or other therapeutic concerns. An example is "Can you tell me how many times a day you are taking your insulin?"

*Education and Counseling—Biomedical (EC/BIO).* These are statements that provide information to patients relating to medications, diagnostic tests, visits with other health providers, or other therapeutic concerns. An example is "Your lab results show a decreased blood sugar level."

*Data Gathering—Lifestyle/Psychosocial (DG/LP).* These could be closed- or open-ended questions that collect information from patients relating to diet, exercise, emotional

status, or home environment. An example is "How are you able to maintain your diet when your family visits for the holidays?"

*Education and Counseling—Lifestyle/Psychosocial (EC/LP).* These are statements that provide information to patients relating to diet, exercise, emotional status, or home environment. An example is "You need to walk outside for 20 minutes every day."

*Checking for Understanding (CK/U).* These are either questions or statements that allow the provider to ensure that the patient understands what he or she is saying. The provider could ask or check to make sure that the patient understood what was said, and could also ask the patient to repeat his or her understanding. An example is "When you get home, what will you tell your husband about your new medicines that we just discussed?"

### Analysis

We used SPSS Version 22.0 (IBM, 2013) for data management and correlations; SPSS does not have the capability to run quantile regression analyses, so we used SAS Version 9.4 (SAS Institute, 2013). We examined the data set for outliers, skewness, and kurtosis. Across seven predictors and the REALM outcome variable, 27 outliers were identified and brought to the boundaries of ±2 interquartile ranges. All skew and kurtosis estimates fell within a reasonable range (±2). We used standardized continuous variables for all predictors and the health literacy outcome measure.

We analyzed varying health literacy levels using quantile regression, which is a direct extension of linear regression to investigate the relations of predictor(s) along the continuum of an outcome variable (Koenker, 2005). This analysis generates multiple researcher-determined slope estimates along the outcome distribution. We chose .2, .5, and .8 quantiles to represent lower, midrange, and higher health literacy levels, respectively. For each quantile, an asymmetric weighting system is applied in which all data points are considered based on their distance from the respective researcher-determined quantile. Thus, we do not reduce sample size and power when generating slope estimates at three quantile levels (.2, .5, and .8).

## Results

As indicated in Table 1, patients were predominantly female (66%) with a mean age of 53.1 years (standard deviation [*SD*] = 9.3). A majority had a high school diploma or more (62%). Average REALM score was 56 (*SD* = 10.8), indicating a mean score of seventh- to eighth-grade reading equivalency. A series of *t* tests revealed no significant mean differences between males and females on health literacy or any of our seven components of provider dialogue predictors ($p > .05$). Similarly, no significant differences were observed between participants with less than a high school diploma versus participants with a high school diploma or more advanced education on health literacy or components of provider dialogue predictors ($p > .05$).

**Table 1.** Descriptive Patient Demographics and Health Literacy Characteristics.

| Patient demographics | *N* | Percentage | Range | Mean (*SD*) |
|---|---|---|---|---|
| Age | 68 | | 23-72 years | 53.1 (9.3) |
| Sex | | | | |
| Female | 45 | 66.2 | | |
| Male | 23 | 33.8 | | |
| Education | | | | |
| No high school diploma | 26 | 38.2 | | |
| High school diploma/college | 42 | 61.8 | | |
| REALM score | 68 | | 33-66 | 56.3 (10.8) |

*Note.* *SD* = standard deviation; REALM = Rapid Estimate of Adult Literacy in Medicine.

**Table 2.** Bivariate Correlations Between Health Literacy Score and Components of Provider Dialogue.

| | HLScore | CLOSED | OPEN | DG/BIO | DG/LP | EC/BIO | EC/LP | CK/U |
|---|---|---|---|---|---|---|---|---|
| HLScore | — | −.398** | −.104 | −.335** | −.211* | −.250* | −.141 | −.039 |
| CLOSD | | — | .346** | .923** | .394** | .489** | .358** | .142 |
| OPEN | | | — | .447** | .603** | −.030 | .153 | .107 |
| DG/BIO | | | | — | .165 | .504** | .238 | .144 |
| DG/LP | | | | | — | −.108 | .333** | .064 |
| EC/BIO | | | | | | — | .243* | .251* |
| EC/LP | | | | | | | — | .259* |
| CK/U | | | | | | | | — |

*Note.* HLScore = Health Literacy Score; CLOSED = closed-ended questions; OPEN = open-ended questions; DG/BIO = data gathering—biomedical; DG/LP = data gathering—lifestyle/psychosocial; EC/BIO = education and counseling—biomedical; EC/LP = education and counseling—lifestyle/psychosocial; CK/U = check for understanding.
*Correlation is significant at the .05 level, two-tailed. **Correlation is significant at the .01 level, two-tailed.

Results for Research Question 1 are presented in Table 2. All correlations between health literacy score and components of provider dialogue were negative. There were significant low to moderate negative correlations between health literacy and closed-ended questions: $r = -.398$; data gathering biomedical $r = -.335$; data gathering lifestyle/psychosocial $r = -.211$; and education and counseling biomedical $r = -.250$. No significant correlations were found between health literacy scores and open-ended questions, education and counseling lifestyle/psychosocial, and checking for understanding. These results suggest that lower health literacy levels are associated with being asked more closed-ended questions and being asked for more biomedical and lifestyle/psychosocial information. Providers did not check for understanding with patients at any health literacy level.

**Table 3.** Quantile Regression Models of Medical Communication Variables on Health Literacy Levels.

| | | | | | 95% CI | | | |
|---|---|---|---|---|---|---|---|---|
| Model | Quantile | Parameter | Estimate | SE | LB | UB | *t* | *p* |
| CLOSED | QR-20 | Intercept | −0.76 | 0.37 | −1.51 | −0.01 | −2.02 | .047 |
| | | All closed | −0.69 | 0.24 | −1.17 | −0.21 | −2.99 | .005* |
| | QR-50 | Intercept | 0.22 | 0.14 | −0.06 | 0.51 | 1.56 | .123 |
| | | All closed | −0.38 | 0.11 | −0.60 | −0.15 | −3.33 | .002* |
| | QR-80 | Intercept | 0.79 | 0.06 | 0.67 | 0.91 | 13.34 | <.001 |
| | | All closed | −0.14 | 0.11 | −0.36 | 0.07 | −1.34 | .185 |
| DG/BIO | QR-20 | Intercept | −0.68 | 0.45 | −1.58 | 0.21 | −1.52 | .133 |
| | | Biomedical | −0.58 | 0.26 | −1.10 | −0.07 | −2.28 | .026* |
| | QR-50 | Intercept | 0.26 | 0.11 | 0.04 | 0.48 | 2.35 | .022 |
| | | Biomedical | −0.37 | 0.12 | −0.62 | −0.12 | −2.97 | .004* |
| | QR-80 | Intercept | 0.80 | 0.07 | 0.66 | 0.95 | 10.99 | <.001 |
| | | Biomedical | −0.16 | 0.16 | −0.48 | 0.16 | −1.00 | .321 |
| DG/LP | QR-20 | Intercept | −0.83 | 0.38 | −1.58 | −0.08 | −2.21 | .031 |
| | | Psychosocial | −0.60 | 0.30 | −1.19 | −0.01 | −2.01 | .049* |
| | QR-50 | Intercept | 0.31 | 0.17 | −0.02 | 0.64 | 1.86 | .013 |
| | | Psychosocial | −0.34 | 0.13 | −0.60 | −0.07 | −2.55 | .314 |
| | QR-80 | Intercept | 0.82 | 0.04 | 0.74 | 0.91 | 18.55 | <.001 |
| | | Psychosocial | −0.08 | 0.07 | −0.22 | 0.06 | −1.14 | .259 |

*Note*: CI = confidence interval; SE = standard error; LB = lower bound; UB = upper bound; QR-20 = quantile regression at the .20 quantile; QR-50 = quantile regression at the .50 quantile; QR-80 = quantile regression at the .80 quantile; CLOSED = closed-ended questions; DG/BIO = data gathering—biomedical; DG/LP = data gathering—lifestyle/psychosocial.

To answer the second research question, we conducted separate quantile regression analyses for each of our seven predictors with health literacy levels as the outcome of each model. Of our original seven predictors, only three (CLOSED, DG/BIO, and DG/LP) emerged as significantly predictive of health literacy levels for at least one of our three identified quantiles (see Table 3 for regression estimates and significance values by quantile for these three predictors). There were significant, strong negative relations of CLOSED, DG/BIO, and DG/LP (βs = −.69, −.58, and −.60, respectively) for patients scoring at lower health literacy levels (.2 quantile). There were significant, moderate negative relations for CLOSED and DG/BIO (βs = −.38 and −.37, respectively) for patients with midrange health literacy levels (.5 quantile).

There were no significant differences in the predictive utility of CLOSED and DG/BIO for patients with lower health literacy levels (.2) compared with midrange health literacy levels (.5): pseudo-$F(1, 131) = 1.13$, $p = .290$; pseudo-$F(1, 131) = 0.52$, $p = .471$, respectively. In addition, there were no significant relations found for patients with higher health literacy levels (.8 quantile) for any of our predictors. This

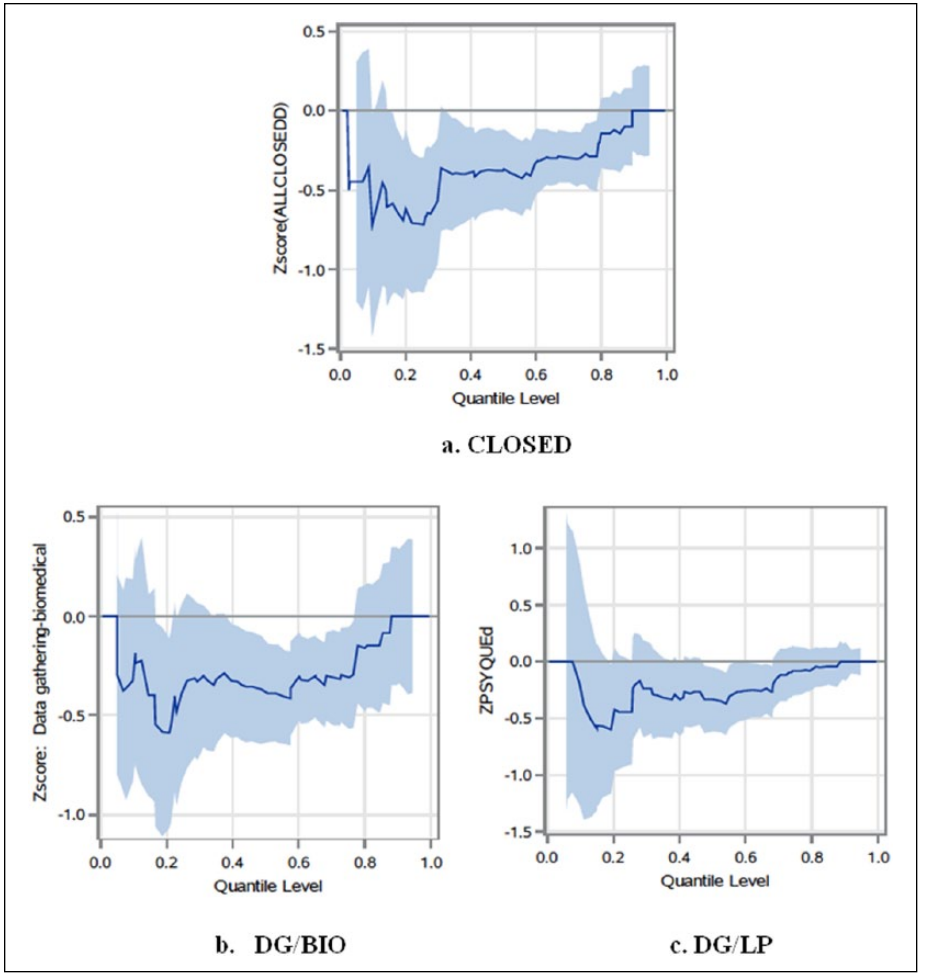


**Figure 2.** Quantile process plots: three medical communication variables to health literacy levels.

trend can also be seen from the quantile processes plots (Figure 2) in which the three predictors exhibited negative relations with health literacy levels at lower to mid-range quantiles (.2, .5) and virtually no relation at higher levels of health literacy (.8 quantile). These findings indicate that nurse providers asked more closed-ended questions and more data gathering questions (both biomedical and lifestyle/psycho-social) from patients with lower and midrange health literacy levels than those with higher health literacy levels; thus, closed-ended questions and information gathering are dialogue components that may be predictive of the lowest level of patient health literacy.

## Discussion

We were interested in exploring whether health providers used different kinds of dialogue components with patients at different health literacy levels. Our results indicate that providers used closed-ended questions and data gathering more often with patients at the lowest and mid-range health literacy levels. Closed-ended questions and data gathering limit the amount and type of information that patients provide in response, including feelings and beliefs, and can inhibit understanding of and compliance with care plans (Goss, Rossi, & Moretti, 2011). Data gathering also places the provider in a more powerful role, and patients may be more submissive and not comfortable asking questions or engaging in conversation (Goodyear-Smith & Buetow, 2001). Patients with low health literacy may need more robust, interactive dialogue to become engaged in their health care; closed-ended questions and data gathering create very little dialogue between the patient and the provider. A more experiential, interactive, and scaffolded approach to patient encounters by incorporating EL and IS techniques into dialogue with patients may increase engagement and participation which are thought to be keys to improving health outcomes (Green, Hibbard, Sacks, Overton, & Parrotta, 2014). We consider implications in the medical setting, adult education classroom, and community health organizations.

### *The Medical Setting*

Approximately 19,500 new physicians graduate every year from 150 accredited U.S. medical schools (American Association of Medical Colleges, 2018); in addition, there are approximately 3.8 million practicing licensed practical nurses (LPNs), registered nurses (RNs), and pharmacists (Bureau of Labor Statistics, 2017a, 2017b). These professionals, along with other allied health care professionals (e.g., physical therapists, certified nursing assistants, pharmacy techs), are primary sources of health care and health information, yet there is little systematic health literacy training in their curricula. In most curricula, health literacy is not taught as a stand-alone class; however, communication skills may be integrated into classroom and practical experiences (Koh, Garcia, & Alvarez, 2014).

Based on our results, patients with lower and midrange health literacy may need interactive education and counseling to be engaged in building partnerships with their health provider and in co-creating self-care plans. A shift to interactive patient participation means that patients ask more questions, request clarification, voice concerns, and share in decision making, and providers have opportunities to use IS techniques to scaffold learning for patients. Dialogue surrounding lifestyle and psychosocial issues is important for patient-centered care because it affirms the construct of understanding; respects patients' perceptions, preferences, and concerns; and takes into consideration patients' individual experiences as described by EL.

Health providers must also ensure that patients understand what is being shared with them. One method of ensuring patient understanding is teach-back, a process where the health provider asks the patient to explain in his or her own words what the

provider said (Cegala & Broz, 2003). The provider should make sure that the patient does not think that he or she is being tested; rather, the reason for patient repetition is to make sure that the provider communicated clearly. Teach-back is evidence based and promotes patient adherence and safety and should always be used regardless of patient literacy level. An outstanding source of teach-back training can be found at http://www.teachbacktraining.org/.

## *The Adult Education Classroom*

Health is a crucial life topic that can be integrated into adult literacy classrooms through an organized health education curriculum or by students who have questions about disease, health behaviors, or access to health care. Introducing health into the curriculum can be transformative as adult students become active learners in the context of their own lives, a key construct of EL (Dirkx, 1998; Hohn, 1998). The topic of health provides motivation for literacy development, which furthers perceptions of both self and others (Hohn, 1998). Teacher guidance and scaffolding through IS and EL techniques can introduce new information as well as help students reflect on their own experiences.

Adult literacy classrooms are particularly important settings to discuss health because adults with low literacy skills are more likely than others to have low health literacy and have difficulty accessing, understanding, and using health information (Olshansky et al., 2012). In addition to learning about health terminology, promoting health behaviors, and learning about access to care, adults with low health literacy can also benefit from learning how to ask questions of their health providers, which questions to ask, and how to best advocate for their health needs (McCaffery et al., 2010). Adults with actionable plans, practice in using those plans, and greater self-confidence in their abilities may have more success in creating dialogue with health providers, thus increasing their health literacy skills.

Based on what our results showed in terms of how patients were talked to, adult learners may have difficulty engaging in meaningful, patient-centered conversation; at the lowest and mid-range health literacy levels, they are unlikely to ask questions, seek information, or understand medical/clinical terms. Educators often have the trust of their students, are in a sustained teaching environment, can integrate health literacy content into basic skills development, and can help students draw on and learn from their prior experiences with content meaningful to their own lives; they are the experts who scaffold health-related learning for adult students.

Educators can create skills-based and experiential opportunities to engage in robust and interactive dialogue about health and health care, and through appropriate scaffolding techniques, they can help students build skills and confidence in accessing, understanding, and using health information. Teachers can explain the importance of providing complete answers in a variety of contexts and can then practice with students to help them add appropriate information when answering closed-ended questions that students may have faced in the past. For example, when a provider asks, “Did you bring your medication list with you?” the student can practice saying “no,

but I did bring all of my medicine bottles with me today" instead of just saying "no." Students can also learn how to describe symptoms and behaviors when answering open-ended questions; teachers can focus on the reading, writing, and math skills required to describe symptoms and behaviors by working with genuine documents such as health history forms and health education booklets. Communication skills can be practiced by performing role-playing in the classroom and can focus on asking for clarity and using descriptive vocabulary (Soricone, Rudd, Santos, & Capistrant, 2007). There are a variety of skills needed to keep accurate and complete records, including making notes of changes in symptoms, keeping time-sequenced records, following numerical-based directions, and understanding how to use and record measurement scales. Experiential classroom activities to enhance these skills could include learning about "before and after," charting a sequence of events, reading medication labels, explaining instructions to someone else, and keeping a daily diary of some event (Soricon et al., 2007). Students can learn to become excellent partners in their health care by learning from authentic, meaningful teaching materials that are incorporated into a skills-based adult education curriculum. Two examples of resources for educators are Health Literacy in Adult Basic Education (ABE; https://cdn1.sph.harvard.edu/wp-content/uploads/sites/135/2012/09/healthliteracyinadulteducation.pdf) and the Florida Health Literacy Initiative (http://www.floridaliteracy.org/health_literacy_curriculum.html). Both resources can help adult educators think through complex and varied health topics as well as the diverse needs of their students in designing a skills-based and scaffolded approach to teaching health in the adult literacy classroom.

### *Community Health Organizations*

Health advocacy and promotion organizations can inform and empower by considering how literacy directly and indirectly affects health. Low literacy has a direct effect on health through lack of scientific knowledge, inability to read or understand instructions, less knowledge about preventive behaviors and disease states, and less adherence to medication and discharge instructions (Paasche-Orlow & Wolf, 2007). Indirect effects of low literacy include lower economic and social opportunities and resources, poor living and working conditions in homes and communities, and high levels of stress (Braveman, Egerter, & Williams, 2011). Understanding literacy needs within a community is foundational to creating an action plan to decrease health disparities. An example of a community's effort to understand how literacy affects health and to develop a collaborative action plan is http://en.copian.ca/library/research/takngoff/takngoff.pdf (Gillis & Quigley, 2004).

Increasing health literacy not only leads to a healthier community but also decreases health disparities. Health disparities are a type of health difference closely linked with economic, social, and/or environmental disadvantage (Braveman et al., 2011). Improving health literacy through community-wide efforts may be an important step on the pathway to reducing health disparities (Braveman et al., 2011; Prins & Mooney, 2014). Health literacy may play an important role in health disparities either because a population may have poorer health literacy (e.g., low income or low educational

status) or because a population has greater health care needs (e.g., elderly, people with disabilities) and greater demands to be health literate.

### *A Collaborative Effort*

Collaboration between health providers, adult education programs, and community health organizations may help adults with low literacy learn the skills and knowledge necessary to improve their own or their family's health and health care. The ABE system serves approximately 1.8 million low-skilled adults; language, reading, writing, math, and technology skills are part of ABE system curricula, and these can also play a critical role in accessing, understanding, and using health information (U.S. Department of Education, 2014). However, health-contextualized basic skills classes are generally not part of the ABE system due to legislation, funding, or program implementation (Bennett et al., 2017). Since many community health organizations serve the same population as health providers and ABE programs do, partnerships between these entities could bring valuable expertise from different venues to a hard-to-reach population with both literacy needs and health needs. Health providers bring much needed services and care; ABE programs bring teaching experience, sustained educational environments, and student trust; and community health programs bring content expertise and connections to health services and health education. Collaborative efforts can help low-skilled adults increase their basic skills, health literacy skills, and confidence in using the medical system and can eventually lead to better health outcomes and a healthier community.

## Limitations and Areas for Future Study

One limitation was the small sample size of audio recordings ($n = 68$). Furthermore, we do not know how the patients were sampled to participate in the original study; generalizability of results may be affected by both sample size and potential convenience sampling. All patients in our sample had T2D, and results may not generalize to the entire population or populations with other diseases. Another potential limitation was the Hawthorne effect, where knowledge of participating in the study may have affected the communication patterns of the provider and/or the patient being observed. Nonverbal behaviors, which could affect communication patterns, were also not observed. In addition, we did not analyze patient responses to either open- or closed-ended questions. Finally, we utilized one coding methodology and did not cross-code to determine the validity of that coding methodology.

A future area of research could be within the framework of a corpus-based study of health discourse, an emerging and exploratory research process that would allow for both qualitative and quantitative analysis (Cortes, 2015). Opportunities to develop interventions could result from understanding the openness of each individual conversation or understanding how grammatical speech functions (e.g., use of first- and second-person pronouns) affect individual agency in conversation (Connor et al., 2012). It would be valuable to profile patients by adherence to their medication and discharge instructions

to understand if patient or provider speech patterns affect adherence. Additional research could focus on how the use of electronic medical records in the exam room may have an effect on patient–provider interactions. Finally, creating and testing collaborative efforts between community partners can help us understand how to better leverage resources and support for adults with low basic skills. Research studies such as the one described here will help us understand how to better facilitate health communication, which can lead to better health through better health care at lower costs.

## Authors' Note

This study has been presented at the Wisconsin Health Literacy Summit, Madison, Wisconsin, in April 2017. Poster title: *Patient Centeredness and Health Outcomes in a Low-Health Literate Population.*

## Acknowledgments

Thanks to Dr. David Ziemer, Emory School of Medicine, and the research staff of the Grady Diabetes Center for providing the secondary data and audio files for this study.

## 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) received no financial support for the research, authorship, and/or publication of this article.

## References

American Association of Medical Colleges. (2018). *Table B-2.2: Total graduates by U.S. Medical School and Sex, 2012-2013 through 2016-2017*. Retrieved from https://www.aamc.org/download/321532/data/factstableb2-2.pdf

Andrulis, D., & Brach, C. (2007). Integrating literacy, culture, and language to improve health care quality for diverse populations. *American Journal of Health Behavior, 31*(Suppl. 1), S122-S133.

Baker, D. (2006). The meaning and the measure of health literacy. *Journal of General Internal Medicine*, *21*, 878-883.

Beed, P., Hawkins, M., & Roller, C. (1991). Moving learners towards independence: The power of scaffolded instruction. *The Reading Teacher*, *44*, 648–655.

Bennett, I., Feinberg, I., Hohn, M., Kersetn, E., Rosen, D., & Santos, M. (2017). *Why healthy communities need adult basic skills education*. Retrieved from http://www.opendoorcollective.org/why-healthy-communities-need-adult-basic-skills-education.html

Berkman, N., Sheridan, S., Donahue, K., Halpern, D., & Crotty, K. (2011). Low health literacy and health outcomes: An updated systematic review. *Annals of Internal Medicine*, *155*, 97-107.

Braveman, P., Egerter, S., & Williams, D. (2011). The social determinants of health: Coming of age. *Annual Review of Public Health*, *32*, 381-398.

Bureau of Labor Statistics. (2017a). *Licensed practical and licensed vocational nurses*. Retrieved from https://www.bls.gov/ooh/healthcare/licensed-practical-and-licensed-vocational-nurses.htm

Bureau of Labor Statistics. (2017b). *Pharmacists*. Retrieved from https://www.bls.gov/ooh/healthcare/pharmacists.htm

Cegala, D., & Broz, S. (2003). Provider and patient communication skills training. In T. L. Thompson, A. M. Dorsey, K. I. Miller, R. Parrott, T. L. Thompson, A. M. Dorsey, . . . R. Parrott (Eds.), *Handbook of health communication* (pp. 95-119). Mahwah, NJ: Lawrence Erlbaum.

Connor, U., Anton, M., Goering, E., Lauten, K., Hayat, A., Roach, P., & Balunda, S. (2012). Listening to patients' voices: Linguistic indicators related to diabetes self-management. *Communication & Medicine*, *9*, 1-12.

Cortes, V. (2015). Using corpus-based analytical methods to study patient talk. In M. Anton & E. Goering (Eds.), *Understanding patient' voices* (pp. 51-70). Amsterdam, Netherlands: John Benjamins.

Davis, T., Long, S., Jackson, R., Mayeaux, E., George, R., Murphy, P., & Crouch, M. (1993). Rapid Estimate of Adult Literacy in Medicine: A shortened screening instrument. *Family Medicine*, *2*, 391-395.

DeWalt, D., Berkman, N., Sheridan, S., Lohr, K., & Pignone, M. (2004). Literacy and health outcomes: A systematic review of the literature. *Journal of General Internal Medicine*, *19*, 1228-1239.

Dirkx, J. (1998). Transformative learning theory in the practice of adult education: An overview. *PAACE Journal of Lifelong Learning*, *7*, 1-14.

Driscoll, A., & Bernstein, A. (2012). *Health and access to care among employed and unemployed adults, United States, 2009-2010* (NCHS Data Brief No. 83). Hyattsville, MD: National Center for Health Statistics.

Epstein, R., Franks, P., Fiscella, K., Shields, C., Meldrum, S., Kravitz, R., & Duberstein, P. (2005). Measuring patient-centered communication in patient–physician consultations: Theoretical and practical issues. *Social Science & Medicine*, *61*, 1516-1528.

Fagerlin, A., Zikmund-Fisher, B., & Ubel, P. (2011). Helping patients decide: Ten steps to better risk communication. *Journal of the National Cancer Institute*, *103*, 1436-1443.

Fenwick, T. (2001). *Experiential learning: A theoretical critique from five perspectives* (Information Series No. 385). Columbus, OH: ERIC Clearinghouse on Adult, Career, and Vocational Education, Center of Education and Training for Employment.

Gazmararian, J., Williams, M., Peel, J., & Baker, D. (2003). Health literacy and knowledge of chronic disease. *Patient Education and Counseling*, *51*, 267-275.

Gillis, D., & Quigley, A. (2004). *Taking off the blindfold: Seeing how literacy affects health* (A Report of the Health Literacy in Rural Nova Scotia Research Project). Antigonish, Nova Scotia, Canada: St. Francis Xavier University.

Goodyear-Smith, F., & Buetow, S. (2001). Power issues in the doctor-patient relationship. *Health Care Analysis*, *9*, 449-462.

Goss, C., Rossi, A., & Moretti, F. (2011) Assessment stage: Data gathering and structuring the interview. In M. Rimondini (Ed.), *Communication in cognitive behavioral therapy* (pp. 25-51). Springer Science + Business Media.

Green, J., Hibbard, J., Sacks, R., Overton, V., & Parrotta, C. (2014). When patient activation levels change, health outcomes and costs change, too. *Health Affairs*, *34*, 431-437. doi:10.1377/hlthaff.2014.0452

Harvey, J., Regenstein, M., & Jones, K. (2004). *An assessment of the safety net in Atlanta, Georgia*. Washington, DC: George Washington University Medical Center, School of Public Health and Human Services.

Hohn, M. (1998). *Empowerment health education in adult literacy: A guide for public health and adult literacy practitioners, policy makers, and funders*. Washington, DC: National Institute for Literacy.

IBM Corp. (2013). PASW statistics for windows (Version 22.0). Armonk, NY: Author.

Institute of Medicine. (2004). *Health literacy: A prescription to end confusion*. Washington, DC: Institute of Medicine, Board on Neuroscience and Behavioral Health, Committee on Health Literacy.

Inzuchhi, E., Bergenstal, R., Buse, J., Diamant, M., Ferrannini, E., Nauck, M., . . . Matthews, D. (2015). Management of hyperglycemia in type 2 diabetes, 2015: A patient-centered approach: Update to a position statement of the American Diabetes Association and the European Association for the Study of Diabetes. *Diabetes Care*, *38*, 140-149.

Ishikawa, H., & Yano, E. (2008). Patient health literacy and participation in the health-care process. *Health Expectations: An International Journal of Public Participation in Health Care & Health Policy*, *11*, 113-122.

Keeble, W., & Cobbe, S. (2002). Patient recall of medication details in the outpatient clinic. *Postgraduate Medical Journal*, *78*, 479-482.

Koenker, R. (2005). *Quantile regression*. Cambridge, England: Cambridge University Press.

Koh, H., Gracia, J., & Alvarez, M. (2014). Culturally and linguistically appropriate services: Advancing health with CLAS. *New England Journal of Medicine*, *371*, 198-201.

Kolb, D. (1984). The process of experiential learning. In *Experiential learning: Experience as the source of learning and development* (pp. 20-38). Englewood Cliffs, NJ: Prentice Hall.

Kutner, M., Greenberg, E., Jin, Y., & Paulsen, C. (2006). *The health literacy of America's adults: Results from the 2003 national assessment of adult literacy* (NCES 2006-483). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Ley, P. (1989). Improving patients' understanding, recall, satisfaction and compliance. In A. K. Broome (Eds.), *Health psychology: Processes and applications* (pp. 74-102). Boston, MA: Springer.

McCaffery, K., Smith, S., & Wolf, M. (2010). The challenge of shared decision making among patients with lower literacy: A framework for research and development. *Medical Decision Making*, *30*, 35-44.

McCray, A. (2005). Promoting health literacy. *Journal of the American Medical Informatics Association*, *12*, 152-163.

Merriam, S., Caffarella, R., & Baumgartner, L. (2007). *Learning in adulthood: A comprehensive guide* (3rd ed.). San Francisco, CA: Jossey-Bass.

Mulder, B., Lokhorst, A., Rutten, G., & van Woerkum, C. (2015). Effective nurse communication with type 2 diabetes patients: A review. *Western Journal of Nursing Research*, *37*, 1100-1131.

Olshansky, S., Antonucci, T., Berkman, L., Binstock, R., Boersch-Supan, A., Cacioppo, J., . . . Rowe, J. (2012). Challenges facing the safety net. *Health Affairs*, *31*, 1803-1813.

Paasche-Orlow, M., & Wolf, M. (2007). The causal pathways linking health literacy to health outcomes. *American Journal of Health Behavior, 31*(Suppl. 1), 19-26.

Parnell, T. (2014). Nursing leadership strategies, health literacy, and patient outcomes. *Nurse Leader*, *12*(6), 49-52.

Pillay, J., Armstrong, M., Butalia, S., Donovan, L., Sigal, R., Vandermeer, B., . . . Dryden, D. (2015). Behavioral programs for type 2 diabetes mellitus: A systematic review and network meta-analysis. *Annals of Internal Medicine*, *163*, 848-860.

Powers, M., Bardsley, J., Cypress, M., Duker, P., Funnell, M., Fischl, A., . . . Vivian, E. (2015). Diabetes self-management education and support in type 2 diabetes: A joint position statement of the American Diabetes Association, the American Association of Diabetes Educators, and the Academy of Nutrition and Dietetics. *Diabetes Care*, *38*, 1372-1382.

Prins, E., & Mooney, A. (2014). Literacy and health disparities. In J. Collins, L. Bryant, & T. Rocco (Eds.), *Health and wellness concerns for racial, ethnic and sexual minorities: New directions for adult and continuing education* (No. 142). San Francisco, CA: Jossey-Bass.

Roter, D. (2011). Oral literacy demand of health care communication: Challenges and solutions. *Nursing Outlook*, *59*, 79-84.

Roter, D. (2015). *The Roter Interaction Analysis System (RIAS) Coding Manual (Simplified Version, 2015)*. Baltimore, MD: Johns Hopkins University Press.

Roter, D., & Hall, J. (1998). Studies of doctor–patient interaction. *Annual Review of Public Health*, *10*, 163-180.

Salmon, P., & Young, B. (2011). Creativity in clinical communication: From communication skills to skilled communication. *Medical Education*, *45*, 217-226.

SAS Institute. (2013). SAS software (Version 9.4). Cary, NC: Author.

Schillinger, D., Grumbach, K., Piette, J., Wang, F., Osmond, D., Daher, C., . . . Bindman, A. (2002). Association of health literacy with diabetes outcomes. *JAMA Journal of the American Medical Association*, *288*, 475-482.

Schulman-Green, D., Jaser, S., Martin, F., Alonzo, A., Grey, M., McCorkle, R., . . . Whittemore, R. (2012). Processes of self-management in chronic illness. *Journal of Nursing Scholarship*, *44*, 136-144.

Shahady, E. (2011). Barriers to effective diabetes care: How to recognize and overcome. *Consultant 360*. Retrieved from http://www.consultant360.com/content/barriers-effective-diabetes-care-how-recognize-and-overcome

Skovlund, S.E., & Peyrot, M. (on behalf of the DAWN International Advisory Panel). (2005). The Diabetes Attitudes, Wishes, and Needs (DAWN) program: A new approach to improving outcomes of diabetes care. *Diabetes Spectrum*, *18*, 136-142.

Soricone, L., Rudd, R., Santos, M., & Capistrant, B. (2007). *Health literacy in adult basic education: Designing lessons, units, and evaluation plans for an integrated curriculum*. Retrieved from https://cdn1.sph.harvard.edu/wp-content/uploads/sites/135/2012/09/health-literacyinadulteducation.pdf

Street, R., Gordon, H., Ward, M., Krupat, E., & Kravitz, R. (2005). Patient participation in medical consultations: Why some patients are more involved than others. *Medical Care*, *43*, 960-969.

U.S. Department of Education, Office of Career, Technical and Adult Education. (2014). *Adult education—basic grants to states*. Retrieved from http://www2.ed.gov/programs/adulted-basic/index.html?exp=0

Yang, W., Dall, T., Halder, P., Gallo, P., Kowal, S., & Hogan, P. (2013). Economic costs of diabetes in the U.S. in 2012. *Diabetes Care*, *36*, 1033-1046. doi:10.2337/dc12-2625

## Author Biographies

**Iris Feinberg**, PhD is the associate director of the Adult Literacy Research Center at Georgia State University (GSU). Her primary research concentrates on spoken health communication between health consumers and health providers.

**Elizabeth L. Tighe**, PhD is an assistant professor of developmental psychology at GSU. She is also the assistant director of the Adult Literacy Research Center as well as affiliated faculty with the Language and Literacy Initiative at GSU. Her primary research focuses on understanding the challenges and instructional and assessment needs of struggling adult readers enrolled in literacy programs.

**Daphne Greenberg**, PhD is a distinguished university professor in the educational psychology program at GSU and is the director of the Adult Literacy Research Center. Her area of expertise focuses on adults who read below the high school level.

**Michelle Mavreles**, MPH is a research coordinator at GSU for the Adult Literacy Research Center. Her focus is examining the utilization of health infomation and health communication between doctors and patients.