

# Fostering Literacy for Good Health Today/Vive Desarollando Amplia Salud (FLIGHT/VIDAS)

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## Abstract

Health literacy has been shown to be an important factor in health outcomes, but existing measures focus on a narrow range of content and skills and require substantial clinician time and effort to administer and score. In this paper we report on the initial development and testing of an interactive computer-delivered health literacy assessment that uses video elements and multimedia simulations to evaluate patients' health literacy. The measure is automatically administered and scored, reducing demands on clinician time. Scales derived from the measure are correlated with standard health literacy measures and predict patient behavior. The measure is likely to be a useful measure of a critical patient skill.

## Measure



## Outcomes

### Correlations

|                       | HL   | NUM <sup>a</sup> | FACT <sup>a</sup> | LIS <sup>a</sup> | TOFHLA Reading | TOFHLA Numeracy | REALM <sup>b</sup> | SAHLSA <sup>b</sup> | Hospital <sup>c</sup> | Forms <sup>c</sup> | Info <sup>c</sup> |
|-----------------------|------|------------------|-------------------|------------------|----------------|-----------------|--------------------|---------------------|-----------------------|--------------------|-------------------|
| HL                    | 1.00 | .99**            | .67**             | .80**            | .62**          | .34**           | .46**              | .48**               | -.15*                 | .38**              | -.24**            |
| NUM                   |      | 1.00             | .67**             | .77**            | .62**          | .35**           | .48**              | .46**               | -.16*                 | .38**              | -.24**            |
| FACT                  |      |                  | 1.00              | .81**            | .42**          | .26**           | .44**              | .56**               | -.11                  | .28**              | -.19*             |
| LIS                   |      |                  |                   | 1.00             | .53**          | .20**           | .34**              | .62**               | -.05                  | .32**              | -.17*             |
| TOFHLA Reading        |      |                  |                   |                  | 1.00           | .29**           | .69**              | .57**               | -.13                  | .40**              | -.25**            |
| TOFHLA Numeracy       |      |                  |                   |                  |                | 1.00            | .24*               | .17                 | -.14                  | .16*               | -.12              |
| REALM <sup>b</sup>    |      |                  |                   |                  |                |                 | 1.00               | n/a <sup>b</sup>    | -.28**                | .23*               | -.23*             |
| SAHLSA <sup>b</sup>   |      |                  |                   |                  |                |                 |                    | 1.00                | .10                   | .16                | -.25**            |
| Hospital <sup>c</sup> |      |                  |                   |                  |                |                 |                    |                     | 1.00                  | -.29**             | .34**             |
| Forms <sup>c</sup>    |      |                  |                   |                  |                |                 |                    |                     |                       | 1.00               | -.31**            |
| Info <sup>c</sup>     |      |                  |                   |                  |                |                 |                    |                     |                       |                    | 1.00              |

\*Correlation is significant at the 0.05 level (2-tailed); \*\*Correlation is significant at the 0.01 level (2-tailed).  
<sup>a</sup>Some items on NUM, FACT, and LIS were also included in the HL scale, resulting in higher scale intercorrelations.  
<sup>b</sup>The REALM was only administered to English speakers, and the SAHLSA was only administered to Spanish speakers  
<sup>c</sup>Hospital = Need help reading hospital materials; Forms = Confident in filling out medical forms; Info = Difficulty in understanding written medical information

## Approach

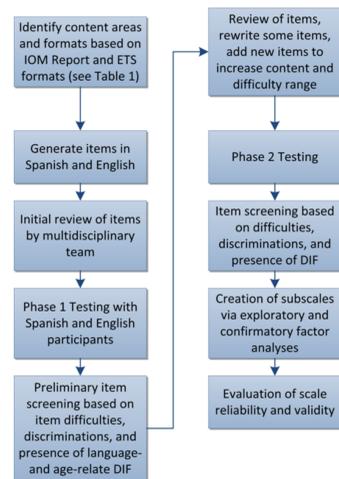
### BACKGROUND

New measures of health literacy are needed in order to better understand what health literacy is and why it is related to health outcomes. Previous measures have focused on screening, itself an important objective, but have not been based on broad content domains or developed using rigorous psychometric approaches. Development of a health literacy measure with a broad content base that can be used with both Spanish- and English-speaking persons is important in light of the number of Spanish-speaking persons in the US. A computer-delivered and scored measure that automates assessment of individuals' health literacy could allow for a wider evaluation of patients' health literacy.

### METHOD

An initial pool of 208 items was developed after creating a matrix of contents based on the 2004 report on health literacy by the Institute on Medicine (*Health Literacy: A Prescription to End Confusion*) and item formats used by the Educational Testing Service (prose, document, and quantitative). Items are presented on large touch screen computers to keep the importance of computer skills to a minimum.

Items were first administered to 69 Spanish and 73 English speakers and items were evaluated using nonparametric item response theory (IRT) to assess for the presence of language- and age-related differential item functioning (DIF). The resulting pool of 98 items has been used in the second phase of the project.



## Scales

| Scale  | Examples  |
|--|---|
| <b>General Health Literacy (HL):</b> The ability to read and complete mental operations on health care information, including identify relevant information in prose, documents, and figures (39 items).<br><br>Cronbach's $\alpha$ for Spanish speakers = 0.81; for English = 0.84; for entire sample = 0.84. | <b>Prose:</b> After reading instructions for laboratory test preparation, correctly identify appointment time.<br><br><b>Document:</b> Correctly identify fields in an insurance form; Use an electronic device on a Web page to calculate body mass index. |
| <b>Numeracy (NUM):</b> The application of quantitative skills including arithmetic operations and appraisal of relations among numeric concepts such as ratios and percentages (24 items).<br><br>Cronbach's $\alpha$ for Spanish speakers = 0.83; for English = 0.82; for entire sample = 0.84.               | <b>Quantitative:</b> Correctly identify meaning of terms related to probability; Correctly identify number of grams of fat consumed in a meal based on values in a table.   |
| <b>Conceptual Knowledge (FACT; Experimental):</b> Demonstrate understanding of specific concepts related to health care (15 items).  | Correctly identify the organ treated by a medical specialist such as a cardiologist   |
| <b>Listening Comprehension (LIS; Experimental):</b> The ability to acquire and remember information presented orally (13 items).   | After viewing a video of a clinician giving information about participation in a clinical research study, correctly identify treatment alternatives.  |



## Participants

|  | Spanish          | English          |
|--|------------------|------------------|
| Gender M/F   | 41/52            | 52/53            |
| Hispanic   | 93               | 3                |
| African American   |                  | 37               |
| Afro Caribbean   |                  | 14               |
| Asian/Pacific Islander                                   |                  | 2                |
| White  | 93               | 52               |
| <b>Continuous variables: Means (standard deviations)</b> |                  |                  |
| Age  | 52.4 (14.7)      | 50.2 (16.4)      |
| Education  | 12.7 (2.8)       | 13.5 (2.0)       |
| TOFHLA Reading   | 42.6 (8.3)       | 46.0 (4.4)       |
| TOFHLA Numeracy  | 43.7 (6.2)       | 47.9 (2.8)       |
| REALM  | N/A <sup>a</sup> | 62.6 (6.6)       |
| SAHLSA   | 45.8 (3.6)       | N/A <sup>a</sup> |
| Hospital <sup>b</sup>                                    | .66 (.89)        | .35 (.76)        |
| Forms <sup>b</sup>                                       | 1.82 (1.20)      | 2.4 (.94)        |
| Info <sup>b</sup>  | .65 (.95)        | .55 (.92)        |

<sup>a</sup>The REALM was only administered to English speakers, and the SAHLSA was only administered to Spanish speakers

## Implications

The new measure of health literacy, FLIGHT/VIDAS, shows preliminary evidence of validity. The two main scales for health literacy and health numeracy have good reliability and clear relations to other measures. Work on the two experimental scales, Listening and Fact, will continue. The computer-administered and -scored format makes the measure potentially useful in both clinical and research contexts; it will be possible for it to be used over Internet connections.

Data collection is continuing, and we anticipate being able to make it available for wider use during 2014. Potential uses of the measure include automated creation of patient information at appropriate level of health literacy for each patient (including materials in Spanish and English). The measure can readily be included in an electronic medical record and used in clinical settings. We are in the process of creating it as a tablet-delivered measure so that it can be used in a wider variety of settings, including in areas in which desktop computers are not available.

### Acknowledgment

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