

## Oral Session I: Monday 11:00am

**Assessing End-of-Life Preferences for Advanced Dementia in Rural Patients Using an Educational Video: A Randomized Controlled Trial.** Volandes, Angelo<sup>1</sup>; Ferguson, Laurie-Anne<sup>2</sup>; Paasche-Orlow, Michael<sup>3</sup>. <sup>1</sup>Massachusetts General Hospital, Boston, MA. <sup>2</sup>University of Texas Health Science Center, Houston, TX. <sup>3</sup>Boston University School of Medicine, Boston, MA.

### Background

Few studies have evaluated the end-of-life preferences of elderly patients in rural communities, and whether preferences are associated with level of health literacy. We conducted a randomized controlled trial of a goals-of-care video decision aid of advanced dementia to explore end-of-life preferences in elderly subjects ( $\geq 65$ ) at a primary care clinic in rural Louisiana.

### Methods

Half of subjects heard a verbal description of advanced dementia and the goals of care; the other half heard the same verbal description and then viewed the video decision aid. End points were the preferred goal of care in advanced dementia: life-prolonging care (CPR, etc.), limited care (hospitalization but not CPR), or, comfort care (symptom relief). The principal category for analysis was the difference in proportions of subjects preferring comfort care for each characteristic including randomization group and health literacy level.

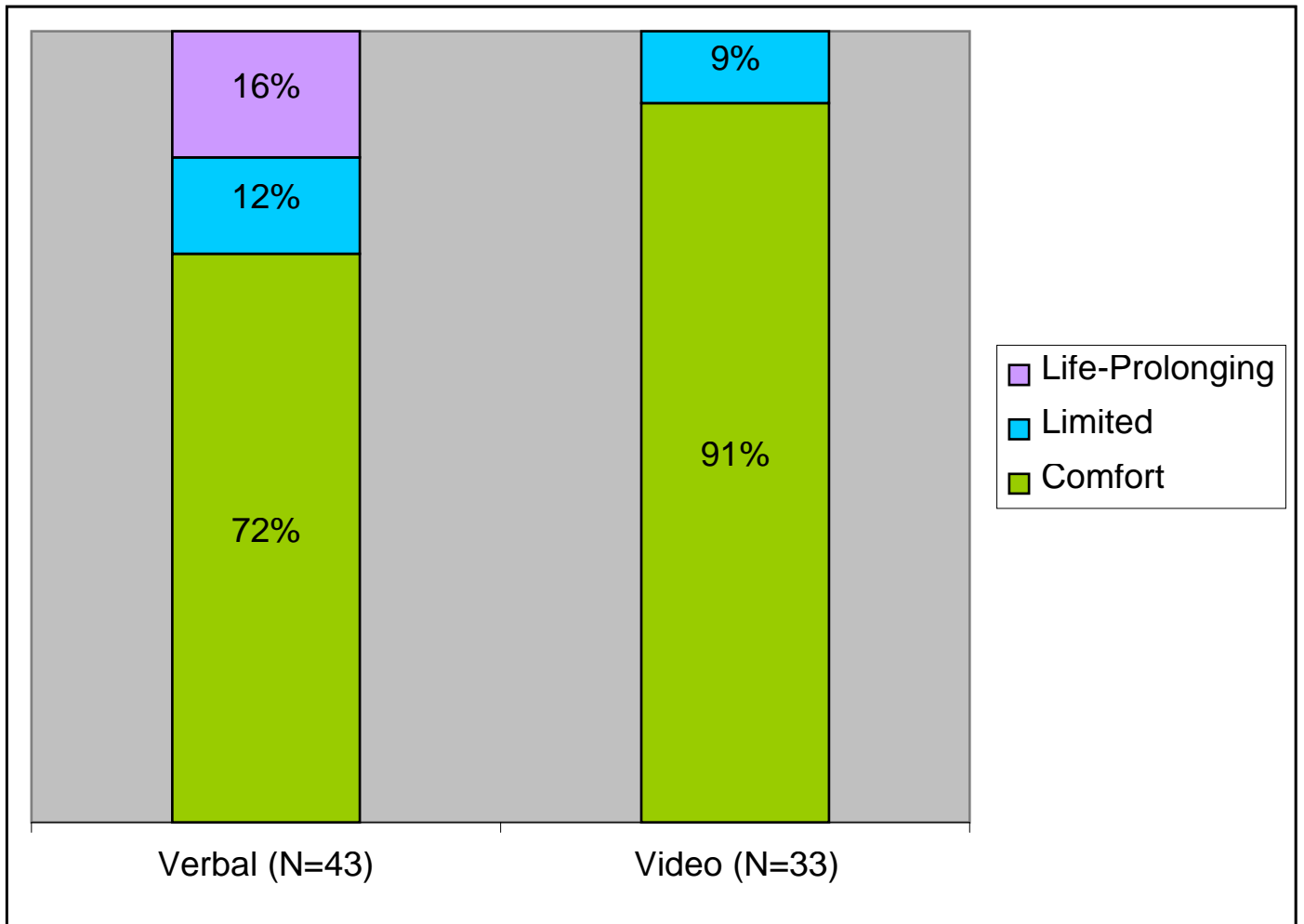
### Results

76 subjects were randomized to the verbal (N=43) or video (N=33) arms of the study. Among subjects receiving the verbal description of advanced dementia and the goals of care, 31 (72%) preferred comfort; 5 (12%) chose limited; and 7 (16%) desired life-prolonging. In the video group, 30 (91%) preferred comfort; 3 (9%) chose limited; and none desired life-prolonging ( $\chi^2=6.3$ ,  $df=2$ ,  $P=.047$ ). Factors associated with greater likelihood of opting for comfort included greater health literacy (OR 12.1; 95% CI, 2.4-62.6) and randomization to the video (OR 3.9; 95% CI, 1.0-15.1). (Please see Figure 1).

### Conclusions

Rural subjects with higher health literacy were more likely to want comfort compared to those with lower levels. Furthermore, subjects who viewed a video decision aid were more likely to opt for comfort compared to those who solely listened to a verbal description. These findings suggest that video can help elicit preferences and that interventions to empower such patients need to be designed in a manner that is sensitive to health literacy.

**Figure 1.** Subjects' Preferences for Their Goals of Care in Advanced Dementia



**Health Literacy in a Consumer-Driven Health Plan.** Hardie, Nancy A.<sup>1</sup>; Kyanko, Kelly<sup>2</sup>; Busch, Susan<sup>2</sup>; LoSasso, Anthony T.<sup>3</sup>; Levin, Regina A.<sup>1</sup>. <sup>1</sup>UnitedHealthcare, Edina, MN. <sup>2</sup>Yale University, New Haven, CT. <sup>3</sup>University of Illinois at Chicago, Chicago, IL.

## **Background**

We theorized that members new to Consumer-Driven Health Plans (CDHP) with inadequate health literacy have more medical and pharmacy use and higher costs than CDHP members with adequate health literacy scores. There is virtually no research linking CDHPs and health literacy. By linking responses to a set of health literacy screening questions to administrative claims data for a sample of new CDHP enrollees, we sought to examine the effect of health literacy upon healthcare spending and utilization.

## **Methods**

New CDHP enrollees from two employers were invited to complete a health plan survey when logging into a secure CDHP website from January through April, 2006. The survey included a 3-item questionnaire which measured health literacy. Adult (18 to <65 years old) survey respondents new to CDHP from two employers who were continuously enrolled for one year (2006) and answered health literacy items were included in the study (n = 4,130). Each member's summed score and responses to three individual health literacy items were linked to respondents' 2006 claims to ascertain healthcare costs and utilization. Responses to 3 health literacy items were summed to attain a score for each respondent. Individual health literacy items were re-categorized into binary variables of inadequate and adequate health literacy. Poisson regressions were applied to determine the relationship of healthcare costs and utilization with health literacy scores. The dependent variables were cost or utilization parameters and independent variables were health literacy measures. Covariates included age, gender, region, health risk score and employer.

## **Results**

Increased summed health literacy scores were associated with lower healthcare spending on all spending parameters (total, medical, admissions and emergency departments) except pharmacy (p-value < 0.05). Spending on emergency department visits and total health care decreased as the summed score and as each of the three individual items increased (p < 0.05). Among the three individual items, health care spending parameters were most related to item three, which measured a member's difficulty understanding written medical information. Consistent with the finding for inpatient spending, the numbers of inpatient admissions and emergency department visits decreased with higher summed health literacy scores and item 3 literacy scores. Cholesterol screening and one or more out-patient visits did not exhibit a statistically significant relationship to any of the health literacy measures.

## **Conclusions**

CDHP members with adequate health literacy had statistically lower total healthcare, medical, admissions and emergency department spending, more admissions and more emergency department visits. CDHP enrollees with inadequate health literacy scores were more apt to use services intended for treatment. Employers and insurers should be alerted to the influence of health literacy on health care costs and utilization for enrollees within CDHP and consider health literacy interventions for those in these plans.

## **Literacy-Compensatory Strategies and Resources of Older Latinos with Diabetes.**

Cordasco, Kristina M.<sup>1</sup>; Ryan, Gery<sup>1</sup>; Dominguez, Blanca X.<sup>1</sup>; Homeier, Diana C.<sup>2</sup>; Sarkisian, Catherine A.<sup>3</sup>. <sup>1</sup>The RAND Corporation, Santa Monica, CA. <sup>2</sup>Keck School of Medicine at USC, Los Angeles, CA. <sup>3</sup>University of California, Los Angeles, CA.

### **Background**

Limited health literacy is associated with multiple health disparities. As a foundation for developing patient-centered interventions to address these disparities, we explored the range of literacy-compensatory strategies and resources used by older Spanish-speaking Latinos with diabetes and limited health literacy.

### **Methods**

We conducted semi-structured interviews with monolingual Spanish-speakers who were illiterate (sTOFHLA=0), very low literate (sTOFHLA score=1-8), or limited health literate (sTOFHLA score=9-16); aged 65 years or more; patients of Los Angeles County + University of Southern California Medical Center primary care clinics; visual acuity  $\geq$  20/100; and diagnosed with diabetes for 1 or more years. We asked participants to describe how they manage the prevention, monitoring, responding, and communicating tasks associated with diabetes self-management (Table). All interviews were professionally translated and transcribed. Using content analysis, two team members (K.C. and B.D.) read the first 30 transcripts and then jointly listed and discussed themes of reported literacy-compensatory strategies and resources. After serially testing these themes against 6 intentionally-selected “test” transcripts, we presented them to the entire research team. Through discussion, the team further developed and clarified theme definitions. Using these definitions, two team members independently reviewed 60 transcripts, labeling participants’ statements that illustrated these themes. We then determined differences in labeling and resolved these by consensus. Transcripts and labeling were managed with Atlas.ti 6.0.

### **Results**

Among participants, 23% were illiterate, 43% were very low literate and 34% had limited health literacy. We found that our participants have a range of strategies and resources they use for acquiring information, organizing information and acting on tasks. Strategies can be broadly classified as those in which the participant retains complete control for caring for their health, those in which the participant shares control with others, and those in which the participant relinquishes control to others. Those participants who retain complete control in managing their disease compensate for their literacy deficits by relying on alternative skills, such as memory, and procuring assistance from a variety of resources, including healthcare personnel, neighbors, and available strangers. A second category of participants share control with family members, consistently utilize one or two family-members as their resource when faced with literacy-dependent tasks. In a third category, some patients completely relinquish control of their health to others, so that a caregiver performs all tasks related to the participants’ health. These strategies appeared to interact with differences in patient desire to obtain information about their health and motivation to act on that information.

## Conclusions

Illiterate, low-literate, and limited health literate patients use a range of strategies and resources to compensate for their literacy limitations. Future work should seek to determine if certain strategies and resources are more effective than others, potential determinants of effectiveness, and how interventions can be synergistic with them.

Prevention Tasks	Taking and Refilling Medications
	Using Insulin
	Caring for Feet
	Maintaining a Diabetic Diet
	Obtaining a Flu Shot
Monitoring and Responding Tasks	Knowing signs / symptoms of hyper/hypo-glycemia
	Monitoring Blood Glucose and Blood Pressure
	Knowing how to respond to hyper/hypo-glycemia
	Attending Appointments
	Obtaining Regular Laboratory Assessments
Communicating Tasks	Seeking information from health care providers
	Seeking clarification when they do not understand what a health care provider is saying to them
	Seeking information from, utilizing, and requesting help from family members, friends, and community resources
	Revealing limited literacy skills

**The Influence of cultural beliefs and health literacy on use of preventive health services among older African-American women, age 65 and older.** Baker, Janelle R. Florida A&M University, Tallahassee, FL.

**Background**

Americans are growing older and the majority of older Americans are women. The life expectancy of African Americans (women 76.9 years and men 70 years) has increased but still remains lower than the life expectancy for Caucasians (women 81 years and men 76 years) (Administration on Aging, 2008). According to the Agency for Healthcare Research and Quality (AHRQ) (2007), it is estimated that 90 million American adults have limited health literacy. Literacy levels less than the ninth grade level practically doubles the five-year risk of mortality among older adults regardless of culture, access, socioeconomic status, or education (Sudore, et al., 2006). Therefore the purpose of this study was to explore the relationship between cultural beliefs and health literacy on use of preventive health services among older African-American women, age 65 and older.

**Methods**

This study used a descriptive cross-sectional co-relational predictive design to explore the relationship between cultural beliefs and health literacy on use of preventive health services among  $N = 201$  older African-American women, age 65 and older; and to determine if cultural beliefs or health literacy is the better predictor of use of preventive health services among older African-American women age 65 and older. The ages of older African-American women in this study ranged from 65 to 102 years old. The sample was further divided into three age groups: the young-old, ages 65 to 74, 61.7% ( $n = 124$ ); the old, ages 75 to 84, 25.4% ( $n = 51$ ) and old-old, ages 85 and older, 12.9% ( $n = 26$ ).

**Results**

There is a significant relationship between cultural beliefs, health literacy and use of preventive health services among older African-American women age 65 and older. In addition, older African-American women with inadequate literacy were less like to have pap tests, mammograms, and colorectal screening tests. Health literacy was better predictor above cultural beliefs of older African-American women's use of preventive health services.

**Conclusions**

Although there is notable progress in the nation's overall health, disparities in illness and death experienced by racial and ethnic minorities exist. For instance, cancer mortality rates, which include breast, cervical, colon, and prostate, are 35% higher in African Americans than in Caucasians. Inadequate health literacy equates to health disparities. These findings have implications for nursing research, practice, and education for a multidisciplinary innovative approach to improve the beliefs, knowledge, attitudes, and screening rates for this vulnerable population.

## Oral Session II: Tuesday 11:00am

**Parent Understanding of Active Ingredients and Medication Errors in Children: Role of Health Literacy.** Yin, H. Shonna<sup>1</sup>; Mendelsohn, Alan L.<sup>1</sup>; van Schaick, Linda<sup>1</sup>; Cerra, Maria<sup>1</sup>; Dreyer, Benard P.<sup>1</sup>. <sup>1</sup>NYU School of Medicine, New York, NY.

### Background

One in 4 US children are given 2 or more medications in a given week, a large proportion of which are nonprescription medications. Unintentional overdoses, due to the administration of multiple medications containing the same active ingredient, have led to cases of significant pediatric morbidity and mortality.

The ability to understand and appropriately act upon active ingredient information presented on nonprescription medication labels is an important health literacy skill. There has been limited study of parent ability to understand active ingredient information. We therefore sought to examine parent understanding of active ingredient information, and the degree to which health literacy plays a role.

### Methods

Experimental study of parents of children presenting for care in an urban public hospital pediatric clinic: parents were asked to determine which of 3 possible cold/cough medications could be given to relieve their child's cold symptoms, as part of a scenario in which they had already given their 6 year old child a dose of Tylenol®. Dependent variables: Appropriate selection of cold/cough medication (+/- correct rationale), correct determination of time interval to next dose. Primary predictor: Health literacy (Newest Vital Sign (NVS)). Potential confounders: parent age, language, ethnicity, SES, education, presence of  $\geq 2$  children in household, child with chronic disease, history giving a cold medication in the past. Chi square and multiple logistic regression analyses were performed.

### Results

Of 199 parents, 81.2% had low health literacy (49.2% high likelihood; 32.0% possible). 34.8% of parents correctly chose the cold/cough medication which did not contain acetaminophen. The proportion of those who made the correct choice was no different from what would have been expected from chance alone ( $p=0.7$ ). Only 14.5% of those who picked the correct medication, correctly cited overlapping active ingredients as the rationale for their decision. Compared to those with low literacy, those with adequate literacy skills were more likely to have picked the correct medication for the appropriate rationale (18.9% vs. 1.9%;  $p=0.001$ ). 29.8% of parents were correct regarding the timing of the next dose of medication they would give, with those having adequate literacy more likely to be correct (48.6% vs. 25.6%;  $p=0.01$ ). In adjusted analyses, having a higher health literacy level was associated with increased odds of picking the correct medication for the appropriate rationale, and for knowing the correct time interval to the next dose (see **Table 1**).

**Table 1.** Parent ability to incorporate knowledge of active ingredients in medication selection and determination of time interval to next dose<sup>a</sup>

		Selected correct medication and cited active ingredient as rationale			Correctly determined appropriate time interval to next dose		
		<b>AOR<sup>c</sup></b>	<b>95% CI</b>	<b>p-value</b>	<b>AOR<sup>c</sup></b>	<b>95% CI</b>	<b>p-value</b>
<b>Health Literacy Level</b>	Adequate Literacy	16.7	2.8-98.9	0.002	2.8	1.2-6.9	0.02
	Low Literacy	1.0	---	---	1.0	---	---

<sup>a</sup>Multiple logistic regression models adjusting for potential confounders.

### Conclusions

A large percentage of parents have difficulty understanding and acting upon active ingredient information, increasing the potential for overdosing. While those with low health literacy were at greatest risk for error, the rate of error was high even among those characterized as having adequate literacy. Additional research is needed to determine how to best convey active ingredient information in a manner that is accessible and actionable for families across literacy levels.



**Evaluation of a Health Promotion Model of Health Literacy Intervention Based on Home Visiting, Plain Language Materials, and a Reflective Approach.** Smith, Sandra A.<sup>1</sup>; Moore, Elizabeth J.<sup>1</sup>; Mobley, Sandra C.<sup>2</sup>; Thomas, Suzanne D.<sup>3</sup>; Sutherland, Donald E.<sup>4</sup>. <sup>1</sup>University of Washington, Seattle, WA. <sup>2</sup>Medical College of Georgia, Augusta, GA. <sup>3</sup>CSRA Nursing Associates, Inc, Augusta, GA. <sup>4</sup>MCGHealth, Inc, Augusta, GA.

## **Background**

The purpose of this study was to implement Nutbeam's (2008) health promotion (HP) model to increase functional health literacy among disadvantaged parents in the prenatal to preschool period. The HP model views health literacy (HL) as an asset to be developed through health education, skills development and direct assistance to personalize information and apply it in context for personal benefit. Successful efforts empower individuals to use information and services in ways that promote health and exert increasing control over personal, family and community health and its determinants. The research question was: What were the short-term and intermediate outcomes from implementation of the HP model of health literacy in a home-based intervention with a diverse population of disadvantaged parents (N=2532; 39.7% African American, 22.2% Latino, 35.6% white, 2.5% other)?

## **Methods**

We implemented the HP model in 6 home visiting programs that aim to reduce disparities in birth outcomes and promote maternal and child health and school readiness during the prenatal to preschool period. Sixty-six visitors were trained to use 4th-grade level health education materials and a reflective approach to develop parents' interactive and reflective HL skills, along with social support and direct assistance to personalize information and apply it in context. The intervention was field tested in a 2-year AHRQ/NICHD funded quasi-experimental multi-group cohort study using multiple waves of measurement. A matching process was used to create a comparison group within the cohort. Reading ability was assessed using a brief screening tool to produce proxy REALM scores (Bennett 2003). Health literacy as defined by WHO (Nutbeam, 1998) was assessed at 6-month intervals for up to 36 months using the Life Skills Progression instrument (Wollesen & Peifer, 2006). Results were analyzed by reading level, age and race/ethnicity to determine who improved. Effects of attrition were assessed in a separate HRSA-funded study.

## **Results**

Overall, parents demonstrated significant improvement in functional HL in the first 6 months of service and continued to improve at a slower rate over time. Parents with lower estimated reading levels achieved the greatest gains. Teens started at a disadvantage but made gains in first six months to achieve par with their older counterparts. All ethnicities improved, in different patterns. Comparison of matched parents indicated improvements were not due to maturation or community events. Attrition of lower versus higher functioning parents in the Healthy Start cohort was not different; nor did attrition change the proportion of parents who demonstrated improved scores over time.

## **Conclusions**

The HP model of HL intervention is practical for implementation using home visiting, plain language materials, and a reflective approach; it opens new directions for intervention to achieve

Healthy People 2020 HL Objective 11.2: Improve the HL of the population (DHHS, 2009). Home visitors/community health workers can promote HL and empower participants to better manage their personal and family health and healthcare. A national response to HL may be feasible through existing national networks of home visitation programs with short and long term benefits accruing to entire families over their lifetimes, to the healthcare system and the schools.

**The Impact of Communication Strategies to Address Poor Health Literacy of the Adult Caregivers of Children.** Preston, Gregory<sup>1</sup>; Dorman-O'Donnell, Margie<sup>1</sup>; Colby, Becky T.<sup>1</sup>; Camp, Sheila M.<sup>1</sup>; Hurt, Clinton J.<sup>1</sup>; Sanders, Joann M.<sup>1</sup>. <sup>1</sup>Cook Children's Health Plan, Fort Worth, TX.

## **Background**

Adults with inadequate health literacy are more likely to fail to seek necessary healthcare or comply with instructions given by their healthcare provider. They seek more emergency care, and receive more inpatient care. They miss more work than patients with adequate literacy, become frustrated with their healthcare experience, and are more likely to pursue litigation. Do communication strategies that address the issues associated with poor health literacy of the caregivers impact the quality of the healthcare their children receive?

## **Methods**

Between March 11, 2008 and December 31, 2009 the primary caregiver of 2969 consecutive patients admitted to the 23-hour observation unit from the emergency department of a pediatric medical center were screened for literacy and numeracy skills using the Newest Vital Sign: ([http://www.pfizerhealthliteracy.com/pdf/FH\\_vitalsigns\\_040605.pdf](http://www.pfizerhealthliteracy.com/pdf/FH_vitalsigns_040605.pdf)).

The screen was administered in English or Spanish within a short time after the patient reached the unit. The entire nursing staff of the unit was trained to employ "teach back", using plain language and approved illustrations, and a medication adherence application to deliver all instructions to the families. Families who failed the screen were enrolled in a case management program that included additional teaching and post-discharge follow-up to assess understanding and compliance with discharge instructions.

## **Results**

1% of caregivers refused the screen. 5% were not screened for various reasons. 32% were unable to answer >3 questions on the NVS indicating a high probability of less than basic literacy. The failure rate (F group) varied by insurance type (Commercial=17%; Government=52.2%; None=75%). 95% of F families were able to demonstrate understanding of the instructions they received in a phone call with the nurse case manager 5-7 days after discharge. 438 of the patients were members of a CHIP or Medicaid health plan which was part of the same integrated delivery system as the medical center. The 438 plan members were evaluated for cost and utilization in the pre (mean 10.4 months), and post (mean 8.8 months) discharge periods. These patients were representative of the entire 1659 patients insured by CHIP or MA when compared for failure rate, age, sex, ethnicity and diagnosis. Both groups (Pass or P -63%; F -59.3%) demonstrated decreased health care costs, and decreased emergency room use (P -51.5%; F -36%) following exposure to the program. Primary care visit rates were not different between the pre- and post-discharge periods.

## **Conclusions**

Pre (10.01 vs. 10.67 mo) and Post (8.74 vs. 8.77 mo) discharge periods were similar between the Pass and Fail groups. The interventions were effective for the management of an underserved population (government funded health insurance). ER utilization and total health care costs were reduced in both groups (mean \$3545/patient). Communication strategies (Teach Back, Plain

Language, Medication Administration Tool) achieved high levels of compliance for the Fail group. The case management intervention contributed to the favorable performance observed in the Fail group.

**Health literacy and health care experience: Findings from a representative statewide survey.** Kaphingst, Kimberly A.<sup>1</sup>; Weaver, Nancy L.<sup>2</sup>; Cheng, Meng-Ru<sup>1</sup>; Brown, Melissa<sup>1</sup>; Wray, Ricardo J.<sup>2</sup>; Smith, Diane L.<sup>3</sup>; Rath, Susie<sup>1</sup>; Buskirk, Trent D.<sup>2</sup>; Gasper, Charles<sup>4</sup>; Culbert, Arthur J.<sup>5</sup>; Kreuter, Matthew W.<sup>1</sup>. <sup>1</sup>Washington University, St. Louis, MO. <sup>2</sup> Saint Louis University School of Public Health, St. Louis, MO. <sup>3</sup>MU School of Health Professions, Columbia, MO. <sup>4</sup>Missouri Foundation for Health, St. Louis, MO. <sup>5</sup>Health Literacy Missouri, St. Louis, MO.

## **Background**

Research with national data has described the scope of the problem of limited health literacy in the United States and illuminated health disparities by sociodemographic factors such as race and ethnicity, age, and educational attainment. These data, however, have not fully examined the relationship between health literacy and important health indicators such as experience with health care. In order to identify communities with unmet health care needs, representative statewide data are needed so that interventions can be targeted to specific populations. The Missouri Foundation for Health, through Health Literacy Missouri, has conducted a statewide survey in order to inform how disparities in health literacy within Missouri are related to individuals' health care experiences.

## **Methods**

We conducted a statewide random digit dial telephone survey (n=1028) of the general public in Missouri using two sampling frames, a household landline telephone number frame and a cell phone frame. The telephone survey assessed health literacy using a subjective screener item about perceived document literacy ('How confident are you filling out medical forms by yourself?': not at all confident, somewhat confident, and extremely confident). The survey also measured the domains of provider-patient communication, health information seeking, respondents' health status, health care experiences, and ability to manage chronic diseases such as diabetes and hypertension. These analyses examined whether responses to the health literacy screener item were related to respondents' health care experiences.

## **Results**

The respondents had a mean age of 51.8 years. About half (55.4%) were female and 89.8% were white. 41.0% of respondents reported having no education beyond high school, and 35.3% had a total household income of less than \$30,000. For the health literacy screener, about 56.5% of respondents reporting being extremely confident filling out medical forms by themselves, while 37.5% said somewhat confident and 5.2% not at all confident. Health literacy was significantly and positively related to education (p<0.0001) and household income (p<0.0001); those with lower health literacy were less likely to own their own home (p<0.0001) or to have health insurance (p<0.0001). Among respondents overall, 19.3% reported not having a personal doctor, 16.9% had last seen a doctor more than 12 months ago and 19.8% did not ask the doctor questions at their most recent visit. Significantly fewer respondents with lower health literacy reported having a personal doctor (p<0.004), asking their doctor questions (p<0.003), or feeling comfortable interacting with front desk staff (p<0.0001).

**Conclusions**

Most respondents reported having a medical home (e.g., having a personal doctor) and being engaged patients (e.g., asking questions). However, individuals with lower health literacy had less access to a medical home and participated less actively in their appointments with providers. These individuals were also of lower socioeconomic status and were less likely to have health insurance. These findings therefore identify disparities in health literacy and health care that will require targeted individual-level and system-level approaches in order to improve the health of the population.

## Oral Session III: Tuesday 1:30pm

### **Factors Associated with Patients' Understanding of their Pre-Admission Medication**

**Regimen.** Cawthon, Courtney<sup>1</sup>; Kripalani, Sunil<sup>1</sup>; Marvanova, Marketa<sup>2</sup>; Roumie, Christianne L.<sup>1,3</sup>; Eden, Svetlana<sup>1</sup>; Schnipper, Jeffrey L.<sup>4</sup>. <sup>1</sup>Vanderbilt University, Nashville, TN. <sup>2</sup>Belmont University, Nashville, TN. <sup>3</sup>VA Tennessee Valley Geriatric Research Education Clinical Center, Nashville, TN. <sup>4</sup>Brigham & Women's Hospital, Boston, MA.

### **Background**

Patients' ability to accurately report their pre-admission medication regimen is a vital basis for medication reconciliation in the hospital. Understanding of the medication regimen may also affect post-discharge adherence and medication safety. We examined the effect of health literacy, cognitive function, number of medications, and other factors on patients' understanding of their pre-admission medication regimen at 2 large academic hospitals.

### **Methods**

Patients who enrolled in the Pharmacist Intervention for Low Literacy in Cardiovascular Disease (PILL-CVD) study provided at baseline an assessment of health literacy (short Test of Functional Health Literacy in Adults), cognitive function (MiniCog), and sociodemographic information. A medication understanding score was computed based on patients' ability to provide the indication (1 point), strength (1/2 point), number of units/tablets per dose (1/2 point), and frequency (1 point) for up to 5 prescription medications selected at random from their pre-admission medication list. Scores ranged from 0 to 3, with 3 indicating better understanding. We used proportional odds logistic regression to analyze the independent association of health literacy, cognitive function, number of pre-admission medications, and other patient characteristics on medication understanding scores.

### **Results**

Patients (N=790) had a median age of 61 years (inter-quartile range [IQR] 52 to 71), 57% were male, 77% were white, and 21% had marginal or inadequate health literacy. The median number of prescription medications was 8 (IQR 5 to 11). The median medication understanding score was 2.5 (IQR 2.2 to 2.8). In the adjusted analysis, patients with marginal or inadequate health literacy had a lower odds of understanding their medication regimen [(OR=0.52, 95% CI 0.33-0.88; p=0.0001) and (OR=0.48, 95% CI 0.30-0.77; p=0.0001), respectively], compared to patients with adequate health literacy. Being prescribed more medications was highly associated with lower scores (p=0.0019). In addition, Black race, male gender, and impaired cognitive function were associated with lower medication understanding scores (p<0.05 for each).

### **Conclusions**

Patients' health literacy and number of prescribed medications are highly and significantly related to their understanding of the pre-admission medication regimen, after adjustment for numerous other factors. Cognitive function, race, and gender are also significantly associated with medication understanding. Clinicians should be aware of these factors when taking a medication history, performing medication reconciliation, and counseling patients about safe and effective medication use.

**Randomized trial of intensive telephone education and counseling to overcome disparities in knowledge, self-care behaviors and symptom severity for patients with heart failure and low health literacy.**

Baker, David W.<sup>1</sup>; DeWalt, Darren A.<sup>2</sup>; Schillenger, Dean<sup>3</sup>; Hawk, Victoria<sup>2</sup>; Ruo, Bernice<sup>1</sup>; Bibbins-Domingo, Kirsten<sup>3</sup>; Weinberger, Morris<sup>2</sup>; Macabasco-O'Connell, Aurelia<sup>4</sup>; Grady, Kathleen L.<sup>1</sup>; Holmes, Mark<sup>2</sup>; Erman, Brian<sup>2</sup>; Pignone, Michael<sup>2</sup>.

<sup>1</sup>Northwestern University, Chicago, IL. <sup>2</sup>University of North Carolina, Chapel Hill, NC.

<sup>3</sup>University of California, San Francisco, CA. <sup>4</sup>University of California, Los Angeles, CA.

## **Background**

Patients with heart failure (HF) need to learn self-care behaviors to minimize symptoms, prevent hospitalizations, and prolong survival. We conducted a randomized trial to determine whether a “teach to goal” (TTG) educational and behavioral support program was more successful than a brief educational intervention (BEI) for achieving learning goals, promoting self-care behaviors, and improving HF symptoms.

## **Methods**

We recruited patients from four academic centers who had symptomatic HF. All participants were given a one hour educational session focusing on the most relevant information for self-management behaviors; plain-language print materials were used as a teaching aid that patients could take home along with a scale. Participants were then randomized to no further intervention (BEI group) or TTG. TTG immediately taught how to adjust diuretic dose to maintain target weight and reinforced learning goals and behaviors with 5-8 telephone counseling sessions over one month. Patients completed the short version of the Test of Functional Health Literacy in Adults (TOFHLA) and a survey of HF-related knowledge, self-care behaviors, and the Heart Failure Symptom Scale (HFSS) (range 0-100, with higher scores denoting better quality of life). After one month, participants were called by a blinded interviewer to assess changes in knowledge, self-efficacy, behaviors, and HF symptoms. Analyses of differences in these measures were stratified by health literacy (HL).

## **Results**

605 patients agreed to participate; 526 (86.9%) completed the one month interview. The mean age was 61 years; 48% were female; 38% were African-American and 16% Latino; 26% had less than a high school education; 68% had annual incomes <\$25,000; and 37% had marginal or inadequate HL (combined as “low” HL). At baseline, those with low HL had worse knowledge and self-care behaviors. At one month, general HF knowledge and knowledge about high salt foods improved significantly more in the TTG group vs. the BEI group ( $p < 0.005$  for all). Patients in the TTG group also reported substantially greater increases in the composite index of 10 self-care items than the BEI group (increase from mean of 4.8 to 7.6 for TTG vs. increase from 5.2 to 6.7 for BEI;  $p < 0.001$ ), including greater awareness of their target weight, checking weight daily, self-adjusting diuretic dose to maintain target weight, and having an action plan for a weight gain of  $\geq 4$  lbs; the absolute benefits of the TTG intervention vs. the BEI were similar for those with low and adequate HL. The HFSS improved from 58.5 to 64.6 for the TTG group but did not change for the BEI group (64.7 to 63.9;  $p < 0.001$ ); there were similar differences in the improvement in HF symptoms between the TTG and BEI group for those with low and adequate HL.



**Conclusions**

The TTG strategy of multiple, progressive, reinforcing telephone education and counseling sessions was able to overcome learning barriers caused by low HL and improve knowledge, health behaviors, and HF symptoms for all patients. However, the TTG intervention did not narrow the disparities in knowledge and health behaviors by HL that existed at baseline.

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## **Background**

Despite effective treatment of events, patients with coronary artery disease (CAD) are still at high risk for occurrence of coronary re-events and death. Beneficial lifestyle and adherence to medication can reduce the risk, but require a high level of self-management skills. From Northern American studies we learned before that patients with low health literacy exert poor self-management skills, are more often hospitalized and have unfavourable health outcomes. Low health literacy has been reported in 27% to 54% of patients with heart failure. However, the association of low health literacy with cardiovascular risk scores and with effective secondary prevention is unclear.

In this study we assessed:

1. The prevalence of low health literacy among post-MI patients in the Netherlands;
2. The association between health literacy and risk scores for occurrence of future ischemic events;
3. The association between health literacy and the effect of secondary prevention in a nurse coordinated prevention clinic on risk for occurrence of future ischemic events.

## **Methods**

This study was part of 'RESPONSE' (Randomised Evaluation of Secondary Prevention by Outpatient Nurse Specialists; Peters 2010). Patients with a recent acute coronary syndrome were individually randomized to receive either usual care alone or usual care plus a nurse-led prevention clinic (NLPC) programme. During the 12 month follow-up visit, 155 patients in one RESPONSE centre were asked to participate in a personal interview. Health literacy was objectively assessed by Dutch versions of the Newest Vital Sign (NVS) and the Rapid Estimate in Adult Literacy in Medicine (REALM), and subjectively by Chew's three screenings items. Cardiovascular risk profiles were measured by the Systematic COronary Risk Evaluation (SCORE).

## **Results**

In total 113 patients participated in the sub-study (response rate 73%). 50% scored low on the NVS, indicating a high likelihood of limited health literacy. According to the REALM, 18% experienced difficulty reading. 95% of the patients that scored low on the REALM also scored low on the NVS. Only 5% of the patients scored low on Chew's screenings items. Patients with low REALM and/or NVS scores had significantly higher risk levels of cardiovascular disease, after adjustment for educational attainment level. Irrespective of the HL measure used, NLPC was more effective in reducing cardiovascular risks among patients scoring low on health literacy.

## **Conclusions**

Low health literacy was commonly prevalent among patients with CAD and was associated with higher levels of cardiovascular risk. Systematic secondary prevention seems more effective in reducing cardiovascular disease risk among patients with low health literacy.