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Readability analysis of online resources related to lung cancer



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ABSTRACT

Background: Patients seeking health information commonly use the Internet as the first source for material. Studies show that well-informed patients have increased involvement, satisfaction, and healthcare outcomes. As one-third of Americans have only basic or below basic health literacy, the National Institutes of Health and American Medical Association recommend patient-directed health resources be written at a sixth-grade reading level. This study evaluates the readability of commonly accessed online resources on lung cancer.

Methods: A search for “lung cancer” was performed using Google and Bing, and the top 10 websites were identified. Location services were disabled, and sponsored sites were excluded. Relevant articles ($n = 109$) with patient-directed content available directly from the main sites were downloaded. Readability was assessed using 10 established methods and analyzed with articles grouped by parent website.

Results: The average reading grade level across all sites was 11.2, with a range from 8.8 (New Fog Count) to 12.2 (Simple Measure of Gobbledygook). The average Flesch Reading Ease score was 52, corresponding with fairly difficult to read text. The readability varied when compared by individual website, ranging in grade level from 9.2 to 15.2. Only 10 articles (9%) were written below a sixth-grade level and these tended to discuss simpler topics.

Conclusions: Patient-directed online information about lung cancer exceeds the recommended sixth-grade reading level. Readability varies between individual websites, allowing physicians to direct patients according to level of health literacy. Modifications to existing materials can significantly improve readability while maintaining content for patients with low health literacy.

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Introduction

Healthcare in the United States has become increasingly consumer-driven, and this parallels the expanding access to online resources. Internet usage among adult Americans has surged from 14% in 1995 to 87% in 2014.¹ The availability of online health resources has changed the way in which patients obtain health information. In 2012, 72% of Internet users reported having searched online for health information within the past year.² In the 2005 Health Information National Trends Survey data set, 60% of surveyed patients reported using the Internet as their first source of health information compared to only 20.8% who reported asking a doctor.³

Increasing access to health information has many perceivable benefits. However, adequate interpretation of the available resources is paramount. The proper utilization of health information is dependent on a person's health literacy, which the Institute of Medicine has defined 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.⁴ Unfortunately, the vast majority of Americans lack proficiency in health literacy. According to the 2003 National Assessment of Adult Literacy performed by the US Department of Education, only 12% of Americans demonstrated proficient health literacy, while 36% were considered to have basic or below basic health literacy.⁵

Health literacy in part depends on an individual's ability to read. The average American reads at an eighth-grade level, and approximately one of five Americans reads at or below the fifth-grade level.⁶ However, the capability to comprehend a document is not only a function of literacy but also the readability of the text. Readability, a measure that describes how difficult a text is to read and understand, should ideally match the literacy of the target audience. To address this point, the American Medical Association (AMA) and National Institute of Health (NIH) have recommended that patient-directed health information should be written at or below the sixth-grade reading level.^{7,8} Multiple studies spanning various medical specialties have evaluated the readability of print and electronic health information from professional societies and Internet search results. These studies have consistently found the resources to be above the reading level for the average American and failed to meet the AMA and NIH recommendations for readability.⁹⁻²⁰

The primary objective of this study was to characterize the readability of the most popular Internet resources available for patient information about lung cancer. The study was designed to simulate a patient query using online search engines and to evaluate the readability of information from the most accessed websites in the context of average American literacy. Secondary analysis of readability of information grouped by website was performed to evaluate whether some sites may be more appropriate than others for patients with lower health literacy.

Methods

A search for the term "lung cancer" was performed using the two largest public Internet search engines, Google (Google Inc, Mountain View, CA) and Bing (Microsoft Corporation, Redmond, WA). Location settings and account information were disabled to avoid biased search results. After sponsored hits were excluded, the first 10 websites common to both search engines were selected. Only articles written in English were considered. The websites identified were: Medicinenet.com,²¹ Cancer.com,²² WebMD.com,²³ Cancer.gov,²⁴ Mayoclinic.org,²⁵ Lungcancer.org,²⁶ Wikipedia.org,²⁷ Lung.org,²⁸ Cancer.net,²⁹ Medicalnewstoday.com,³⁰ (Table 1). All sites were accessed on August 7, 2015. Each website was accessed from the address returned in the search, and relevant, patient-directed information available within one click from that page was included in the study. Articles on the subject of lung cancer directly accessible from the main website were copied and pasted into individual Microsoft Word (Microsoft Corp) documents. A total of 109 articles were identified. Although information from other multimedia formats could help understanding, readability is not assessed. Thus, each was formatted to remove all images, figures, multimedia components, captions, advertisements, references, disclaimers, and acknowledgments. The files were then converted to plain text format.

Readability analysis was performed using the Readability Studio Professional Edition v2012.0 (Oleander Software Ltd, Vandalia, OH). Ten established tests were used to assess the readability of the articles: Coleman–Liau Index, Flesch–Kincaid Grade Level, Flesch Reading Ease, FORCAST

Table 1 – Lung cancer websites.

Web site	Organization	Number of articles
Medicinenet.com	MedicineNet	12
Cancer.org	American Cancer Society	4
WebMD.com	WebMD	26
Cancer.gov	National Cancer Institute at the National Institutes of Health	5
Mayoclinic.org	Mayo Foundation for Medical Education and Research	10
Lungcancer.org	CancerCare	11
Wikipedia.org	Wikipedia	5
Lung.org	American Lung Association	23
Cancer.net	American Society of Clinical Oncology	12
Medicalnewstoday.com	MediLexicon International	1
Total		109

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