

## American Academy of Family Physicians Patient Education Materials: Can Patients Read Them?

Lorraine Silver Wallace, PhD; Elizabeth S. Lennon, BSN, MPH, COHN-S

**Background and Objectives:** *A large proportion of US adults struggle with limited literacy skills, which affect their ability to fully function in health care settings. This study evaluated the readability of English-language American Academy of Family Physicians (AAFP) patient education materials. Methods:* A random sample of 171 AAFP patient education materials was selected from a list of 518 health topics available via the Internet. The SMOG grade formula was used to measure readability of the written patient education materials. **Results:** *The mean SMOG grade level of AAFP patient education materials was  $9.43 \pm 1.31$  (range=6–12). This is higher than the average reading skills of US adults. Conclusions:* Our results support and extend the findings of other readability studies across many medical specialties, all of which find that patient education materials are written at a difficulty level that is too high. The AAFP and individual family physicians should strive to improve communication with their patients by providing educational materials that are written at an appropriate reading level.

(Fam Med 2004;36(8):571-4.)

In 1993, the US Department of Education conducted the National Adult Literacy Survey (NALS)<sup>1</sup> to systematically assess the literacy skills of a stratified random sample of more than 26,000 US adults from all “walks of life.” Based on the NALS, 22% of individuals scored in the lowest literacy level, meaning they could not perform basic reading tasks such as locating several pieces of information in a newspaper article or finding an intersection on a street map.<sup>2</sup> Another 27% of adults were considered marginally literate and able to only complete minimal tasks, such as entering background information on a Social Security application.

Based on results from the NALS,<sup>1</sup> family physicians should expect almost 25% of their patients to have limited literacy skills (ie, reading at or below the 5th grade level), thus making all aspects of physician-patient communication challenging. Although low literacy skills are seen across all demographic groups, individuals most likely to exhibit limited literacy include those 65 years of age, recent immigrants to the United States, those with limited formal education (< 8 years), and those with limited incomes (ie, unemployed or living in poverty).<sup>3</sup>

Inadequate literacy has quantifiable effects on morbidity, mortality, and health care costs. Medicaid enrollees with limited literacy skills have higher annual health care costs<sup>4</sup> and greater likelihood of hospital admission.<sup>5</sup> Low literacy is also negatively related to the management of chronic disease, including diabetes mellitus,<sup>6,7</sup> asthma,<sup>8</sup> and hypertension.<sup>6</sup> Further, patients with limited literacy have more difficulty understanding medication-related instructions and navigating the health care system. For instance, 65% of public hospital patients did not understand how to take medication on an empty stomach, and 75% were unable to determine if they were eligible for financial assistance.<sup>9</sup>

The combination of oral instructions and written patient education materials has been shown to enhance patient understanding of medical information.<sup>10-12</sup> Recent studies have reported the usefulness of written materials in assisting patients with personal medical decisions on issues related to postpartum contraceptive options for women,<sup>13</sup> pain relief options during labor,<sup>14</sup> and encouraging prostate screening among middle-aged men.<sup>15</sup>

Despite the availability and usefulness of such written patient materials, much of the information distributed to patients is written at levels above most patients’ literacy skills. If patients cannot read or comprehend the patient education materials provided to them, their usefulness will be limited and/or nonexistent. For in-

---

From the Department of Family Medicine, University of Tennessee, Knoxville.

stance, Foster and Rhoney<sup>16</sup> found that the readability of printed information for epileptic patients exceeded the reading ability of the majority of patients. Further, Estrada et al<sup>17</sup> found that patient education materials related to the use of anticoagulants were written on average at a 10.7 grade level, while readability of pamphlets developed by the American College of Obstetricians and Gynecologists<sup>18</sup> ranged from grades 7.0 to 9.3. These figures contrast with the average reading skills of US adults, which are at approximately the eighth-grade level. This study's purpose was to evaluate the readability of English-language American Academy of Family Physicians (AAFP) patient education materials available via the Internet at <http://familydoctor.org/healthtopic.html>.<sup>19</sup>

## Methods

### Materials and Procedures

We downloaded a list of health topics (n=518) available via the Internet from <http://familydoctor.org/healthtopic.html>. The health topics cover a wide range of medical/health topics (eg, breast cancer, immunizations, osteoporosis). The list of health topics was numbered in alphabetical order from 1 through 518. The sample size required to estimate readability of all AAFP patient education materials was 171 based on a 95% confidence interval,  $\pm 1$  margin of error (0.5 grade levels above and 0.5 grade levels below), and an estimated standard deviation for grade level of 3.<sup>20</sup> Using a table of random numbers, 171 health topics were selected for review in this study.

### Readability Analyses

Calculation of readability was done using McLaughlin's SMOG<sup>21</sup> (Simplified Measure of Gobbledygoo) formula. The SMOG is accurate, correlates highly with other readability formulas, and has been recommended by the American Cancer Society for evaluation of written materials.<sup>22,23</sup> The SMOG estimates grade level by selecting three groups of 10 consecutive sentences at the beginning, middle, and end of a document, for a total of 30 sentences. Next, all words with three syllables within the selected sentences are tallied and the total noted. Then, the square root of that total is obtained and rounded to the nearest integer, and the number 3 is added to the integer to obtain the grade level of the document. A modified SMOG formula was used to assess the readability of documents with <30 sentences.<sup>24</sup>

### Interrater Reliability

A review of 25 randomly selected health topics was conducted to assess interrater reliability. The first author reviewed all patient education materials, while the second author reviewed the 25 randomly selected patient education materials. Interrater reliability was as-

sessed using an intraclass correlation coefficient (ICC), validated for use with multiple raters, and calculated in a two-way random model based on absolute agreement. Agreement between the two raters was high, ICC=0.84.

### Data Analysis

The Statistical Package for the Social Sciences (SPSS+) for Windows<sup>®</sup> Version 11.0 was used for all statistical analyses. Descriptive statistics (means, standard deviations, percentages) were calculated to describe the readability (ie, grade level and number of three-syllable words) of AAFP patient education materials. Chi-square ( $\chi^2$ ) goodness of fit was calculated to compare the percentage of US adults in each NALS reading level in proportion to AAFP materials written at each reading level. Alpha ( $\alpha$ ) was set at .05 a priori.

## Results

The mean SMOG grade level of AAFP patient education materials was  $9.43 \pm 1.31$  (range=6–12). Patient education materials averaged  $43.87 \pm 16.28$  (range=7–86) three-syllable words per document. Only three (5.1%) patient education materials were written at or below the sixth grade level, while 21.1% were at either 11th or 12th grade level (Figure 1).

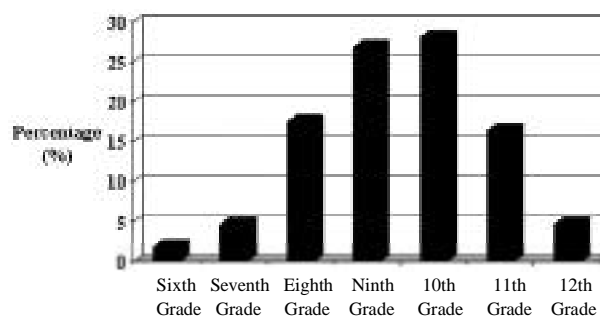
Figure 2 depicts the proportion of US adults in each literacy level of the NALS as compared to the proportion of AAFP materials written at these levels. A significant deviation between the percentage of individuals in each NALS reading level was found in comparison to the number of AAFP patient education materials written at each level ( $\chi^2=39.07$ ,  $P<.01$ ).

## Discussion

Currently, most AAFP patient education materials are written at a level that many patients will not be able to comprehend. As the largest primary care specialty,

Figure 1

Estimated Reading (Grade) Level of AAFP Patient Education Materials



AAFP—American Academy of Family Physicians

family medicine should lead the way in producing and/or revising patient education materials that reflect guidelines recommended by literacy experts. Literacy specialists have recommended that patient education materials should be written at a sixth-grade reading level to be readable by the greatest number of patients.<sup>3,25</sup> Doak et al<sup>3</sup> suggest that even those with advanced degrees and high reading ability prefer to receive patient education materials that are straightforward and easy to comprehend.

We found that most AAFP written materials (76%) were written at the ninth-grade educational level or higher. Similar findings have been documented for patient education materials produced by other professional organizations. For instance, most patient education materials from the American Academy of Electrodiagnostic Medicine and the Muscular Dystrophy Association were written at 11th- or 12th-grade levels,<sup>26</sup> while Thomas and Corwin<sup>27</sup> found that many hormone replacement therapy materials were written at a level exceeding the reading level of many women.

Among the AAFP patient education materials reviewed in this study, most included approximately 44 three-syllable words. Using the SMOG formula, however, 12 or more three-syllable words per document make the document exceed the sixth-grade reading level, which is the recommended level at which patient education materials should be written. Family physicians should be aware that many patients do not understand much of the medical information that is often considered rudimentary. For example, Davis and colleagues<sup>28</sup> found that many patients did not understand terms often considered basic, such as “blood in the stool,” “rectum,” “screening,” and “tumor.” The stressors of illness and being on medication may further impair one’s ability to comprehend medical information and health instructions.

Although lowering reading difficulty by reducing the number of complicated words per document is important, other strategies have also been suggested to construct easy-to-read materials. Strategies to improve physician-patient communication include limiting content to the most pertinent topics, using nonmedical terms (“user friendly” words), writing in the active voice, using a large font (12), ensuring that there is plenty of empty (white) space throughout the document, and using bulleted text in place of long paragraphs.<sup>29</sup>

The importance and effect of limited literacy on the overall health care system has received more attention the past few years. For instance, Healthy People 2010<sup>30</sup> has defined health literacy as “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.”

Health literacy was identified in the *Priority Areas for National Action: Transforming Health Care Qual-*

*ity*<sup>31</sup> document as one of 20 priority areas to improve the overall quality of the health care system. Although these are important strides in raising awareness of this enormous public health and medical problem, greater attention is warranted. For instance, Davis and colleagues<sup>32</sup> first addressed the gap between patient reading comprehension and the readability of patient education materials in the family medicine literature over a decade ago.

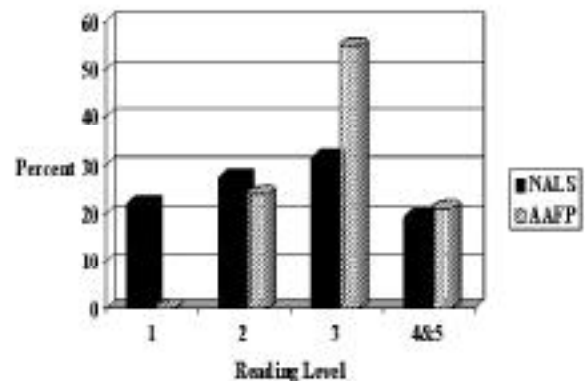
#### Limitations

There are several limitations to consider when interpreting the results of this study. First, we only reviewed a sample of AAFP patient education materials. However, we selected materials at random, and our results are consistent with other readability studies across many medical specialties. Second, only English-language patient education materials were reviewed. Many Spanish-language patient education materials are available, and these also need to be written at appropriate reading levels.

Lastly, simplifying patient education materials is an important step in improving physician-patient communication but is only one aspect of this relationship. A segment of the population will be unable to understand any written patient education material that is given to them because of extremely low literacy skills (ie, some of those in NALS Level 1). Strategies to improve com-

Figure 2

Reading Abilities of US Adults as Measured by the NALS Compared to Reading Levels of AAFP Patient Education Materials



Note: Reading level 1 is approximately 5th grade. Reading level 2 is approximately 6th–8th grade. Reading level 3 is approximately 9th–10th grade. Reading levels 4 and 5 are approximately 12th grade.

There was a significant difference between the proportion of US adults in each NALS reading level as compared to the readability of AAFP materials ( $\chi^2=39.09, P<.01$ ).

NALS—National Adult Literacy Survey

AAFP—American Academy of Family Physicians

munication with patients include: non-written patient education materials (eg, computer modalities, videotapes, audiotapes) and use of graphics (eg, pictures, pictograms).

### Conclusions

Many US adults struggle with limited literacy skills, which affect their ability to function fully in the health care setting. The AAFP's health education materials are written at a reading level that is too high for most Americans to understand. Family physicians and the AAFP should strive to improve written patient education materials that are routinely distributed in the practice setting by writing them at lower reading levels.

*Corresponding Author:* Address correspondence to Dr Silver Wallace, University of Tennessee, Knoxville, Department of Family Medicine, 1924 Alcoa Highway, U-67, Knoxville, TN 37920. 865-544-9352. Fax: 865-544-6532. lwallace@mc.utmck.edu.

### REFERENCES

- National Center for Education Statistics. National Adult Literacy Survey. [www.nces.ed.gov/pubsearch/pubsinfo.asp?pubid=93275](http://www.nces.ed.gov/pubsearch/pubsinfo.asp?pubid=93275). Accessed July 1, 2003.
- Kirsch I, Jungeblut A, Jenkins L, Kolstad A. Adult literacy in America: a first look at the results of the National Adult Literacy Survey. Washington, DC: National Center for Education Statistics, US Department of Education, 1993.
- Doak C, Doak L, Root J. Teaching patients with low literacy skills, second edition. New York: Lippincott-Raven Publishers, 1996.
- Weiss BD, Palmer R. Relationships between health care costs and very low literacy skills in a medically needy and indigent Medicaid population. *J Am Board Fam Pract* 2004;17(1):44-7.
- Baker DW, Gazmararian JA, Williams MV, et al. Functional health literacy and the risk of hospital admission among Medicare managed care enrollees. *Am J Public Health* 2002;92:1278-83.
- Williams MD, Baker DW, Parker RM, Nurss JR. Relationship of functional health literacy to patients' knowledge of their chronic disease: a study of hypertension and diabetes. *Arch Intern Med* 1998;158:166-72.
- Schillinger D, Grumbach K, Piette J, et al. Association of health literacy with diabetes outcomes. *JAMA* 2002;288:475-82.
- Williams MD, Baker DW, Honig EG, Lee TM, Nowlan A. Inadequate literacy is a barrier to asthma knowledge and self-care. *Chest* 1998;114:1008-15.
- Williams MD, Parker RM, Baker DW, et al. Inadequate functional health literacy among patients at two public hospitals. *JAMA* 1995;274:1677-82.
- Mayeaux EJ, Murphy PW, Arnold C, Davis TC, Jackson RH, Sentell T. Improving patient education for patients with low literacy skills. *Am Fam Physician* 1996;53:205-11.
- Kenny T, Wilson RG, Purves IN, et al. A PIL for every ill? Patient information leaflets (PILs): a review of past, present, and future use. *Fam Pract* 1998;15:471-9.
- Buck ML. Providing patients with written medical information. *Ann Pharmacother* 1998;32:962-9.
- Johnson LK, Edelman A, Jensen J. Patient satisfaction and the impact of written material about postpartum contraceptive decisions. *Am J Obstet Gynecol* 2003;188:1202-4.
- Stewart A, Sodhi B, Harper N, Yentis SM. Assessment of the effect upon maternal knowledge of an information leaflet about pain relief in labour. *Anesthesia* 2003;58:1015-9.
- Davison BJ, Kirk P, Degner LF, Hassard TH. Information and patient participation in screening for prostate cancer. *Patient Educ Couns* 1999;37:255-63.
- Foster DR, Rhoney DH. Readability of printed patient information for epileptic patients. *Ann Pharmacother* 2002;36:1856-61.
- Estrada CA, Hryneiwick MM, Higgs VB, Collins C, Byrd JC. Anticoagulant patient information material is written at high readability levels. *Stroke* 2000;31:2966-70.
- Freda MC, Damus K, Merkatz IR. Evaluation of the readability of ACOG patient education pamphlets. *Obstet Gynecol* 1999;93:771-4.
- American Academy of Family Physicians. Health topics on familydoctor.org. [www.familydoctor.org/healthtopic.html](http://www.familydoctor.org/healthtopic.html) Accessed June 20, 2003.
- Browner WS, Newman TB, Cummings SR, Hulley SB. Estimating sample size and power: the nitty-gritty. In: Hulley SB, Cummings SR, Browner WS, Grady D, Hearst N, Newman TB, eds. *Designing clinical research*, second edition. Philadelphia: Lippincott Williams & Wilkins, 2001:65-85.
- McLaughlin GH. SMOG grading: a new readability formula. *Journal of Reading* 1969;12:639-46.
- Meade CD, Smith CF. Readability formulas: cautions and criteria. *Patient Educ Couns* 1991;17:153-8.
- Meade CD, Diekmann J, Thornhill DG. Readability of American Cancer Society patient education literature. *Oncol Nurs Forum* 1992;19:51-5.
- Weinrich SP, Boyd MD, Power BD. Tool adaptation for socioeconomically disadvantaged populations. In: Frank-Stromborg M, Olsen SJ, eds. *Instruments for clinical health care research*, second edition. Sudbury, Mass: Jones & Bartlett, 1997:20-30.
- Redman BK. The process of patient education, eighth edition. St Louis: Mosby Year Book, Inc, 1997.
- Galloway G, Murphy P, Chesson AL, Martinez K. MDA and AAEM informational brochures: can patients read them? *J Neurosci Nurs* 2003;35:171-4.
- Thomas LG, Corwin EJ. The readability of printed education materials regarding hormone replacement therapy. *J Am Acad Nurse Pract* 1998;10:447-52.
- Davis TC, Dolan NC, Ferreira MR, et al. The role of inadequate health literacy skills in colorectal cancer screening. *Cancer Invest* 2001;19:193-200.
- Weiss BD. Health literacy. A manual for clinicians. Chicago: American Medical Association Foundation and American Medical Association, 2003.
- Healthy People 2010. Washington, DC: US Department of Health and Human Services, Office of Disease Prevention and Health Promotion, 2000.
- The National Academies. Officials should target 20 key areas to transform health care system. [www.nas.edu/news.nsf/isbn/0309085438?OpenDocument](http://www.nas.edu/news.nsf/isbn/0309085438?OpenDocument). Accessed July 1, 2003.
- Davis TC, Crouch MA, Wills G, Miller S, Abdehou DM. The gap between patient reading comprehension and the readability of patient education materials. *J Fam Pract* 1990;31:533-8.