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Online Health Information: Multiple Dimensions of Quality

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Health-care consumers increasingly turn to the World Wide Web for health information to support active participation in their health care. However, the quality of this information is highly variable. Therefore, consumers need tools that help them distinguish high quality from low quality resources. Based on our review of methods for evaluating the quality of online health information, we identified four prominent dimensions of quality: content, usage, authorship, and publication. This multidimensional framework provides a structure for characterizing online health information that could support patients' transformation into active health-care participants.

Health information consumers seek a variety of online health-related resources. Consumers use this information to play an active role in their health care by making better-informed medical decisions that enhance health outcomes and the patient-provider relationship. However, the abundance of poor quality online health information makes finding useful resources an arduous task. Many consumers lack the time and expertise required to make solid quality judgments about the large volume of health information they encounter online. Consumers, therefore, need tools that can help them differentiate between high and low quality health information. Variation in consumers' needs and search purposes creates the need for tools that reveal quality in numerous ways.

We reviewed current quality appraisal methods that apply to online health information ranging from informal health web pages to scientific literature. Our synthesis reveals four primary dimensions that characterize health information quality: content, usage, authorship, and publication quality.

The **content quality** dimension characterizes the degree to which information present within the document is scientifically rigorous and free of bias. Evidence of scientific rigor for published studies comes from details about the study methodology, such as randomization, sample size, and the use of a control group. In addition, text terms or metadata that indicate publication type, venue, or potential bias reveal quality of informal health resource content. To determine content quality, people often rely on expert evaluation through an authoritative review processes or they use automated techniques to identify predefined patterns in the text or metadata, such as searching for the word *double-blind*.

Usage quality indicates how other information resources cite or refer to a health information resource. Impact factors, derived from citation indexing, reveal the rate at which scientific work is cited. Similarly, web statistics, such as hyperlink structure, identify authoritative web pages based on the number and characteristics of inbound links it receives. Citation indexing and web statistics rest on the assumption that as the number of citations to an information resource increases, so does its likelihood of quality. Analysis of text surrounding citations reveals insights about quality based on the context of use.

Authorship quality reveals the merit of reputations, credentials, and competing interests of authors, contributors, and their affiliations. Filtering tools or checklists identify terms descriptive of authorship quality such as author qualifications, institutions, affiliations, or presence of financial or other bias. Presence of author, affiliation, or institution names in databases of high standing contributors in a field demonstrates authorship quality. Author-specific and institution-specific impact scores based on citation indexing indicate authorship quality.

Publication quality communicates the extent of experience, reputation, and practices of the body publishing a health information resource. External data associated with a document, such as its publishing venue, the history and procedures of its publisher, the editorial or review board of its publisher, its sources of sponsorship, and its publisher's perceived impact (e.g. journal impact factor), provide publication quality insights of merit and endurance. Presence of information on a reputable health information portal as well as health information awarded a quality label indicates publishing quality.

Consumers must be able to find high quality health information to participate actively in their own health care decisions. To fulfill this function, health-care consumers increasingly turn to the World Wide Web. Consumers vary greatly in their needs for health information, thus, each must appraise its quality according to the dimensions they deem most important. Our synthesis identifies multiple dimensions from which to characterize online health information quality. Content, usage, authorship, and publication characteristics provide consumers with an organizing framework that can be suited to match a broad variety of needs, purposes, and characteristics. Although current evaluation methods contribute valuable quality appraisal criteria, none covers the breadth of useful criteria that this synthesis reveals. New informatics tools that describe quality in multiple ways could meet the varying needs of consumers by highlighting these multiple dimensions of quality in health information.