Background

Low literacy is a pervasive and underrecognized problem in health care.\(^1\) Approximately 21% of American adults are functionally illiterate, and another 27% have marginal literacy skills! As patients, such individuals may have difficulty reading and understanding discharge instructions, medication labels, patient education materials, consent forms, or health surveys.\(^1,3\) Several studies have shown literacy is related to multiple aspects of health, including health knowledge, health status, use of health services and cost.\(^2\)

Despite the prevalence of low literacy in the United States and in medical settings, identifying those with limited literacy may be difficult due to patients’ efforts to mask their deficiencies.\(^1,4,7\) A patient’s self-reported educational status may not serve as an accurate estimate of his/her reading ability.\(^1,4,8\) In an effort to solve this problem, the authors have developed the Rapid Estimate of Adult Literacy in Medicine (REALM).

Pertinent Definitions

**Literacy** in the United States is 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 develop one’s knowledge and potential.”\(^9\)
Health Literacy is a constellation of skills, including the ability to perform basic reading and numerical tasks required to function in the health care environment. Patients with adequate health literacy can read, understand and act on health care information.²

Word Recognition Tests are tests in which an individual reads aloud from a list of individual words. In the English language, word recognition tests are a good way to quickly screen for reading ability. The results do not imply comprehension or interpretation of words or medical instructions.¹⁰⁻¹¹ If patients have trouble reading and pronouncing words, clinicians/researchers are alerted to the possibility that reading comprehension is likely a problem.

Examples: REALM, SORT-R, WRAT-3 Reading subtest, PIAT-R Word Recognition subtest.

Reading Comprehension Tests measure an individual’s ability to derive meaning from printed words. Comprehension can focus on an individual’s understanding of a word, phrase, sentence, longer passage or an individual’s interpretation of the information. Most reading comprehension tests assess the individual’s ability to understand text written at different levels of difficulty.

Examples: PIAT-R Comprehension Subtest, Cloze Technique, TOFHLA.⁵,¹¹⁻¹⁶

Description of the Test

The REALM is a screening instrument used to assess an adult patient’s ability to read common medical words and lay terms for body parts and illnesses. It is designed to assist medical professionals in estimating a patient’s literacy level so that the appropriate level of patient education materials or oral instructions may be used. The test takes 2 to 3 minutes to administer and score.

The REALM has been correlated with other standardized tests of word recognition, reading comprehension and health literacy.¹⁰⁻¹₂,¹⁷

The REALM is a word recognition test – not a reading comprehension instrument. Adults are asked to de-code or pronounce words.

Design and Development

This instrument was field-tested with 203 adult patients in four public university hospital primary care clinics in northern Louisiana, southern Arkansas and eastern Texas.¹⁸⁻¹⁹

The words are all commonly used health terms or words used in medical settings. They are arranged in three columns based upon number of syllables and item difficulty,
with the easiest words at the beginning to enhance patient confidence and reduce performance anxiety.\textsuperscript{18-19}

REALM reading levels were derived through a linear regression analysis performed using the REALM to predict scores on the Slosson Oral Reading Test - Revised (SORT-R).\textsuperscript{10} REALM scores were established as estimates of literacy, not grade equivalents.\textsuperscript{18-19}

### Validity

Criterion validity was established through correlations of REALM raw scores with the raw scores of three standardized reading tests: the SORT-R, the Peabody Individual Achievement Test - Revised (PIAT-R)\textsuperscript{11}, and the Wide Range Achievement Test - Revised (WRAT-R)\textsuperscript{17} (see Table 1). The REALM and all three tests were administered in the same order to each participant in accordance with standardized instructions for each test.\textsuperscript{18}

<table>
<thead>
<tr>
<th>Table 1</th>
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<tbody>
<tr>
<td><strong>Correlation of REALM with SORT-R, PIAT-R, and WRAT-R</strong></td>
</tr>
<tr>
<td></td>
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<tr>
<td>REALM</td>
</tr>
</tbody>
</table>

*\(p < .0001\)

Further comparison of the WRAT-R and REALM revealed a Pearson correlation coefficient of .82 (\(p < .0001\)).\textsuperscript{20}

The REALM has concurrent validity with the Test of Functional Health Literacy in Adults (TOFHLA)\textsuperscript{12} producing a correlation coefficient of .84 (\(p < .001\)).\textsuperscript{12} A high correlation (.80) also exists between a short version of the TOFHLA (STOFHLA)\textsuperscript{21} and the REALM.\textsuperscript{22}

### Reliability

Test-retest reliability was conducted on 100 adult inmates at a penal institution in Louisiana. All inmates were readministered the REALM one week after the original administration.

Inter-rater reliability was conducted in a university-based medicine clinic. One research assistant administered the REALM to a patient while six additional research assistants scored each word.

<table>
<thead>
<tr>
<th>Table 2</th>
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<tbody>
<tr>
<td><strong>Reliability</strong></td>
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<tr>
<td>Test-Retest (n = 100)</td>
</tr>
<tr>
<td>Inter-Rater (n = 20)</td>
</tr>
</tbody>
</table>
When to use the REALM?

When deciding to use the REALM, first determine how the literacy information will be utilized.

The REALM is designed to provide medical personnel with an estimate of patient literacy levels. It is intended to identify patients in need of additional and/or alternative forms of patient education/communication. The REALM will alert practitioners and researchers to possible literacy problems and may be used as a research tool.

The REALM should be used in clinical settings only when medical personnel intend to use the information to modify existing education and teaching for patients with low literacy.

The REALM is not designed or intended to diagnose specific reading or learning problems.

A patient's physical and mental status should be considered before implementing a literacy assessment. Testing may be inappropriate when a patient is feeling ill or is experiencing emotional distress.

A large print version of the REALM is available for patients who may be visually impaired.

Assessing the literacy level of individual patients or groups may avoid problems in clinical care and research.

REALM Administration:

Testing Materials Needed:

- Laminated patient word list.
- Examiner record form.
- Clipboard.
- Pencil.

Personal Data Lines:

Patient Name/Subject #: Record the patient's name or assigned subject number.

Date of Birth: Record the patient's date of birth.

Grade Completed: Record the highest level of education completed by the patient.

Date: Record the date of administration.

Clinic: Record the clinic name and/or location.

Examiner: Record the examiner's name.

Reading Level: This space is provided for recording the patient's reading level based upon the raw REALM score.
Administration and Scoring:

1. Give the patient the laminated copy of the REALM word list. Attach the examiner record form to the clipboard. Hold the clipboard at an angle such that the patient is not distracted by your scoring procedure.

In your own words, introduce the REALM to the patient:

In a research setting or for research purposes:

"It would be helpful for us to get an idea of what medical words you are familiar with. What I need you to do is look at this list of words, beginning here [point to first word with pencil]. Say all of the words you know. If you come to a word you don't know, you can sound it out or just skip it and go on."

If the patient stops, say, "Look down this list [point] and say the other words you know."

In a clinical setting:

"Sometimes in this office, we may use medical words that patients aren't familiar with. We would like you to take a look at this list of words to help us get an idea of what medical words you are familiar with. It will help us know what kinds of patient education to give you. Start with the first word [point to 1st word with pencil], please say all of the words you know. If you come to a word you do not know, you can sound it out or just skip it and go on." If patient stops do as above.

**Special Note: Do not use the words "read" and "test" when introducing and administering the REALM. These words may make patients feel uncomfortable and unwilling to participate.

"Please say these words for me?"

2. If the patient takes more than 5 seconds on a word, encourage the patient to move along by saying,

"Let's try the next word."

If the patient begins to miss every word or appears to be struggling or frustrated, tell the patient,

"Just look down the list and say the words you know."

3. Count as an error any word that is not attempted or mispronounced (see "Special Considerations" for pronunciation/scoring guidelines).

4. Scoring options:

1) Place a check mark (✓) in the box next to each word the patient pronounces correctly.

   OR

2) Place an X in the box next to each word the patient does not attempt or mispronounces.
Scoring should be strict, but take into consideration any problems which could be related to dialect or articulation difficulties. Use the dictionary if in doubt. Count as correct any self-corrected word.

5. Count the number of correct words in each list and record the number in the blank. Total the numbers and record the total score in the “Raw Score” blank. Match the total raw score with its grade equivalent found in Table 3.

Special Considerations for Administration and Scoring:

**Examiner Sensitivity:**

Many low literate patients will attempt to hide their deficiency. Ensure that you approach each patient with respect and compassion. You may need to provide encouragement and reassurance.

A positive, respectful attitude is essential for all examiners. (Remember, many people with low literacy feel ashamed.) Be sensitive.

**Visual Acuity:**

If the patient wears glasses, ask him/her to put them on for this test. The REALM is designed to be read by persons with 20/100 vision or better. A large print version of the REALM is available for persons with 20/200 vision, the level of legal blindness.

**Pronunciation:**

Dictionary pronunciation is the scoring standard.
Dialect, Accent or Articulation Problems:

Count a word as correct if the word is pronounced correctly and no additions or deletions have been made to the beginning or ending of the word. For example: A patient who says "alcohol" would not receive credit for the word "alcoholism"; "eyes" would not receive credit for the word "eye"; "nervous" and "nerve" would not receive credit for "nerves". Words pronounced with a dialect or accent should be counted as correct provided there are no additions or deletions to the word. Particular attention should be paid for patients who use English as a second language.

Comprehension and Interpretation of Words:

Reading recognition does not imply comprehension or proper interpretation. The REALM is a reading-recognition test. If a patient indicates that he/she knows the meaning of a word but is unable to say it, no credit is given. Persons interested in assessing patient comprehension are referred to the Test of Functional Health Literacy in Adults (TOFHLA).²²

Children and Adolescents:

Presently we recommend using the SORT-R when assessing the literacy levels of children and adolescents. A quick screening instrument for use with adolescents in health care settings, REALM-teen, is currently in production.

Patients Who Speak Another Language:

The REALM is a reading-recognition test and is a reliable screening instrument to assess literacy in English. Reading-recognition is not useful in assessing literacy in other languages. An attempt to develop a Spanish REALM was unsuccessful.²³ The REALM has not and cannot be translated into other languages for valid administration. Persons wishing to assess Spanish-speaking patients are referred to the Test of Functional Health Literacy in Adults - Spanish (TOFHLA-S).²⁴
### Score Interpretation

<table>
<thead>
<tr>
<th>Raw Score</th>
<th>Grade Range Equivalent</th>
<th>Literacy Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 18</td>
<td>3rd Grade and Below</td>
<td>Will not be able to read most low-literacy materials; probably not able to read appointment and prescription labels/warning labels. Will need repeated, individual oral instructions.</td>
</tr>
<tr>
<td>19 - 44</td>
<td>4th to 6th Grade</td>
<td>Will need low literacy materials with accompanying verbal instructions; may not be able to read low literacy materials independently.</td>
</tr>
<tr>
<td>45 - 60</td>
<td>7th to 8th Grade</td>
<td>Will struggle with many patient education materials; may be able to pronounce words but not fully comprehend the message</td>
</tr>
<tr>
<td>61 - 66</td>
<td>High School</td>
<td>Will be able to read most patient education materials; will not be offended by low literacy materials</td>
</tr>
</tbody>
</table>

### Ordering the REALM

Additional copies of the REALM or the large font version and supplies can be obtained through the Health Education and Literacy office of the Louisiana State University Health Sciences Center - Shreveport. Contact: Terry Davis, PhD, Department of General Internal Medicine, P.O. Box 33932, Shreveport, LA 71130; (318) 675-4584; tdavis1@lsu.edu.

### Other Literacy Instruments Used in Health Care Settings

#### Word Recognition:

Slosson Oral Reading Test - Revised (SORT-R)
Slosson Educational Publications, Inc.
P.O. Box 280
East Aurora, NY 14052
1-800-828-4800; Fax: 1-800-655-3840

Wide Range Achievement Test - Third Edition (WRAT-3)
Jastak Associates, Inc.
P.O. Box 3410
Wilmington, DE 19804
1-800-221-9728
Reading Recognition and Comprehension:

Peabody Individual Achievement Test - Revised (PIAT-R)
American Guidance Service, Inc.
P.O. Box 99
Circle Pines, MN 55014
612-786-4343

Health Comprehension (English and Spanish):

Test of Functional Health Literacy in Adults (TOFHLA) and Spanish-TOFHLA (S-TOFHLA)
Joanne Nurss, Ph.D.
Director, Center for Study of Adult Literacy
Georgia State University
1 University Plaza
Atlanta, GA 30303-3083

Instrument for Diagnosis of Reading (Instrumento Para Diagnostica Lectoras)
Kendall Hunt Publications
Dubuque, IA

References


20. Davis TC, Mayeaux EJ, Fredrickson D, Bocchini JA Jr, Jackson