Evaluation of MedlinePlus

Group 13

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**Evaluation of MedlinePlus**

As the Internet becomes increasingly accessible and ubiquitous, it has become people’s primary source when seeking information of various types, including health information. With the abundance of health information available online, it is often a challenge to locate and discern that which is accurate and credible from that which is not. MedlinePlus is by far the most comprehensive source for consumer health information on the Internet. Produced by the National Library of Medicine (NLM) and the National Institutes of Health (NIH), the information on MedlinePlusis designed for consumers, and is accurate, unbiased, timely and easily utilized.

There is a trend of consumer empowerment which has resulted in people assuming greater control over their health, no longer satisfied with sole reliance upon a healthcare provider for information (McGonigle & Mastrian, 2012). Health practitioners and Library and Information Science professionals frequently recommend the MedlinePlus website to both patients and patrons as a source of reliable health information, thus the group’s selection for evaluation. In December 2003, the ACP *Observer* posted results from a pilot program using an “Information Rx Pad” in which the physician wrote the patient’s diagnosis on a prescription pad and referred the patient to healthcare websites for additional information on disease management and treatment (Doyle, 2003). “According to a survey of internists who participated, more than half (52%) said they were now referring more patients to the Web for health-related information. While 59% of the doctors referred patients to the Web before the pilot program, 92% now send patients to MedlinePlus” (Doyle, 2003). To assess the website and its content, we utilized criteria recommended by the Medical Library Association when determining accuracy, the site’s intended audience, author, currency, and factual information (Medical Library Association, 2011). Additionally, the website’s accessibility, graphics, links, and privacy practices were examined.

**Web Site Information**

The evaluation tool used to critique MedlinePlus was the Health-Related Web Site Evaluation Form (HRWSEF) (see Appendix A). This form is designed specifically for health-related web sites and offers an easily-understood quantitative measure of evaluation (Teach, 1998). HRWSEF was selected because it incorporates many of the criteria utilized by other evaluation tools, is specific to health related web sites, and is produced by a credible source.

Because users may navigate to MedlinePlus via the domains .org, .edu, .gov, or .com, it is convenient for those who might not remember the exact web address. Health professionals and consumers utilize MedlinePlus for its comprehensive, yet easily-understood content which features over 4,000 articles, over 2,000 color images, and 60,000 definitions (MedlinePlus, 2011). The web site provides users with information about wellness, health conditions and diseases. Barbara F. Schloman (2006) stated, “…this pattern of use can be expected to grow, calling upon health professionals to be aware of what health information the Internet has to offer. This should include a working understanding of the resources available through MedlinePlus to increase the likelihood that consumers will find the best information available” (Schloman, 2006).

**Content**

Measured against the Health-Related Web Site Evaluation Form (HRWSE), MedlinePlus scored a 10/10 in the area of content. The website’s intent to provide unbiased educational information was clearly stated. MedlinePlus provides in-depth information about drugs and supplements, diseases and wellness, plus a medical dictionary, encyclopedia, treatment information, videos and instructional materials. It was clearly stated that advertising is prohibited. MedlinePlus does not endorse any products or providers and proscribes content which might be interpreted as an endorsement.

**Accuracy**

MedlinePlus scored a 6/6 in the area of accuracy using the HRWSE. All information on the website is cleared by the National Institutes of Health, the National Library of Medicine, and ClinicalTrials.gov (Medlineplus, 2011). The website’s goal is to provide accurate information. Sources are clearly documented, well-known, trustworthy, and reputable. The site’s advisory board, members and consultants are listed.

MedlinePlus subscribes to Health on the Net Foundation (HON) code of conduct. Created in 1995, HON is a non-profit, non-governmental organization, accredited to the Economic and Social Council of the United Nations (Health on the Net Foundation, 2011). The HON addresses the credibility of health and medical web sites on the internet. A HON certification “implies a thorough evaluation” of the website (Health on the Net Foundation, 2011). The website is monitored throughout the year and an annual review is performed on all HON certified websites.

**Author**

Based on the HRWSE, the website received a score of 4/4 for author. MedlinePlus is sponsored by the U.S. National Library of Medicine and the National Institutes of Health (MedlinePlus, 2011). Links to both the National Library of Medicine and the National Institutes of Health were displayed visibly on the homepage. An email address, physical mailing address, and customer service phone numbers were provided for additional assistance.

**Currency**

MedlinePlus scored a 4/4 on the HRWSE for currency. The frequency of content update and review was prominently indicated. All health topic pages are reviewed every six months. Two dates appeared on each topic page: the first was the “date last updated”, which specified when content was last added or deleted from the page. The second date was the “topic last reviewed” which indicated when the entire subject was last reviewed.

The medical dictionary currently has a copyright date of 2010 (MedlinePlus, 2011). Drug information is updated monthly and supplement information is updated quarterly. Tutorials are updated yearly and the encyclopedia monthly. Updates to the health news occur each weekday, with content drawn from Reuters Health Information, HealthDay, and press releases from medical organizations. Information from Reuters and HealthDay remain on the site for three months. MedlinePlus reflects the continual changes occurring in medicine with current and timely material on the latest treatments and medications. A tag cloud offers a visual representation of popular searches conducted on the site, and the search term’s font size varied according to the current popularity of the search topic.

**Audience**

The website scored 8/8 for audience. Dr. Lindberg, director of the National Library of Medicine stated that the information was directed at both healthcare professionals and the consumer (MedlinePlus, 2011). MedlinePlus is an excellent source of information for any user. The content is credible and user-friendly in several formats which include videos, diagrams, and text. It is accessible to people with special needs or adaptive equipment and is available in forty-seven different languages via the “Multiple Languages” tab (MedlinePlus, 2011).

The site reported steadily increasing usage, with over 42 million new visitors from April to June 2011 (MedlinePlus, 2011). Current health information is offered with clear definitions and minimal medical jargon. MedlinePlus is free to its users and does not require membership or registration.

The fonts used are large enough for most readers to view without eyestrain. Important headings are in bold for easy identification and navigation. Short, direct paragraphs highlight specific content which help maintain a reader’s attention. The website is user-friendly and easily navigated.

Clear definitions are supplied for any technical term s. Additionally, a medical dictionary further explains unfamiliar terms. The language used is straightforward and an “Easy to Read” link offers content for low-level readers as well as pictures for increased understanding. The reading level of information contained within this section is fifth to eighth grade level (MedlinePlus, 2011). This was confirmed with the SMOG Readability Formula (Rollins School of Public Health, Health Promotion and Wellness, 1998). This tool is utilized by the HRWSEF to measure a website’s reading level (Assessing reading level). Using this tool, the section that was evaluated scored at a sixth grade reading level (see Appendix B).

**Navigation**

In the area of navigation, MedlinePlus earned a HRWSEF score of 12/12. The website is well-organized, with a prominent search box for simple and rapid information retrieval. Tabs at the top of the page assist in searching for information by category. The side bar menu is located in a manner which does not distract from the rest of the page. The Facts-Answers-Questions (FAQ) page addresses commonly asked questions. Tabbed information at the bottom of the page yields facts regarding privacy, accessibility, quality of content, and disclaimers.

MedlinePlus offers information in various formats to appeal to different learning styles. Videos are free of advertisements, easily accessible and provide relevant information. Written content is augmented by tutorials, images and diagrams. MedlinePlus provides links to the vendor of any software needed to access information on the web site. The graphics on the website are useful and do not distract the user with unnecessary information.

**External Links**

MedlinePlus scored 12/12 for external links based on the HRWSEF. MedlinePlus specifically displays the criteria used to evaluate external links. The website indicated that links were reviewed for quality of information and limited to those that provide health content. External links were only to credible, reliable resources and associated national organizations (MedlinePlus, 2011). The source of the link is clearly shown. All links were directly related to the search performed, and provided additional resources. Links operated properly and no non-functioning links were encountered. MedlinePlus linked only to original information and nothing was copied from another source (MedlinePlus, 2011). The website’s primary intent is to educate. All participating organizations must offer accurate, science-based information which either compliments or enhances the information from the NLM. Participating organizations must have a matching mission of education only.

**Structure**

The structure of the website scored 9/10 on the HRWSEF. MedlinePlus offers various informational formats for different user learning styles, but did not provide a text-only option. The website is accessible to all users including those with special needs or adaptive equipment. A toll-free number and email address are available for reporting of accessibility issues. To make the site more user-friendly, MedlinePlus offers access via mobile devices, email updates, and Twitter. To enhance usefulness with healthcare providers, the website may be linked to electronic medical records (EMR). Videos are free of advertisements, easily accessed and provide relevant information. Tutorials, images and diagrams augment written content.

Graphics and videos downloaded with minimal delay. The graphics were useful and did not distract the user with unnecessary information. They were a good supplemental tool, although the website’s content was thorough enough to stand alone. The privacy policy for MedlinePlus was easily accessed, and clearly indicates that no information is collected for marketing purposes. Although some information about the user’s visit is collected, this information is regularly deleted. MedlinePlus states that no identifiable user data will be retained when used in conjunction with an EMR. MedlinePlus clearly explains the temporary and persistent cookie use. Cookies can be disabled either on the user’s web browser or via an opt-out option, neither of which would prevent a user from accessing website content.

**Evaluation Summary**

Based on the HRWSEF, the total score possible for MedlinePlus was 66. MedlinePlus scored 65. This is an overall rating of 98%. MedlinePlus rated excellent. Excellent is defined by the HRWSEF as “… an excellent source of health information.

Consumers will be able to easily access and understand the information contained in this site. Do not hesitate to recommend this site to your clientele” (Teach, 1998).

**Conclusion**

Since the inception of the World Wide Web, consumers have relied on information which may not be 100% factual, depending upon the chosen website and any bias inherent in the website. Today, more physicians refer consumers to the Internet for health-related information, specifically to MedlinePlus.

MedlinePlus was critiqued using the Health-Related Web Site Evaluation Form in regards to content, accuracy, author, currency, audience, navigation, external links, and structure. Based on the HRWSEF, MedlinePlus received a total score of 98% rendering the website a valuable tool for both consumers and health professionals seeking health-related information.

Appendix A

**Health-Related Web Site Evaluation Form**

Web site information:  
Title of site:  
Subject of site:   
Web site address:   
Whom do you think is the intended audience?  
What do you think the objective is for this site?  
  
Circle the number which you feel best represents the site: 1 = disagree, 2 = agree, 0 = not applicable (N/A). Add up the total points scored for each page at the bottom of each page.

|  |  |  |  |
| --- | --- | --- | --- |
| II. Content   1. The purpose of the site is clearly stated or may be clearly inferred. 2. The information covered does not appear to be an “infomercial” (i.e., an advertisement disguised as health education 3. There is no bias evident. 4. If the site is opinionated, the author discusses all sides of the issue, giving each due respect. 5. All aspects of the subject are covered adequately. 6. External links are provided to fully cover the subject (if not needed, circle 0).   III. Accuracy   1. The information is accurate (if not sure, circle 0). 2. Sources are clearly documented. 3. The web site states that it subscribes to HON code principles.   IV. Author   1. The site is sponsored by or is associated with an institution or organization. 2. For sites created by an individual, author’s/editor’s credentials (educational background, professional affiliations, certifications, past writings, experience) are clearly stated. 3. Contact information (email, address, and/or phone number) for the author/editor or webmaster in included.   V. Currency   1. The date of the publication is clearly posted. 2. The revision date is recent enough to account for changes in the field.   VI. Audience   1. The type of audience the author is addressing is evident (academic, youth, minority, general, etc.) 2. The level of detail is appropriate for the audience. 3. The reading level is appropriate for the audience. 4. Technical terms are appropriate for the audience.   VII. Navigation   1. Internal links add to the usefulness of the site. 2. Information can be retrieved in a timely manner. 3. A search mechanism is necessary to make this site useful. 4. A search mechanism is provided. 5. The site is organized in a logical manner, facilitating the location of information. 6. Any software necessary to use the page has links to download software from the Internet.   VIII. External Links   1. Links are relevant and appropriate for this site. 2. Links are operable. 3. Links are current enough to account for changes in the field. 4. Links are appropriate for the audience (e.g. sites for the general public do not include links to highly technical sites). 5. Links connect to reliable information from reliable sources. 6. Links are provided to organizations that should be represented.   IX. Structure   1. Educational graphics and art add to the usefulness of the site. 2. Decorative graphics do not significantly slow downloading. 3. Text-only option is available for text-only Web browsers. 4. Usefulness of site does not suffer when using text-only option. 5. Options are available for disabled persons (large print, audio). 6. If audio and video are components of the site, and cannot be accessed, the information on the site is still complete. | Disagree  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1  1 | Agree  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2  2 | N/A  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0 |

Page Score\_\_\_\_\_\_\_\_\_\_\_

Total Score\_\_\_\_\_\_\_\_\_\_\_

Total number of possible points\_\_\_\_\_\_\_\_\_\_\_

Percentage of total points\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

To calculate the web site's score, the total points scored must be added up as well as total points possible. Total points possible is defined as the number of questions answered as either agree or disagree multiplied by two. The total score must then be divided by the total number of points possible to determine the overall rating of the web site.

**Total score/Total number of possible points = percentage of total points**

For example, if 30 out of 36 questions were answered with either disagree or agree, then the total number of points possible is 60 (30 multiplied by 2). If the total points scored were 54, then divide 54 by 60 (the total points possible). The overall rating of the web site is 90%, which falls into the excellent range.   
Total score: 54   
Total number of possible points: 30 x 2 = 60  
Percentage of total points: 54/60 = 90%  
Rating of web site: Excellent

|  |  |
| --- | --- |
| **Score** | **Rating** |
| At least 90% of total possible points. | **Excellent**: This web site is an excellent source of health information. Consumers will be able to easily access and understand the information contained in this site. Do not hesitate to recommend this site to your clientele. |
| At least 75% of total possible points. | **Adequate**: While this web site provides relevant information and can be navigated without much trouble, it might not be the best site available. If another source cannot be located, this site will provide good information to your clientele. Care should be taken to discuss with your clientele what information was found on this web site and what information is still needed. |
| Less than 75% of total possible points. | **Poor**: This site should not be recommended to your clientele. Validity and reliability of the information cannot be confirmed. All information on the site might not be accessible. Look for another web site to prevent false or partial information from being read. |

Appendix B

**Assessing Reading Level**

**The SMOG Readability Formula**

To calculate the SMOG reading grade level, begin with the entire written work that is being assessed, and follow these four steps:  
  
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), including repetitions of the same word, and 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.

A few additional guidelines will help to clarify these directions:

* 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 considered, and if in numeric form in the text, they should be pronounced to determine if they are polysyllabic.
* Proper nouns, if polysyllabic, should be counted, too.
* Abbreviations should be read as unabbreviated to determine if they are polysyllabic.

Not all pamphlets, fact sheets, or other printed materials contain 30 sentences. To test a text that has fewer than 30 sentences:  
1. Count all of the polysyllabic words in the text.  
2. Count the number of sentences.  
3. Find the average number of polysyllabic words per sentence as follows:  
Average= Total # of polysyllabic words/Total # of sentences  
4. Multiply that average by the number of sentences short of 30.  
5. Add that figure on to the total number of polysyllabic words.  
6. Find the square root and add the constant of 3.

A quick version of the SMOG test:  
  
Count the number of polysyllabic words in the chain of 30 sentences and look up the approximate grade level on the SMOG conversion table.

**SMOG Conversion Table**

|  |  |
| --- | --- |
| **Total polysyllabic word counts** | **Approximate grade level (+/- 1.5 grades)** |
| 0-2 | 4 |
| 3-6 | 5 |
| 7-12 | 6 |
| 13-20 | 7 |
| 21-30 | 8 |
| 31-42 | 9 |
| 43-56 | 10 |
| 57-72 | 11 |
| 73-90 | 12 |
| 91-110 | 13 |
| 111-132 | 14 |
| 133-156 | 15 |
| 157-182 | 16 |
| 183-210 | 17 |
| 211-240 | 18 |

(Making Health Communication Programs Work, A Planner's Guide, US. Dept of Health and Human Services, 1992)

References

Doyle, E. (2003). MedlinePlus project: Premium information for patients. *ACP Observer*, *12*. Retrieved from http://www.acpinternist.org/archives/2003/12/medlineplus.htm

Health on the Net Foundation website. (2011). http://www.hon.ch/

McGonigle, D., & Mastrian, K. G. (2012). *Nursing Informatics and the foundation of knowledge* (2nd ed.). Burlington, MA: Jones & Bartlett.

Medical Library Association website. (2011). http://www.mlanet.org/resources/userguide.html

MedlinePlus website. (2011). http://www.nlm.nih.gov/medlineplus/

Schloman, B. F. (2006). Information resources MedlinePlus: Key resource for both health consumers and health professionals. *OJIN: The Online Journal of Issues in Nursing*, *11*(2). doi: 10.3912/OJIN.Vol11No02InResCol01

Teach, L. (1998). Health-Related Web Site Evaluation Form. Retrieved from http://www.sph.emory.edu/WELLNESS/instrument.html