This study aims at measuring the readability level of selected recommended consumer health books. National literacy studies suggest that about half of the United States population has low functional literacy levels. Health literacy is a specialized aspect of literacy and is often complicated by technical language and barriers including psychological stress. Books for analysis were selected from Library Journal’s “Best Consumer Health Books of 2006” list. The readability of text was tested using the Simple Measure Of Gobbledygook (SMOG) and Flesch-Kincaid (FK) formulas. Results found that no books tested below a SMOG grade level of ten, the average FK grade was also ten. The results correspond to high school level readability—higher than the average consumer’s estimated reading level. The findings suggest that even recommended consumer health books are written at a level that is beyond the reading comprehension of about half of the population. Impacts on collection development are discussed.

Headings

Library schools – Theses – University of North Carolina at Chapel Hill

Public libraries – Collection development – United States

Libraries – Special collections – Medicine

Medicine, Popular – Information services

Communication barriers – United States
AN ASSESSMENT OF THE READABILITY OF RECOMMENDED POPULAR CONSUMER HEALTH TITLES: IMPLICATIONS FOR COLLECTION DEVELOPMENT

by
Emily J Hurst

A Master’s paper submitted to the faculty of the School of Information and Library Science of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Master of Science in Library Science.

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Approved by

______________________________
Claudia Gollop
Introduction

“As many as half of all adults in all socio-economic levels struggle with health literacy.” (Landro, L., 2003)

As expressed in this brief statement, health literacy is an epidemic problem in the United States. This statement draws attention to the startling realization that health literacy is a growing problem that affects many individuals and deserves more attention. Studies have been conducted to better understand the effects of low health literacy rates and national organizations including the Medical Library Association are taking the initiative to educate and inform librarians about health literacy and the important role of the library in providing access to health information.

Throughout the United States, public libraries provide an access point to information. Individuals frequently seek out health information in libraries. Information about health and healthcare needs for self, family or friends can often be located in the collections of a local public library. Subjects of interest may range from high blood pressure or menopause to cancer or heart transplants. Some health topics, such as euthanasia and abortion may even be of interest because of their controversial nature. Nevertheless, books on these topics address medical and health information that the library user may be seeking. No matter what the topic is, each issue is in some way important to the library user that is seeking information on the topic. Seeking information for health purposes can be of extreme importance to patients or individuals with a recent diagnosis.
Unfortunately finding useful health information is complicated when the available medical or health related texts are too difficult for the individual to understand or interpret. Studies suggest that individuals select a source of information “on the basis of convenience (or ease of access) however, an information source based on ease of access may not be the best source (Krikelas, J., 1983). Illiteracy is a barrier to information acquisition and faced with interpreting medical terminology and jargon a library user may abandon the search for information altogether. If libraries cannot provide users with access to materials to meet their information needs, the library user may be forced to seek other forms of information, which may not be accurate. Finding information that sounds “too good to be true” but is easy to comprehend is a serious pitfall for information acquisition and can be dangerous when considering the sensitive nature of medical information. Through collection development strategies and material readability testing libraries can help provide health information seekers with materials that best fit their needs.

To better understand literacy and its impact on health information acquisition we must first identify and define the salient terms related to health literacy and the public library:

*Health literacy.* As defined in *Health People 2010* health literacy is "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (U.S. Department of Health and Human Services, 2000). Health literacy requires that an individual be able to understand and utilize information.
Consumer health. Broadly defined, consumer health applies to health information for the general public (Baker, L. & Manbeck, V., 2002). Consumer health collections may consist of materials including medical texts and medical reference as well as information presented as pamphlets, care guides, websites or general texts. Consumer health collections may be utilized by average library goes who have health-related questions for family, friends or self as well as by patients seeking more information about a particular condition.

Popular/Hot topics: May include, subjects of particular interest due to recent medical developments, local health concerns or subjects promoted by the media. Within, consumer health these topics may be popular for a short period and then less so over time (Baker, L. & Manbeck, V., 2002; Rees, A.M., 1998). Lists such as “Best Consumer Health Books 2006” provide selected titles on popular topics published during the year (Bibel, B., 2007).

Background

The need for providing consumer health information through the library is important. The “Public Library Consumer Health Information Pilot Project” conducted by the National Library of Medicine (NLM) in 1998 monitored consumer health activities at libraries throughout the United States. The study found that in the public libraries monitored, health related questions were in the top five or top ten of all questions asked by library users. Of total reference questions, health related questions accounted for about six to twenty percent of reference questions (Wood, F.B. et al., 2000). In public libraries
the demand for health information continues. Providing information that best fit the needs of the public remains a priority demand in public information settings.

According to consumer health expert Alan Rees, in health literature “the quality of the book literature varies greatly.” He cites monographs as ranging from “carefully researched and well documented” to money driven and slanted. He also notes that authoritative specialists and physicians fail to produce consumer friendly works because of their tendency to only translate medical texts into lay language without providing additional support or information that may be of importance to the consumer. Physical authored texts provide a wide amount of information but often fail to answer the questions that are of interest to the consumer. “A well-written consumer health book communicates to consumers what they want to know…consumers wish to perform a simple triage and to decide what their next step should be” (1998). Understanding more about the health information needs of the consumer is vital to developing a collection that properly addressed these needs.

**Identifying the health consumer**

To get a better understanding of who seeks health information in a library, one must first have knowledge of the motivation that drives individuals to seek health related information. Understanding the information needs of library users with health questions is key to purchasing resources for a consumer health collection. The librarian must tailor a collection to meet the needs of the library user.

Understanding what motivates a library user to seek health information can be difficult. There are several models relating to information seeking behaviors and motivations but in the context of health information individuals typically appear
motivated by a health concern or risk. According to communication expert Brenda Dervin’s “sense-making model,” people seek information in order to bridge a gap in knowledge. According to this model an individual encounters a “situation” that impedes progress to the next step. This gap in knowledge is a barrier that can only be bridged through information seeking behavior. By asking questions and obtaining resources, referred to by Dervin as “helps”, the individual can use the resources and information to continue through daily life (1992).

While the “sense-making model” identifies an information gap as a starting place for information seeking behavior, other models of “information seeking behavior” suggests that an individual seeks information based on levels of uncertainty. When a state of uncertainty arises, for instance from a medical diagnosis, information seeking behavior is promoted. This level of uncertainty may lead to an immediate need for information or to a “deferred need.” The urgency of the information will depend upon how the individual conceptualizes the situation at hand. According to this model, information needs may also “grow logically out of previous needs.” This suggests a type of “continuity” in which an individual moves from one need to another (Krikelas, J., 1983).

No matter how information needs arise, an overriding factor in providing health information is the uniqueness of each situation. Dervin developed models such as the “sense-making model” in order to better explain diversity in information seeking behavior seen in health communication. In a 1980 study, Dervin found that diversity in a number of factors including individual “micromoments” in the context of health diagnosis, the kinds of questions patients want answers to and how individuals assess the helpfulness of answers to those questions all played an overriding role in health
communication (1980). In order to serve the information needs that arise from the diversity of health situations library must provide diverse resources.

*Literacy as a barrier*

Clarity is another aspect of communication that is vital for gathering and using information. Transmission of ideas cannot occur if there is a barrier between the information seeker and the information. Even if a knowledge gap is bridged with resources, the inability to utilize these resources will obstruct the transmission of information. The level of literacy a library user has and the readability level of the text provided in a library book can become barriers to knowledge acquisition.

Testing and understanding the literacy level of the U.S. population is important because it provides insight into reading comprehension skills. In order to provide information of any kind, one must also understand the basic literacy background of the person seeking information. In previous decades literacy was an issue for individual concern, but in the 1990’s literacy became an issue of national awareness in the US. With the passage of the National Literacy Act of 1991 the Federal government began taking steps to raise literacy awareness and combat illiteracy through education (Kirsch, I.S. et al., 1993). In general, basic print literacy can be defined as “the ability to read, write, and understand written language” (Nielsen-Bohlman, L. et al., 2004). Considering that all text is written for a specific purpose or function however, the meaning of the text is unique depending on the situation. In a more evolved definition, literacy is defined as “using printed and written information to function in society, to achieve one’s goals, and to develop one’s knowledge and potential” (Kirsch, I.S. et al., 1993). Measuring levels of literacy provides insight into an individual’s ability understand different types of
information including health information. Because health literacy implies utilization of information and skills, “health literacy is highly dependent on being functionally literate with written information” (Schloman, B.F., 2004). Developing a better understanding of health literacy levels can benefit health providers as well as health resource centers.

Providing information that is at an appropriate level of readability level can assist in the individual’s information acquisition process and help an individual make more appropriate health decisions.

According to the National Adult Literacy Survey (NALS) completed in 1993 almost fifty percent of adults in the US or about ninety million people have difficulty with basic reading and comprehension skills (Kirsch, I.S. et al., 1993). The most recently completed study of literacy in the U.S., the 2003 National Assessment of Adult Literacy (NAAL), found that about ninety-three million adults have a literacy level that is defined as basic or below basic skills (Kunter, M., Greenberg, E. & Baer, J., 2005). Individuals at these levels are unlikely to have high health literacy because their general literacy skills are minimal. These survey results reflect little change in the overall functional literacy level of individuals in the U.S. Functional literacy remains low and as a result continues to impact aspects of daily life for many Americans.

Illiteracy has many faces and cuts across social and economic lines. According to NALS data, adults that consistently scored low during literacy testing were typically older, less educated, held low playing jobs, lived at or near poverty levels and were of an ethnic or racial minority group (Kirsch, I.S. et al., 1993). The demographics of low literacy and low health literacy suggest that some of the nation’s poorest adults have difficulty functionally utilizing written information. These results are alarming when the
ability to utilize health information is considered. Because health information is highly specialized, individuals with low functional literacy may struggle more with information relating to health topics. The high level of illiteracy among the elderly is also alarming because they often require special medical attention and may not be able to understand directives from their physician. Overall, the NALS reported that about sixty-six percent of adults over sixty had marginal literacy skills (Kirsch, I.S. et al., 1993). Additionally the NAAL reported that about eleven million adults were non-literate in English (Kunter, M. et al., 2005). Promoting literacy and health information literacy requires a library to be aware of the needs of library users. Library resources should reflect the language and reading comprehension needs of the community.

Another important aspect of the NAAL finding is that the estimated average reading level for most Americans is at around eighth grade (Kunter, M. et al., 2005). When materials are written at a higher reading level users will likely have difficulty finding, interpreting or using information. Health books may be more difficult to understand if they are written with medical jargon and terms not easily understood by the average reader (Nielsen-Bohlman, L. et al., 2004). Aspects such as these present barriers that inhibit the reader’s ability to utilize information on medical topics.

In an effort to better understand health literacy in America, the NAAL was the first survey to include a section specifically aimed at assessing health literacy. According to the survey findings about fifty-three percent of individuals surveyed had “intermediate” health literacy skills and twenty-two percent had “basic” health literacy skills. As defined by the survey, intermediate literacy skills refer having the “skills necessary to perform moderately challenging literacy activities” such as reading and
summarizing moderately dense text and making inferences about the information. Basic literacy skills indicate “skills necessary to perform simple and everyday literacy activities” such as reading and understanding commonplace text. Reading and understanding specialized text is not included in this definition. According to survey results “fewer than fifteen percent of adults had either “below basic” or “proficient” health literacy” (Kunter, M. et al., 2006). The survey also found that the demographics of illiteracy related to health information mirrored those of general functional illiteracy. According to the survey adults sixty-five or older had the lowest average health literacy rate with twenty-nine percent having below basic literacy skills. Only three percent of adults in the sixty-five or older group had proficient health literacy (Kunter, M. et al., 2006). These rates are again alarming because of the medical attention usually necessary for individuals in this same age group. The survey also found that ethnic/racial minorities had lower levels of health, with Hispanic adults having the lowest average health literacy of those surveyed (Kunter, M. et al., 2006). The low level of health literacy found in Hispanic adults could be tied to barriers including limited English language skills. These findings support the need to provide library users with health information that will fit their needs. Language, age, education and other community needs should be considered when purchasing resources.

As a result of analysis on health literacy and the need for clear communication between medical professionals and patients, in 1998 the American Medical Association (AMA) developed plain language and health literacy promotion programs in order to provide patients with health information in more understandable ways. Through innovative toolkits and information groups, medical professionals are learning more
about the importance of health literacy and attempting to meet the health literacy needs of patients (American Medical Association Foundation, 2007). In order to create a collaborative relationship and continue to promote health literacy initiatives, the National Library of Medicine (NLM) awarded the Medical Library Association (MLA) a two-year contract to study health literacy in hospital libraries (Medical Library Association, 2008). The project, when complete, will provide an overview of how aware healthcare providers are of consumer health resources and information available through the NLM. This project will help NLM develop new strategies for promoting awareness of their consumer collections as well as aid in the development of new information resources.

**Literature Review**

A review of the literature found very few studies related to the readability of popular consumer, non-patient oriented materials. While numerous studies have undertaken the assessment of the readability of information pamphlets and specialized health topic information, studies addressing the readability of consumer health monographs, particularly on current or hot topic issues are not readily available.

One study on the readability of consumer health literature compared the reading levels of texts, journal articles and newspaper articles on health topics (Baker, L.M. & Wilson, F.L., 1996). Baker and Wilson’s study looked at thirteen different materials including articles from *JAMA* and the *Mayo Clinic Family Health Book*. This study used the Flesch-Kincaid reading level assessment to assign grade levels to texts reviewed. The comparative study found that the average reading level of the items assessed was grade twelve, the lowest level items reviewed were categorized as grade ten. This study also
found that several public libraries in the geographic area of review held texts specifically aimed at medical professionals. Titles such as *Harrison’s Principles of Internal Medicine* were held at twenty-three public library locations. According to this study *Harrison’s Principles of Internal Medicine* received a average estimated reading grade level of seventeen (Baker, L.M. & Wilson, F.L., 1996). This study provided an across the board comparison of various types of consumer information.

Because health literature for consumers and patients is available from a variety of sources it is also important to review the readability of different publication types written by various authors and organizations. In a comparative analysis of asthma related educational materials, the author undertook to rate the readability of asthma information from various sources including a popular newspaper, pamphlets from the Asthma Foundation, a news article written by a health professional and textbooks written by physicians. It was determined that the general newspaper articles and the educational pamphlets were written at an eighth grade reading level while literature written by health professionals were written between tenth and at least twelfth grade levels (Bauman, A., 1997). While information written by health expects and other reputable sources are offer the most reliable information, if these materials are not readable by patients and information seekers the utilization of information will fail. Doctors and medical foundations must consider the readability level of educational texts before making them available.

Patient education is an important field receiving growing interest in the health profession. Providing patients with materials that they can read is an important aspect of providing adequate healthcare support. While the average reading level of most adults
may be around the eighth grade level, studies find that patients have difficulty with health education materials written at this level. Providing health education materials at fifth to sixth grade reading levels is most beneficial for patients (Blackwell, J., 2005). Because patients often need specialized instructions, this article, a meta-analysis of study findings, suggests that some medical literature be rewritten or rephrased in order to meet the needs of patients. A 1998 study of patients’ ability to understand basic instructions regarding use of asthma inhalers supports the need for health education information presented at levels below the suggested eighth grade level. In this study of 486 patients, mostly African American women, found that despite two thirds of those that participated in the study reporting completion of high school, only twenty-seven percent could read at the ninth grade level or higher. Another twenty-seven percent read at a level between fourth and sixth grade (Williams, M.V. et al., 1998). These findings support the need for health education and consumer health information written at lower readability levels.

Recent studies also suggest a correlation between health literacy and personal health may exist. While a causal relationship between health literacy and health has yet to be proven, research studies linking limited health literacy to poor health conditions continue to appear (Nielsen-Bohlman, L. et al., 2004). A report and meta-analysis of literature on health literacy and health outcomes preformed by the Agency for Healthcare Research and Quality (AHRQ) provided additional information about the health outcomes as they relate to health literacy. The overall findings show a “statistically significant association between higher literacy level and knowledge of matters relating to use of health services and lower literacy and rates of hospitalization” (Berkman, N.D. et al., 2004). The findings in this analysis support the claim that raising health literacy one may improve overall health.
In summation, health literature hints that there may be a link between health, health seeking behavior, healthcare and health literacy. Despite recent articles addressing the readability of consumer and patient health texts, a conclusive association between health literary and personal health cannot be verified. Studies however, suggest a strong positive association between personal health behaviors and health literacy. Illiteracy is a broad problem affecting large portions of the U.S. population. Efforts to provide health information at lower reading levels are key to promoting and improving health literacy.

**Methodology**

This study and analysis uses a non-probability purposive sampling technique to select and analyze the readability of suggested current or popular topic consumer health titles published in 2006. The titles were chosen from the article “Best Consumer Health Books of 2006”, first published in the May 1, 2007 issue of *Library Journal*. The article featured brief reviews of twenty-two popular titles in consumer health published over the year. Topics in the list are geared to popular and hot topic issues relating to health.

Selection of this list of titles was based upon the wide circulation of *Library Journal*, 19,548 paid subscriptions as of February 2008 (Ulrich's Periodicals Directory). *Library Journal* is also indexed by several databases making the list more widely available. Archived lists are also made available free on the Internet through *Library Journal* archives. *Library Journal* often features segments for collection development devoted to specific specialty topics. The “best consumer health books” list has been a yearly feature in *Library Journal* since 1988. Barbara Bibel, a reference and consumer health librarian from Oakland, California, selects titles and provides reviews. Bibel is a member of the American Library Association as well as the Medical Library Association.
and is certified by the Medical Library Association as a consumer health information specialist (Bibel, B., 2005). With over twenty years of experience, Bibel provides insight into trends and topics that are of interest to library users seeking consumer health information. She provides concise reviews that may be instrumental in the collection development strategy of many libraries.

The 2006 list was selected to ensure that the titles were recent and that libraries which use Library Journal as a collection development tool had relatively equal time to acquire books on the list. At the time of this study the list had been available for approximately ten months. It was decided not to use a more recent list such as “Best Consumer Health Books of 2007” because this list was released in February of 2008, not allowing enough circulation time for the article.

Although the original list consisted of twenty-two titles, in order to select a convenient and representative sample the original list was compared to library holdings information found in WorldCat online database. Based on popularity, indicated by the number of libraries owing the title, the list was reduced to a sample size representing the top ten most popular titles (Figure 1).
<table>
<thead>
<tr>
<th>Book Title</th>
<th>Number of libraries owning title</th>
</tr>
</thead>
<tbody>
<tr>
<td>If Your Adolescent has an Anxiety Disorder: An Essential Resource for Parents</td>
<td>1863</td>
</tr>
<tr>
<td>What To Eat: An Aisle-by-Aisle Guide to Savvy Food Choices and Good Eating</td>
<td>1477</td>
</tr>
<tr>
<td>Unplugged: Reclaiming Our Right to Die in America</td>
<td>1409</td>
</tr>
<tr>
<td>Our Bodies, Ourselves: Menopause</td>
<td>1241</td>
</tr>
<tr>
<td>Last Rights: Rescuing the End of Life from the Medical System</td>
<td>1204</td>
</tr>
<tr>
<td>Money Driven Medicine: The Real Reason Health Care Costs so Much</td>
<td>1155</td>
</tr>
<tr>
<td>Big Pharma: Exposing the Global Healthcare Agenda</td>
<td>1129</td>
</tr>
<tr>
<td>Is it Hot in Here? Or is it Just Me? The Complete Guide to Menopause</td>
<td>1025</td>
</tr>
<tr>
<td>Body Hunters: Testing New Drugs on the World’s Poorest Patients</td>
<td>979</td>
</tr>
<tr>
<td>Human Drama of Abortion: A Global Search for Consensus</td>
<td>976</td>
</tr>
</tbody>
</table>

**Figure 1** (Data gathered February 13, 2008)

The readability of these ten titles was then analyzed using both the Simple Measure Of Gobbledygook (SMOG) and the Flesch-Kincaid (FK) methods. Readability levels were assigned based on the analysis of sample text (Figures 2-3).

The method for calculating the SMOG readability level is based on the formula devised by psychologist and education expert, G. Harry McLaughlin in 1969. The SMOG formula is designed to be more accurate than other tests such as the Flesch-Kincaid because the formula relies on syllabification and sentence length, two factors strongly associated with reading comprehension skill. The number of words with more than three syllables and the average sentence length are both associated with ease of reading (McLaughlin, G.H., 1969). In accordance with the SMOG method, for each title thirty sentences (ten from the first pages of the work, ten from the middle and ten from
the end) were selected from each book for analysis. The basis of the SMOG readability formula is found by counting the average number of polysyllabic words in each sentence, then estimating the square root of the number of polysyllabic words and adding a constant of three. By adding three the SMOG grade can be calculated. To ensure accuracy in calculation, procedures outlined in Appendix A provide additional measures for calculating the SMOG grade. The SMOG grade can then be compared to educational level equivalent (Appendix B).

To calculate the FK levels the same set of text (thirty sentences from each book) was typed into Microsoft Word software. Using the Spelling and Grammar tool in Microsoft Word, the FK Reading Ease and Grade Level scores for each title were then calculated through the software program. The FK formula for Reading Ease measures the readability of text based on the average number of words in each sentence and the average number of syllables in the overall text. The Reading Ease formula can be then translated into a corresponding grade level using the FK Grade Level formula (Flesch, R.F., 1951) (Appendix C).

**Results**

Selected text from ten titles was analyzed for readability level based on the SMOG and FK formulas. Each text was assigned a SMOG grade based on the result of analysis (Figure 2). For all texts the mean reading level was found to be 12.97, standard deviation of 1.58 was calculated. According to this average, the books analyzed in this study were on average written at a readability level best suited for a user with a high school or college reading level. Of the texts graded, *Last Rights* had the lowest assigned readability grade of 10.55. The highest readability grade was *The Human Drama of*
Abortion with a SMOG score of 15.81 this text was equivalent, to the “some college” level of the SMOG grade scale.

![SMOG Grade Levels](image)

**Figure 2**

Analysis of the same selected texts using the FK Reading Ease formula found that the mean Reading Ease was 49.74. The easiest to read title, based on the Reading Ease formula was *If Your Adolescent has an Anxiety Disorder* with a calculated Reading Ease of 61.40. The most difficult to read text, based on this formula was *The Human Drama of Abortion* with a Reading Ease level of 33.40. When the FK Reading Ease results were translated in the corresponding U.S. grade levels the average grade level for the ten titles was 10.84 (standard deviation 1.28), a high school reading equivalent. Of all the titles tested, none tested below *Last Rights* at a grade level of 9.1. The highest grade level assigned by the FK Grade Level formula is twelve, this grade was assigned to three of the
titles analyzed *The Human Drama of Abortion, Money Driven Medicine* and *Our Bodies, Ourselves: Menopause* (Figure 3).

**Figure 3**

**Discussion**

The findings presented in this study support literature that suggests that health related titles are more difficult to understand for the average consumer. The texts used in this analysis were chosen because they are recommended “consumer health” titles. Despite being labeled as consumer oriented, analysis demonstrated that the readability of the ten items was relatively high. The education level necessary for understanding the content of the books ranged from the “high school” to “some college” levels which are
beyond those of “junior high” or eighth grade readability which is the estimated average reading level.

This study also provided insight into two common readability measures. FK readability analysis has been commonplace and software such as Microsoft Word makes testing readability through this formula rapid and reliable. SMOG readability scores can easily be measured by hand using the SMOG formula (Appendix A) or online via web based SMOG calculators. Analysis of which test is more accurate deserves more attention. While the findings in this study were similar, it is important to note that some strong differences in the grade level readability did occur. The FK analysis gave lower reading levels to some texts while SMOG grades were somewhat higher. The FK is limited however by assigning grades only as high as twelve. Some text may be college level and should be calculated adequately. The FK is based on a formula that does not provide for grading or assessment of the college level materials.

As discussed above about half of the U.S. popular has low or below average functional literacy skills. In order to meet the criteria of health literacy as defined by Healthy People 2010, a reader should be able to use the information presented to make health decisions if necessary. If reading levels of books labeled “consumer health” are too high users will continue to encounter information acquisition barriers. The library has a role in information seeking and acquisition. Consumer health books should receive special consideration not only because of the sensitive nature of the topics presented in the collection, but because of the diverse needs of the information seeker.

Providing access to topics of interest to library users remains an important goal of library management. The “Best Consumer Health Books” list suggested by Library
Journal and other similar lists provide one way of distinguishing what topics are popular for the time. Using this as a selection criterion can be beneficial but lists such as these do not often take into consideration reading level of the materials suggested. Important questions remain regarding health literacy, the role of the librarian and the expectations of the library’s consumer health collection. Questions for further consideration include: what is the role of the collection development librarian regarding popular health titles? Can a strategy be developed to review content as well as the readability of texts?

Conclusions

In light of the findings presented by this study, further investigation into the needs of consumers and their use of health collections should be considered. If questions related to health are frequently brought to the reference staff, resources should be available to meet the needs of diverse users. Because studies suggest that low literacy may be linked to low health education and healthcare standards more effort should be made to provide access to information that is usable by individuals that fall into low functional literacy categories. Providing access to usable information remains a standard goal in libraries and a consumer health collection should provide information that is usable by all. Through special policies collections librarians can adopt methods to ensure that resources on health topics are provided in different reading levels. The amount of time, resources and responsibility given to tasks such as the development and purchase of plain language materials are key factors for providing access to health information that require further study and analysis.
References


Appendix A

SMOG Readability Formula

The following steps and formula were used to calculate the SMOG reading grade level of texts used in this study. The formula can be used to measure the readability level of most documents.

Using the entire text work that is being assessed the following four steps were used:

1. Count off 10 consecutive sentences near the beginning, in the middle, and near the end of the text.
2. From this sample of 30 sentences, circle all of the words containing three or more syllables (polysyllabic). Include repetitions of the same word. Then total the number of words circled.
3. Estimate the square root of the total number of polysyllabic words counted. (This is done by finding the nearest perfect square, and taking its square root.)
4. Finally, add a constant of three to the square root. This number gives the SMOG grade, or the reading grade level that a person must have reached if he or she is to fully understand the text being assessed.

Additional guidelines:

- A sentence is defined as a string of words punctuated with a period (.), an exclamation point (!) or a question mark (?).
- Hyphenated words are considered as one word.
- Numbers which are written out should also be counted. If in numeric form in the text, they should be pronounced to determine if they are polysyllabic.
- Proper nouns, if polysyllabic are counted.
- Abbreviations should be read as unabbreviated to determine if they are polysyllabic.
Appendix B

SMOG Grades, corresponding education levels and example texts

<table>
<thead>
<tr>
<th>SMOG Grade</th>
<th>Educational Level</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 6</td>
<td>low-literate</td>
<td>Soap Opera Weekly</td>
</tr>
<tr>
<td>7</td>
<td>junior high school</td>
<td>True Confessions</td>
</tr>
<tr>
<td>8</td>
<td>junior high school</td>
<td>Ladies Home Journal</td>
</tr>
<tr>
<td>9</td>
<td>some high school</td>
<td>Reader's Digest</td>
</tr>
<tr>
<td>10</td>
<td>some high school</td>
<td>Newsweek</td>
</tr>
<tr>
<td>11</td>
<td>some high school</td>
<td>Sports Illustrated</td>
</tr>
<tr>
<td>12</td>
<td>high school graduate</td>
<td>Time Magazine</td>
</tr>
<tr>
<td>13 - 15</td>
<td>some college</td>
<td>New York Times</td>
</tr>
<tr>
<td>16</td>
<td>university degree</td>
<td>Atlantic Monthly</td>
</tr>
<tr>
<td>17 - 18</td>
<td>post-graduate studies</td>
<td>Harvard Business Review</td>
</tr>
<tr>
<td>19+</td>
<td>post-graduate degree</td>
<td>IRS Code</td>
</tr>
</tbody>
</table>
Appendix C

Flesch-Kincaid Reading Ease Formula

\[ 206.835 - 1.015 \left( \frac{\text{total words}}{\text{total sentences}} \right) - 84.6 \left( \frac{\text{total syllables}}{\text{total words}} \right) \]

Higher scores indicate that the material tested is easier to read while lower scores are indicative of materials that are more difficult to read.

Flesch-Kincaid Grade Level Formula

\[ 0.39 \left( \frac{\text{total words}}{\text{total sentences}} \right) + 11.8 \left( \frac{\text{total syllables}}{\text{total words}} \right) - 15.59 \]

This formula makes it possible to translate Flesch-Kincaid Reading Ease scores into corresponding grade level reading ability. Grade levels are based on the U.S. education system and rank no higher than grade twelve.