Part 2

- Health literacy and health outcomes
- The National Assessment of Adult Literacy
  health literacy tasks
  - On a scale of 0-500, what was measured?
  - How did people do?
- What tasks are involved in your patients’ health care?
- Participants provide examples of prose, document, and quantitative tasks.
So what role does literacy, health literacy play in health outcomes?

- Some
- Hard to disentangle from all of previous
- Duh.
Literacy and Health Outcomes

Summary

Introduction

Literacy can be defined as “an individual’s ability to read, write, and speak in English and compute and solve problems at levels of proficiency necessary to function on the job and in society, to achieve one’s goals, and to develop one’s knowledge and potential.” Literacy sometimes describes a person’s facility with or knowledge about a particular topic (e.g., “computer literacy”). In that context, “health literacy” is a constellation of skills that constitute the ability to perform basic reading and numerical information (numeracy). A short version (S-TOFHLA) involves only two reading comprehension sections. All of these instruments are highly correlated with one another.

Low literacy is common in the United States; a decade ago, 40 million adult Americans scored on the lowest of five levels (level 1) of the National Adult Literacy Survey (NALS); another 50 million scored at level 2. These levels correspond to having trouble finding pieces of information or numbers in a lengthy text, integrating multiple pieces of information in a document, or finding two or more numbers in a chart and performing a...
low literacy.

**Methods**

We examined two key questions in this review:

- **Key question 1:** Are literacy skills related to
  a. use of health care services?
  b. health outcomes?
  c. costs of health care?
  d. disparities in health outcomes or health care service use according to race, ethnicity, culture, or age?

- **Key question 2:** For individuals with low literacy skills, what are effective interventions to
  a. improve use of health care services?
  b. improve health outcomes?
  c. affect the costs of health care?
  d. improve health outcomes and/or health care service use among different racial, ethnic, cultural, or age groups?

Our inclusion/exclusion criteria limited studies to those with outcomes related to health and health services, studies published from 1980 on, and studies conducted in developed countries (United States, Canada, the United Kingdom, Australia, New Zealand, and Europe). Study participants included individuals of all ages.

We searched several databases, using terms such as “literacy” and “health literacy” and, in some cases, “numeracy” and the name or accepted acronym for standardized tests of literacy related to health outcomes (e.g., WRAT, REALM, and TOFHLA). For MEDLINE®, our primary database, we had to

of overall evidence, for the two key questions separately, in three domains: quality of the research; quantity of studies, including number of studies and adequacy of the sample size; and consistency of findings.\textsuperscript{12,13}

**Results**

**Key Question 1: Relationship of Literacy to Various Outcomes and Disparities**

We identified 44 articles addressing relationships between literacy and use of health care services, health outcomes, costs of health care, and disparities according to race, ethnicity, culture, or age. Study designs, data analysis, and presentation varied widely. The number of participants enrolled ranged from 34 to 3,260. Literacy was most often measured with the REALM (13 studies), TOFHLA or S-TOFHLA (11), or WRAT (6). Literacy levels used to compare study participants varied widely among studies. Most studies reported the unadjusted (bivariate) relationship between literacy and the outcome of interest; 28 adjusted for at least one covariate, chiefly age and education. The quality of articles reviewed for these key questions was fair to good. The overall strength of evidence ranged from II (studies of strong design but remaining uncertainty because of inconsistencies or concern about generalizability, bias, research design flaws, or adequate sample size, or consistent evidence from studies of weaker design) to III (the number of studies was too limited to rate the strength of the literature).

1a. Health Care Services. Six studies measured the
Main Results: We identified 3,015 unique abstracts from our literature searches. We excluded 2,330 that clearly did not meet our inclusion criteria after abstract review. Of the 684 remaining articles subjected to full review, 611 were rejected and 73 retained. Of those retained, 44 articles addressed KQ 1 and 29 articles addressed KQ 2.

Studies examining the relationship between low literacy and adverse health outcomes generally found that patients with low literacy had poorer health outcomes, including knowledge, intermediate disease markers, measures of morbidity, general health status, and use of health resources. Most studies were cross-sectional in design, and many failed to adequately address confounding and the use of multiple comparisons in their analyses. For KQ 2, most interventions led to improved outcomes, particularly for outcomes of understanding or knowledge. Fewer studies examined the effect of interventions for patients with low health literacy on morbidity and mortality.

Based on our 11-item quality scale, we found that the average quality of the individual articles addressing KQs 1a and 1b was good to fair. The quality of the one article addressing KQ 2a was good; the average quality of the articles addressing KQ 2b was fair. We did not find literature that discussed the portion of the key questions addressing costs or disparities, so an average grade is not available.

We also graded the strength of the evidence for this body of literature on a scale from I (strongest design) to IV (no published literature). We concluded that the literature addressing KQ 1a and 1b should receive a grade of II; it generally includes studies of strong design, but some uncertainty remains because of concerns about generalizability, bias, research design flaws, and adequate sample size. The literature addressing KQ 1c and 1d was rated III since the evidence is from a limited number of studies of weaker design and studies with strong designs have not been done. The literature addressing KQ 2a and 2b also received a grade of III, while the literature addressing KQ 2c and 2d received a grade of IV, indicating that there was no published literature.
Conclusions

Low literacy is associated with several adverse health outcomes

• low health knowledge
• increased incidence of chronic illness
• poorer intermediate disease markers
• Sub-optimal use of preventive health services.
Poor Health Literacy in the Elderly Predicts All-Cause and Cardiovascular Mortality

**News Author:** Laurie Barclay, MD  
**CME Author:** Charles Vega, MD

**Disclosures**

**Release Date:** July 31, 2007; **Valid for credit through July 31, 2008**

**Credits Available**

- Physicians - maximum of 0.25 AMA PRA Category 1 Credit(s)™ for physicians;  
- Family Physicians - up to 0.25 AAFP Prescribed credit(s) for physicians;  
- Nurses - 0.25 nursing contact hours (None of these credits is in the area of pharmacology)

July 31, 2007 — Elderly patients with poor health literacy have higher incidence of all-cause mortality and cardiovascular death, according to the results of a prospective cohort study published in the July 23 issue of Archives of Internal Medicine.

"Individuals with low levels of health literacy have less health knowledge, worse self-management of chronic disease, lower use of preventive services, and worse health in cross-sectional studies," write David W. Baker, MD, MPH, from the Feinberg School of Medicine at Northwestern University in Chicago, Illinois, and colleagues. "The number of years of school completed is strongly
The Association Between Age and Health Literacy Among Elderly Persons

David W. Baker, Julie A. Gazmararian, Joseph Sudano and Marian Patterson

Objective. To examine why older age groups have worse functional health literacy.

Methods. Home interviews were conducted with community-dwelling elderly persons (n = 2,774) to determine demographics, years of school completed, newspaper reading frequency, chronic diseases, and health status. Participants completed the Short Test of Functional Health Literacy in Adults (S-TOFHLA, range 6-18) and the Short Functional Health Literacy Test (S-FLHT, range 1-6).
David W. Baker, Julie A. Gazmararian, Joseph Sudano and Marian Patterson

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Results. Mean S-TOFHLA scores declined 1.4 points (95% CI 1.3–1.5) for every year increase in age (p < .001). After adjusting for sex, race, ethnicity, and education, the S-TOFHLA score declined 1.3 points (95% CI 1.2–1.4) for every year increase in age. Even after adjustment for performance on the MMSE, the TOFHLA score declined 0.9 points (95% CI 0.8–1.0) for every year increase in age (p < .001). Differences in newspaper reading frequency, visual acuity, ambulatory medical conditions, and health status, did not explain the lower literacy of older participants.

Discussion. Functional health literacy was markedly lower among older age groups; even after adjusting for differences in MMSE performance, newspaper reading frequency, health status, and visual acuity. Future studies should prospectively examine whether functional literacy declines with age and whether this is explained by declines in cognitive function.
Years of Education Among Persons Age 65 and Over (age-adjusted) by Sex and Race/Ethnicity, 2006

Data source: Current Population Survey
Average Per Capita Health Care Expenditures for Medicare Beneficiaries Age 65 and Over (age-adjusted) by Type of Service, 1992 and 2003

Data Source: Medicare Current Beneficiary Survey
The Health Literacy of America’s Adults

Results From the 2003 National Assessment of Adult Literacy

U.S. Department of Education
NCES 2005-483
The National Assessment of Adult Literacy (NAAL)

• The NAAL is a nationally representative assessment of English literacy among American adults.
• The survey sample included over 19,000 adults ages 16 and older in homes and over 1,000 inmates in state and Federal prisons across the country.
• In 2003, for the first time, the NAAL included a health literacy component which assessed respondents' skills for locating and understanding health-related information and services.
Literacy: It’s more than reading. It’s comprehension

• We learn new information by adding it to what we already know:
  – Our Logic
  – Our Language
  – Our Experience

• Too often health information is presented using a different reference frame and the patient can not understand or incorporate the information effectively.
The Health Literacy Scale

The NAAL assessment measures health literacy on a scale of 0 to 500, using four literacy levels:

- **Proficient** – Able to perform complex activities such as searching a document to define a medical term or other information.
- **Intermediate** – Capable of conducting moderately challenging tasks such as finding the age range for a particular vaccine from a childhood vaccination chart.
- **Basic** – Able to complete simple tasks such as giving two reasons why a person should be tested for a specific disease, based on information in a clearly written pamphlet.
- **Below Basic** – Demonstrates the lowest levels of performance such as identifying what is permissible to drink before a medical test, based on a set of short instructions.
- There is also a fifth category, **Nonliterate in English**, which includes adults at the bottom of the **Below Basic** level and those adults who could not take the test because they did not speak English or Spanish.
<table>
<thead>
<tr>
<th>Level and Definition</th>
<th>Key Abilities Associated with Level</th>
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</table>
| **Below Basic**     | Adults at the Below Basic level range from being nonliterate in English to having the abilities listed below:  
  - locating easily identifiable information in short, commonplace prose texts  
  - locating easily identifiable information and following written instructions in simple documents (e.g., charts or forms)  
  - locating numbers and using them to perform simple quantitative operations (primarily addition) when the mathematical information is very concrete and familiar |
| Score ranges for Below Basic:  
  - Prose: 0–209  
  - Document: 0–204  
  - Quantitative: 0–234 | |
| **Basic**           | - reading and understanding information in short, commonplace prose texts  
  - reading and understanding information in simple documents  
  - locating easily identifiable quantitative information and using it to solve simple, one-step problems when the arithmetic operation is specified or easily inferred |
| Score ranges for Basic:  
  - Prose: 210–264  
  - Document: 205–249  
  - Quantitative: 235–289 | |
| **Intermediate**    | - reading and understanding moderately dense, less commonplace prose texts as well as summarizing, making simple inferences, determining cause and effect, and recognizing the author’s purpose  
  - locating information in dense, complex documents and making simple inferences about the information  
  - locating less familiar quantitative information and using it to solve problems when the arithmetic operation is not specified or easily inferred |
| Score ranges for Intermediate:  
  - Prose: 265–339  
  - Document: 250–334  
  - Quantitative: 290–349 | |
| **Proficient**      | - reading lengthy, complex, abstract prose texts as well as synthesizing information and making complex inferences  
  - integrating, synthesizing, and analyzing multiple pieces of information located in complex documents  
  - locating more abstract quantitative information and using it to solve multistep problems when the arithmetic operations are not easily inferred and the problems are more complex |
| Score ranges for Proficient:  
  - Prose: 340–500  
  - Document: 335–500  
  - Quantitative: 350–500 | |

**Note:** Although the literacy levels share common names with the National Assessment of Educational Progress (NAEP) levels, they do not correspond to the NAEP levels.
3 Literacy Tasks

• The prose literacy scale measured the knowledge and skills needed to search, comprehend, and use information from texts that were organized in sentences or paragraphs.

• The document literacy scale measured the knowledge and skills needed to search, comprehend, and use information from non-continuous texts in various formats.

• The quantitative scale measured the knowledge and skills needed to identify and perform computations using numbers embedded in printed materials.
Difficulty of Selected Health Literacy Tasks

<table>
<thead>
<tr>
<th>Level</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below Basic</td>
<td>Circle the date of a medical appointment on a hospital appointment slip. (101)</td>
</tr>
<tr>
<td>Basic</td>
<td>Give two reasons a person should be tested for a specific disease, based on information in a clearly written pamphlet. (202)</td>
</tr>
<tr>
<td>Intermediate</td>
<td>Determine what time a person can take a prescription medication, based on information on the drug label that relates the timing of medication to eating. (253)</td>
</tr>
<tr>
<td>Proficient</td>
<td>Calculate an employee’s share of health insurance costs for a year, using a table. (382)</td>
</tr>
</tbody>
</table>

Source: National Center for Education Statistics, Institute for Education Sciences

Average score: 245
Figure 1-1. Difficulty of selected health literacy tasks: 2003

<table>
<thead>
<tr>
<th>Health Literacy Scale</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proficient 310–500</td>
<td>362 Calculate an employee’s share of health insurance costs for a year, using a table that shows how the employee’s monthly cost varies depending on income and family size.</td>
</tr>
<tr>
<td></td>
<td>366 Find the information required to define a medical term by searching through a complex document.</td>
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<tr>
<td></td>
<td>325 Evaluate information to determine which legal document is applicable to a specific health care situation.</td>
</tr>
<tr>
<td>Intermediate 226–319</td>
<td>290 Determine a healthy weight range for a person of a specified height, based on a graph that relates height and weight to body mass index (BMI).</td>
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<tr>
<td></td>
<td>266 Find the age range during which children should receive a particular vaccine, using a chart that shows all the childhood vaccines and the ages children should receive them.</td>
</tr>
<tr>
<td></td>
<td>253 Determine what time a person can take a prescription medication, based on information on the prescription drug label that relates the timing of medication to eating.</td>
</tr>
<tr>
<td></td>
<td>228 Identify three substances that may interact with an over-the-counter drug to cause a side effect, using information on the over-the-counter drug label.</td>
</tr>
<tr>
<td>Basic 185–225</td>
<td>202 Give two reasons a person with no symptoms of a specific disease should be tested for the disease, based on information in a clearly written pamphlet.</td>
</tr>
<tr>
<td></td>
<td>201 Explain why it is difficult for people to know if they have a specific chronic medical condition, based on information in a one-page article about the medical condition.</td>
</tr>
<tr>
<td>Below Basic 0–184</td>
<td>169 Identify how often a person should have a specified medical test, based on information in a clearly written pamphlet.</td>
</tr>
<tr>
<td></td>
<td>145 Identify what it is permissible to drink before a medical test, based on a set of short instructions.</td>
</tr>
<tr>
<td></td>
<td>101 Circle the date of a medical appointment on a hospital appointment slip.</td>
</tr>
</tbody>
</table>

NOTE: The position of a question on the scale represents the average scale score attained by adults who had a 67 percent probability of successfully answering the question. Only selected questions are presented.
Before starting school, children who primarily spoke English before kindergarten level, as were a majority of adults who spoke another language before starting school, had lower average health literacy, equivalent to a 5th-grade level. The figure shows the average health literacy scores by age group:

- 16-18: 244
- 19-24: 249
- 25-39: 256
- 40-49: 249
- 50-64: 246
- 65+: 214

These scores indicate the level of understanding required at each age group for health-related information.
How does this apply to you?