
Medical Textbooks: Can Lay People Read and Understand Them?

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ABSTRACT

The proliferation of health information has created a rich field of resources that many lay people can use to make informed health care decisions. For a large segment of the population, these resources will go unseen and unused because they are written at a level that exceeds their reading recognition and comprehension skills. The study discussed in this article assessed the readability of information on six adult and two juvenile diseases in ten medical textbooks. Students in two library and information science (LIS) schools read the same information and indicated the words they did not understand. Results showed that the medical material is written well above the average person's reading ability. Words the students could not understand included anatomical and disease-related terms and drug names. More research needs to be done on lay people's comprehension of medical information.

On their Web site the National Center for the Study of Adult Learning and Literacy (n.d.) states that "more than 40 percent of working-age adults in the United States lack the skills and education needed to succeed in family, work, and community life today." This figure indicates that almost half of the population may not be able to find, read, or understand health information and thus cannot make informed health care decisions.

A considerable amount of research exists on the need to improve access to health information by making it more readable for average readers.

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Lowering the readability level alone may not adequately address the issue of illiteracy because other factors may affect a person's ability to read and comprehend written material. For example, Parikh, Parker, Nurss, Baker, and Williams noted that "the shame and embarrassment felt by some low literate patients may pose an important psychological barrier to asking for help or requesting low literate materials, even when they are available" (1996, p. 34). They found that some patients "did not seek care because of embarrassment about their illiteracy" (p. 34). Estey, Musseau, and Keehan included "anxiety, physical discomfort, and unfamiliarity with the hospital environment" (1994, p. 74) as further impediments to understanding health instruction. Weaver (2003), one of the presenters in the Medical Library Association's teleconference, *Reading Between the Lines*, noted that unfamiliarity with an environment is often an overlooked factor in health literacy. Labeling this concept "contextual literacy," she explained that a person might be "health literate" in one's own country, but she/he may not be in another country (Weaver, 2003, p. 4). Furthermore, while some people may be "comfortable and know what to expect in . . . hospitals and clinics," other people "don't and their anxiety at being in a totally alien setting impairs their coping abilities even more" (Weaver, 2003, p. 4). Thus, a variety of factors may affect people's ability to read and understand printed health information, written instructions, consent forms, or other health-related materials.

DEFINITIONS OF HEALTH LITERACY

What is health literacy? Several definitions were found in the literature. *Healthy People 2010*, the ongoing national promotion and prevention initiative aimed at improving the health status of individuals in the United States, defines 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" (Office of Disease Prevention and Health Promotion, 2001, p. 15). The Medical Library Association's (MLA Net, 2003) definition goes further and includes the following set of abilities:

- Recognize a health information need
- Identify likely information sources and use them to retrieve relevant information
- Assess the quality of the information and its applicability to a specific situation
- Analyze, understand, and use the information to make good health decisions.

This definition incorporates elements of evidence-based practice and puts the onus on lay people to find quality information, analyze it, and use the evidence as a basis for making their decision.

LITERATURE REVIEW

The key elements in making an informed health care decision are the person's ability to read and understand the information. According to Davis, Crouch, Wills, Miller, and Abdehou, "educators have measured the readability of written materials since the 1940s" but "medicine has only recently recognized problems in this area" (1990, p. 533). Health care professionals, they suggest, have taken "patients' educational and reading recognition levels to estimate literacy levels" (Davis et al, 1990, p. 533). While reading recognition (the ability to pronounce words) is important, "reading comprehension is the most important" of all the literacy skills needed in health care (p. 533).

In the literature on readability, there is conflicting evidence on whether an association exists between reading comprehension and educational levels. A few examples are provided to illustrate both sides of this conflict. Gibbs, Gibbs, and Henrich (1987) informally interviewed fifty people chosen at random from patients in a primary care center in Connecticut that serves people in low socioeconomic levels. Each person was asked to define "15 medical terms taken from patient education brochures available in the clinic" (Gibbs, Gibbs, & Henrich, 1987, p. 176). The terms included *atherosclerosis*, *diarrhea*, *stroke*, *orally*, and *diabetes*, to name a few. She/he was also asked about sources of information. The authors scored 63 percent of all responses as correct, 26 percent as "vague or wrong," and 11 percent as "no knowledge" (p. 176). Sources of information were visits to doctor (n = 22), reading (n = 12), television (n = 8), friends (n = 4), and none (n = 4). The authors found that readers had "significantly more education" and scored "significantly higher on the test than the other groups" (pp. 176-177).

Similar conclusions were drawn by Estey, Musseau, and Keehan (1994). The authors studied 189 randomly selected in-patients at three university-affiliated teaching hospitals. To assess their reading ability, the authors used the Wide Range Achievement Test-Revised (WRAT-R). They also constructed two Cloze tests from a handout on bronchoscopy, one written at the grade five level, the other at the grade nine level. In this reading comprehension test, every fifth word is deleted from a written passage and the reader is asked to fill in the blanks. A score of 56 percent or above indicates that the reader is capable of understanding what was read; 44 percent to 56 percent indicates that the person will need additional instructions to understand the material read; and a score of 44 percent or less means the material is too difficult to comprehend (Estey, Musseau, & Keehan, 1994, p. 74). The authors noted that not all patients needed to have a bronchoscopy. The results revealed that 65 percent of the participants had a grade twelve or higher education level, while 17 percent had a grade nine or lower education level. The authors found an average WRAT-R score of 7.3, which is equivalent to a grade seven education level. Further, 77 percent of the patients were able to comprehend the material on the grade five Cloze test,

but only 30 percent were able to comprehend the material on the grade nine Cloze test. In this study, however, significant positive correlations were found between reported education level and the grade five and grade nine Cloze tests, respectively.

In other studies, however, educational level did not correlate with higher reading skills. Davis et al. (1990) assessed the reading comprehension level of 151 primary care patients in five different ambulatory care settings using the Peabody Individual Achievement Test (PIAT). In addition to measuring achievement in mathematics, spelling, and general information, the PIAT contains a reading recognition subtest and a reading comprehension subtest. The authors found that the mean educational level of patients in the public clinic settings was "just above 10th grade," while their mean comprehension level was at the fifth grade level (Davis et al., 1990, p. 535). Patients who used the private practice clinic had a mean educational level of thirteenth grade and a mean comprehension level of tenth grade (p. 535). Because most "written education materials require comprehension grade levels of 11th to 14th," the authors concluded that "the average patient reading levels in all clinics were far below the comprehension level needed to read patient education materials" (p. 535).

Wilson, Mood, Risk, and Kershaw (2003) used the Rapid Estimate of Adult Literacy in Medicine (REALM) to test reading recognition and the Cloze test to measure reading comprehension in their study of 238 randomly selected patients receiving radiation therapy at two Midwest urban radiation oncology centers. The mean of the "self-report of highest grade completed in school" was 13 (SD = 3.3) (p. 72). The mean reading level score on the REALM was equivalent to seventh to eighth grade. The Cloze scores revealed that 52 percent understood the information they read, while 48 percent needed either supplemental instructions or "did not understand any of the information they read" (p. 73). The authors also found no relationship between comprehension and level of education, which led them to state that the "highest grade completed in school should not be used as a measure to infer a patient's comprehension level" (p. 73).

In the library and information science field, the authors did not find any studies that focused on reading comprehension; however, some studies on the readability of health material were retrieved. Baker and Wilson (1996) conducted one of the first studies assessing the readability of some medical and lay health-related books, as well as general and health-related newspaper articles. Using the "computer software program Grammatik-5, the Flesch-Kincaid readability formula was calculated" (p. 127). They found that the mean reading grade level of lay health materials was twelfth grade, the mean reading grade level for medically related newspaper articles was fourteenth grade (the general articles were at the twelfth grade level), and the mean reading grade level of medical texts was at the sixteenth grade level. In another study, Wilson, Baker, Brown-Syed, and Gollop (2000) se-

lected a convenience sample of forty-nine documents from the National Cancer Institution's Web site, CancerNet™, to determine what level of reading skills would be required by lay people who accessed this Web site. Using the Flesch-Kincaid scale available on Microsoft® Word for Windows 95, they found that the overall mean reading level was twelfth grade. The results of these two studies suggest that lay people may find that many health resources exceed their reading ability.

PURPOSE OF THE STUDY

Research has shown that people ask a variety of health-related questions at the reference desk (Marshall, Sowards, & Dilworth, 1989; Baker, Spang, & Gogolowski, 1998; Petty, 2001). On their lists of recommended books for consumer health collections, public librarians frequently include medical textbooks, which suggests that some people looking for more in-depth information about a disease, a condition, or a treatment may use these conventional medical books. Such texts, written primarily for health care professionals and replete with complex, detailed, medical language, can create inherent barriers for lay people unfamiliar with medical terminology. These books may be more difficult to understand, not only for average readers but even for more educated readers, that is, people who have attained a college degree or beyond. Because individuals are being asked to take more responsibility for understanding their health care options and because the amount of available health information continues to grow, it is important to investigate how well highly educated people decipher complex medical texts they may consult.

The purpose of this study was to assess the readability and comprehensibility of a small number of standard medical books that are recommended for consumer health collections. The following questions guided the study:

1. What level of education is required to read the information in medical textbooks?
2. How easy to read is the information in these textbooks?
3. What percentage of words in the selected paragraphs of these medical textbooks are incomprehensible to students in a library and information science program who have a minimum of sixteen years of education?

METHODS

Selection of Medical Textbooks

A number of print and Web-based lists of recommended books for consumer health collections were examined to determine whether they included standard medical textbooks. From the lists of the Consumer Health Information Service of the Toronto Public Library (2001) and Healthnet: Connecticut Consumer Health Information Network (2003), ten well-

known medical textbooks were chosen for inclusion in this study. From these textbooks information on six common adult diseases (myocardial infarction, diabetes mellitus, colon cancer, asthma, endometriosis, osteoporosis, asthma) and two common childhood diseases (juvenile diabetes mellitus and asthma) was examined for readability level, reading ease, and comprehension. A list of the disease information from each textbook is outlined in Table 1.

Readability Measures

The Readability Statistics (RS) option available on Microsoft® Word was used to assess the readability of the material on each disease from each textbook. The RS includes the Flesch-Kincaid Grade Level (FK) and the Flesch Reading Ease (FRE) readability formulas, which are calculated by averaging the number of syllables per word and words per sentence (Dollahite, Thompson, & McNew, 1996; Williams, French, & White, 2003). The FK indicates the “American grade-school level” that would be required to read a document (Williams, French, & White, 2003, p. 919). For example, a score of ten is equivalent to a tenth grade reading level. The higher the score, the more difficult the document is to read and understand. Unfortunately, the RS only assigns scores from third grade to twelfth grade reading levels and cannot “differentiate between information that is more difficult or easier [to read] than those levels” (Graber, Roller, & Kaeble, 1999, p. 59).

The FRE score, also available on Microsoft® Word’s RS function, ranges from 0 to 100. Because standard writing is reported to be in the range of 60–70, the lower the FRE score, the more difficult the document is to understand (Williams, French, & White, 2003, p. 919).

The RS also provides information on other factors that affect readability. According to Doak, Doak, and Root (1996), material that is written in a conversational style (that is, in the active voice) is easier to understand. Sentences constructed in the passive voice contain “embedded information . . . [which] slows down the reading process and generally makes comprehen-

Table 1: Textbooks and Diseases Used in the Evaluation

Textbook	Diseases
Merck Manual of Geriatrics	Osteoporosis
Merck Manual of Diagnosis & Therapy	All 6 Adult Diseases*
Cancer: Principles and Practice of Oncology	Colon Cancer
Nelson Textbook of Pediatrics	Diabetes Mellitus; Asthma
Current Medical Diagnosis & Treatment	All 6 Adult Diseases*
Current Diagnosis & Treatment in Cardiology	Myocardial Infarction
Current Diagnosis & Treatment in Orthopedics	Osteoporosis
Current Surgical Diagnosis & Treatment	Colon Cancer; Endometriosis
Cecil Textbook of Medicine	All 6 Adult Diseases*
Conn’s Current Therapy	All 6 Adult Diseases*

*Asthma, colon cancer, diabetes, endometriosis, myocardial infarction, and osteoporosis

sion more difficult" (Doak, Doak, & Root, 1996, p. 53). In addition, these authors advocated short sentences because sentences with ten to fifteen words are "easier to read and understand compared to long sentences" (p. 80). Therefore, the number of words per sentence and the percentage of passive sentences were also analyzed.

To determine the readability of the information on each of the six diseases, three one hundred-word paragraphs from each textbook were entered into Microsoft® Word to obtain the FK and FRE scores, the number of words per sentence, and the percentage of passive sentences. The paragraphs were taken from the beginning, the middle, and the end of each entry in order to obtain the overall scores for each item. The total number of paragraphs analyzed was ninety-six.

Comprehension of the Words

Readability formulas do not consider important items such as the technicality of the language (Baker & Wilson, 1996). Therefore, medical jargon may be incomprehensible not only to people with low reading skills but also to those who are well educated. To test this assumption, the graduate students in Baker's Introduction to the Library Profession course and Gollop's Information Resources and Services reference course were asked by independent facilitators to volunteer for the study. (The Human Investigation Committees of both universities approved the protocol before the study was undertaken.) Students with health sciences backgrounds or extensive health knowledge were asked to exclude themselves from the study. After briefly explaining the purpose of the study, the facilitator gave each volunteer (n = 32) the three paragraphs on one disease from one textbook and asked her/him to circle words she/he did not understand. It took each student approximately five to ten minutes to read the material and circle words they did not understand in the three paragraphs.

RESULTS

Flesch-Kincaid Readability Scores

The readability of information on six adult and two juvenile diseases found in ten medical textbooks was analyzed using the FK formula. The scores per paragraph ranged from a low of 8.9 to a high of 12. The overall mean FK was 11.9 (SD = .39). As outlined in Table 2, little variability in reading level was found among the textbooks. The mean reading level for seven of the textbooks was twelfth grade (SD = .00). For *The Merck Manual of Diagnosis and Therapy* (Beers & Berkow, 1999), the mean reading level was slightly lower (M = 11.9; SD = .26), as was also the case for *Current Medical Diagnosis & Treatment* (M = 11.87; SD = .57) (Tierney, McPhee, & Papadakis, 2003). The information on osteoporosis in *Current Diagnosis & Treatment in Orthopedics* (Skinner, 2003) required ninth grade reading skills (M = 9; SD

Table 2: Mean Flesch-Kincaid Score by Textbook

Textbook	N*	Mean	Standard Deviation
Nelson Textbook of Pediatrics	6	12	.00
Merck Manual of Geriatrics	3	12	.00
Current Surgical Diagnosis & Treatment	6	12	.00
Conn's Current Therapy	18	12	.00
Cecil Textbook of Medicine	18	12	.00
Current Diagnosis & Treatment in Cardiology	3	12	.00
Cancer: Principles and Practice of Oncology	3	12	.00
Merck Manual of Diagnosis & Treatment	18	11.91	0.26
Current Medical Diagnosis & Treatment	18	11.87	0.57
Current Diagnosis & Treatment in Orthopedics	3	10.50	1.55

*N = number of paragraphs analyzed per textbook. Total number of paragraphs = 96.

= 1.55). An analysis of variance revealed no significant difference in overall reading level among the paragraphs.

Flesch Reading Ease Scores

In addition to obtaining the FK score, the FRE for the six adult and two juvenile diseases was also analyzed. Per paragraph, the scores ranged from 0 (very hard to read) to a high of 50.7 (easier to read). The mean Flesch Reading Ease score for all items was 14.08 (SD = 14.79). As can be seen in the FRE scores outlined in Table 3, the information in *Current Diagnosis & Treatment in Orthopedics* (Skinner, 2003) on osteoporosis was the easiest to read, while the information in *Current Surgical Diagnosis and Treatment* (Way & Doherty, 2003) on colon cancer or endometriosis was the most difficult to read. Analysis of variance revealed significant differences ($p \leq .05$) among

Table 3: Mean Flesch Reading Ease Score* by Textbook

Textbook	N**	Mean	Standard Deviation
Current Surgical Diagnosis & Treatment	6	3.02	2.63
Nelson Textbook of Pediatrics	6	8.62	10.29
Cecil Textbook of Medicine	18	12.05	12.16
Merck Manual of Diagnosis & Therapy	18	13.27	15.16
Conn's Current Therapy	18	13.56	15.66
Current Medical Diagnosis & Treatment	18	13.80	14.56
Current Diagnosis & Treatment in Cardiology	3	17.57	6.41
Cancer: Principles and Practice of Oncology	3	25.97	25.37
Merck Manual of Geriatrics	3	26.17	9.10
Current Diagnosis & Treatment in Orthopedics	3	40.87	14.18

*Score ranges from 0 (very difficult to read) to 100 (easy to read)

** Number of paragraphs analyzed per textbook. Total number of paragraphs = 96.

paragraphs for *Conn's Current Therapy* ($F = 5.80$, $df = 2, 15$) (Rakel & Bope, 2002) and for *Nelson Textbook of Pediatrics* ($F = 11.59$, $df = 2, 3$) (Behrman, Kliegman, & Jenson, 2000). In *Conn's* the means of the paragraphs were linear, that is, the first paragraph had the lowest mean ($M = 3.75$) and was the most difficult to read, the mean of the second paragraph ($M = 9.57$) was higher, and the mean of the last paragraph ($M = 27.37$) revealed that the third paragraph was the easiest one of the three to read. No linearity among the paragraphs was noted for *Nelson*.

Number of Words Per Sentence and Passive Sentences

The overall average number of words per sentence by disease ranged from a low of 14.8 words on adult asthma in *Current Medical Diagnosis & Treatment* (Tierney, McPhee, & Papadakis, 2003) to a high of 33.2 words per sentence on myocardial infarction in *Cecil Textbook of Medicine* (Goldman & Bennett, 2000). The RS option on Microsoft® Word also provides the percentage of passive sentences in its calculations. In this study, the percentage of passive sentences across all textbooks ranged from 0 percent to 100 percent. The mode, or most frequently occurring number, was 40 percent, indicating that slightly less than half of all the material was written in the passive voice.

A total of 23 of the 96 paragraphs (24 percent) had no passive sentences. Three instances of completely passive sentences occurred in the second paragraphs of *Cecil Textbook of Medicine* (Goldman & Bennett, 2000) on asthma and *Conn's Current Therapy* (Rakel & Bope, 2002) on endometriosis, and in the third paragraph of *Conn's Current Therapy* on colon cancer.

Comprehension of the Words

Each student was asked to circle the words she/he did not understand in the three paragraphs about one disease from one medical textbook. While most students circled each unique word they did not understand, others were not as discriminatory and circled a string of words in a sentence. This practice made it more difficult to assess which term(s) they did not comprehend. For example, one student included the two words "mast cells" in one circle, perhaps indicating that she/he did not understand the concept "mast cells." One could assume that the student does know the meaning of the word "cells." Another student, however, included the words "myocardial infarction" in one circle. In this case, it is possible that this lay reader did not understand the concept or either of the two individual words.

To determine the percentage of words that were incomprehensible to the students, the following rules were applied:

1. The same word circled more than once in a document was counted only once
2. Hyphenated words were counted as two words, unless the terms represented a specific entity, for example, ST-segment

3. Variations of the same word were counted as different words, for example, infarct and infarction

As outlined in Table 4, the material on diabetes mellitus contained fewer incomprehensible words ($n = 28$) than did the material on colon cancer ($n = 90$) or myocardial infarction ($n = 94$). Anatomical terms, disease-related terms, and the names of drugs and chemicals were some of the words that stumped the students. A few examples include: endometriosis, myocardial infarction, peritoneum, lymphocytes, sigmoid, GnRH agonists, streptokinase, t-PA, verapamil, hypoxemia, Pa_{CO_2} , hypercholesterolemia, reduction, occlusion, and diltiazem.

DISCUSSION

The results of this study revealed that the information found in medical textbooks on the diseases under examination would be difficult for the average layperson to read. With very few exceptions, the FK readability formula showed that a layperson would need at least twelve years of education in order to read this material. Given the limitations of the FK scoring on Microsoft® Word, it is impossible to determine what reading level is required to read this material. A better indication may be obtained from the FRE scores. As noted above, standard writing is in the range of 60–70. The means of the FRE of the various textbooks were considerably lower than 60, clearly demonstrating that the medical material is very difficult to read. In addition, the length of the sentences (that is, number of words per sentence) greatly exceeds the ten to fifteen words per sentence as recommended by Doak, Doak, and Root (1996). Finally, a considerable amount (40 percent) of the material is written in the passive voice, a factor that may further contribute to making the information on these diseases in these textbooks difficult to read.

The results revealed that students were unable to comprehend some of the very terms they would need to know to get a clear understanding of the disease in question. This finding suggests that the terminology in

Table 4: Number of Incomprehensible Words by Disease

Disease	Total Number of Words Incomprehensible to Students	Total Number of Words per Disease	Percentage of Incomprehensible Words
Diabetes Mellitus	28	1,550	1.81
Osteoporosis	63	1,847	3.41
Asthma	66	1,532	4.31
Endometriosis	69	1,513	4.56
Colon Cancer	90	1,828	4.92
Myocardial Infarction	94	1,546	6.08

medical textbooks written for physicians and other health care professionals would stump many well-educated people. To satisfy their information needs and to be able to make an informed, knowledgeable decision, lay people would have to supplement their reading of medical textbooks with material that is more lay-oriented or consult appropriate reference sources, such as medical dictionaries.

CONCLUSIONS

This study is unique because it did not include the use of a standardized reading comprehension test, which has been employed in many readability studies. Instead, well-educated people were asked to identify specific terms that they did not understand in the medical literature on six adult and two juvenile diseases. The results provide a better indication of the problems involved in reading medical materials and of additional factors that librarians, health educators, and health care professionals should be aware of as they continue to help lay people in their quest to read and understand medical terminology.

The generalizability of the results of this study is limited by the small sample size, as well as by the small number of students who participated. It is possible that a larger corpus of material, participants, or both may yield different results. In addition, although the FK and FRE readability tests are widely recognized and used to determine reading levels of material, they are limited and may not be as accurate as other tests. In their book, Doak, Doak, and Root (1996) recommend the use of the SMOG test. Further research should be conducted using SMOG to determine the readability level of medical textbooks. The SMOG scores could be compared to FRE and FK scores to assess which tool provides more accurate results.

While academic health sciences librarians must have medical textbooks in their libraries, public librarians are still faced with the difficult decision of whether to purchase them for their collections. The results of this study suggest that library and information science professionals should test the reading comprehension of medical textbooks so that they can tailor medical and health material to the specific needs of their communities.

REFERENCES

- Baker, L. M., Spang, L., & Gogolowski, C. (1998). The provision of consumer health information by Michigan public librarians. *Public Libraries*, 37(4), 250-255.
- Baker, L. M., & Wilson, F. L. (1996). Consumer health materials recommended for public libraries. Too tough to read? *Public Libraries*, 35(2), 124-130.
- Beers, M. H., & Berkow, R. (Eds.). (1999). *The Merck manual of diagnosis and therapy* (17th ed.). Whitehouse Station, NJ: Merck Research Laboratories.
- Beers, M. H., & Berkow, R. (Eds.). (2000). *The Merck manual of geriatrics* (3rd ed.). Whitehouse Station, NJ: Merck Research Laboratories.
- Behrman, R. E., Kliegman, R. M., & Jenson, H. B. (2000). *Nelson textbook of pediatrics* (16th ed.). Philadelphia: W. B. Saunders.
- Consumer Health Information Service. Toronto Public Library. (2001). *Collection guide*. Retrieved July 9, 2004, from http://www.tpl.Toronto.on.ca/uni_chi_guide.jsp.

- Crawford, M. H. (Ed.). (2003). *Current diagnosis & treatment in cardiology* (2nd ed.). New York: Lange Medical Books/McGraw-Hill.
- Davis, T. C., Crouch, M. A., Wills, G., Miller, S., & Abdehou, D. M. (1990). The gap between patient reading comprehension and the readability of patient education materials. *Journal of Family Practice*, 31(5), 533-538.
- DeVita, V., Jr., Hellman, S., & Rosenberg, S. A. (Eds.). (2001). *Cancer: Principles and practice of oncology* (6th ed.). Philadelphia: Lippincott, Williams & Wilkins.
- Doak, C. C., Doak, L. G., & Root, J. H. (1996). *Teaching patients with low literacy skills* (2nd ed.). Philadelphia: J. B. Lippincott.
- Dollahite, J., Thompson, C., & McNew, R. (1996). Readability of printed sources of diet and health information. *Patient Education and Counseling*, 27, 123-134.
- Estey, A., Musseau, A., & Keehan, L. (1994). Patient's understanding of health information: A multi-hospital comparison. *Patient Education and Counseling*, 24, 73-78.
- Gibbs, R. D., Gibbs, P. H., & Henrich, J. (1987). Patient understanding of commonly used medical vocabulary. *Journal of Family Practice*, 25(2), 176-178.
- Goldman, L., & Bennett, J. C. (Eds.). (2000). *Cecil textbook of medicine* (21st ed.). Philadelphia: W. B. Saunders.
- Graber, M. A., Roller, C. M., & Kaeble, B. (1999). Readability levels of patient education material on the World Wide Web. *Journal of Family Practice*, 48(1), 58-61.
- Healthnet: Connecticut Consumer Health Information Network. (2003). *Recommended books for a consumer health reference collection*. Retrieved July 9, 2004, from <http://library.uhc.edu/departm/hnet/corelist.html>.
- Marshall, J. G., Sowards, C., & Dilworth, E. L. (1989). *Health information services in Ontario Public Libraries*. Toronto, ON: University of Toronto, Faculty of Library and Information Science.
- MLA Net. (2003). *Putting information into health literacy*. Retrieved July 9, 2004, from <http://www.mlanet.org/resources/healthlit/healthliteracy.html>.
- National Center for the Study of Adult Learning and Literacy (NCSALL). (n.d.). *Home page*. Retrieved July 9, 2004, from <http://gseweb.harvard.edu/ncsall>.
- Office of Disease Prevention and Health Promotion, U.S. Department of Health and Human Services. (2001). Section 11: Health communication. *Healthy people 2010*. Retrieved July 9, 2004, from <http://www.healthypeople.gov/document/HTML/Volume1/11HealthCom.htm>.
- Parikh, N. S., Parker, R. M., Nurss, J. R., Baker, D. W., & Williams, M. V. (1996). Shame and health literacy: The unspoken connection. *Patient Education and Counseling*, 27, 33-39.
- Petty, J. L. (2001). *Providing consumer health information services through collaborative efforts: Determining the need*. Unpublished master's thesis, Kent State University, Ohio.
- Rakel, R. E., & Bope, E. T. (Eds.). (2002). *Conn's current therapy*. Philadelphia: W. B. Saunders.
- Skinner, H. B. (Ed.). (2003). *Current diagnosis & treatment in orthopedics* (3rd ed.). New York: Lange Medical Books.
- Tierney, L. M., McPhee, S. J., & Papadakis, M. A. (2003). *Current medical diagnosis & treatment* (42nd ed.). New York: Lange Medical Books/McGraw-Hill.
- Way, L. W., & Doherty, G. M. (Eds.). (2003). *Current surgical diagnosis & treatment* (11th ed.). New York: Lange Medical Books/McGraw-Hill.
- Weaver, E. (2003). Eris Weaver on health literacy [Electronic version]. *Consumer Connections*, 19(4), 3-4. Retrieved July 9, 2004, from <http://caphis.mlanet.org/newsletter/19n4ConsConnect2003.html>.
- Williams, B. F., French, J. K., & White, H. D. (2003). Informed consent during the clinical emergency of acute myocardial infarction (HERO-2 consent substudy): A prospective observational study. *Lancet*, 361, 918-922.
- Wilson, F. L., Baker, L. M., Brown-Syed, C., & Gollop, C. (2000). An analysis of the readability and cultural sensitivity of information on the National Cancer Institute's Web site: CancerNet™. *Oncology Nursing Forum*, 27(9), 1403-1409.
- Wilson, F. L., Mood, D. W., Risk, J., & Kersaw, T. (2003). Evaluation of education materials using Orem's self-care deficit theory. *Nursing Science Quarterly*, 16(1), 68-76.