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What is This?

The CDC Clear Communication Index Is a New Evidence-Based Tool to Prepare and Review Health Information

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This article presents the Centers for Disease Control and Prevention Clear Communication Index (the Index), a tool that emphasizes the primary audience's needs and provides a set of evidence-based criteria to develop and assess public communication products for diverse audiences. The Index consists of four open-ended introductory questions and 20 scored items that affect information clarity and audience comprehension, according to the scientific literature. A research team fielded an online survey to test the Index's validity. Respondents answered 10 questions about either an original health material or one redesigned with the Index. For 9 out of 10 questions, the materials revised using the Index were rated higher than the original materials. Regardless of education level, respondents rated the revised materials more favorably than the original ones. The results indicate that the Index performed as intended and made it more likely that audiences could correctly identify the intended main message and understand the words and numbers in the materials. The results also support the widely held view that audiences are more positive about clearly designed materials. The Index shows that an evidence-based scoring rubric can assess and improve the clarity of health materials.

Keywords: *consumer health; health literacy; social marketing/health communication*

Communication is an essential component of effective public health programs because, done well, communication supports behavior change, political commitment, and social norms that shape the context for public discourse and public health action (Frieden, 2013). But what does "done well" mean? An abundance of evidence shows that much of the professionally generated health and safety information is not done well, meaning the information is not clear or useful

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to most Americans, and the public's health is adversely affected (Nielsen-Bohlman, Panzer, & Kindig, 2004; Rudd, 2010). In response, leading organizations call for all organizations that provide health information to "develop and disseminate health and safety information that is accurate, accessible, and actionable" and contribute to the public's health and science literacy as well as positive health behaviors (National Academy of Sciences, 2012; Nielsen-Bohlman et al., 2004; U.S. Department of Health and Human Services, 2010).

The Centers for Disease Control and Prevention (CDC) is committed to making sure its information is accurate, accessible, and actionable for the many different audiences who want and need "different types of data presented in different ways" (Frieden, 2013). In the message and materials development process, however, prioritizing audiences' needs is a challenge, especially when resources are insufficient for audience research to show what they need. In addition, organizational review processes, especially those that involve public health and medical subject matter experts, can result in changes to the material that make it less understandable for the primary audience.

This article presents the CDC Clear Communication Index (the Index), a tool that provides a set of evidence-based criteria to develop new and assess existing public communication products for diverse audiences. The Index supports CDC's efforts to comply with the Plain Writing Act (http://www.plainlanguage.gov/plLaw/) and achieve goals in the *National Action Plan to Improve Health Literacy* (http://www.health.gov/communication/hlactionplan/; U.S. Department of Health and Human Services, 2010). CDC creates and disseminates information for multiple audiences such as consumers, clinicians, health department staff, and first responders. The Index is flexible enough to create and evaluate materials for these and other audiences.

We explain how the Index fills gaps left by other health literacy and health communication tools and best fits public health requirements to communicate population-based data, science, and recommendations. We also present results that show audiences identified the main message and were more positive about CDC materials designed using the Index than those not designed with the Index. We conclude the Index offers public health professionals an evidence-based, flexible tool for developing communication materials that audiences find clear and useful.

► BACKGROUND

Many "best practice" guides exist for multifaceted public health communication programs, such as CDCynergy (http://www.cdc.gov/healthcommunication/CDCynergy/), and to evaluate materials, such as the Federal Plain Language Guidelines (Kimble, 2012), the Suitability Assessment of Materials (Doak, Doak, & Root, 2007), and health literacy guidelines (http://www.hsph.harvard.edu/healthliteracy/practice/innovative-actions/). These guides acknowledge the importance of identifying an audience and delivering clear and actionable information to them. Readability formulas are specific scoring tools, but they are a mechanical "count" of syllables and sentences. They do not account for audience, purpose, or the majority of communication characteristics that contribute to clarity. The Suitability Assessment of Materials is also a scoring tool that incorporates readability formulas as well as general (e.g., layout) and specific (e.g., captions for graphics) factors to evaluate audience appropriateness.

Despite these tools' popularity and availability, the health communication field lacks consensus about the most effective criteria to evaluate health materials for the public (Kaphingst et al., 2012). The CDC Index is built on research about effective clear communication criteria and integrates this research with risk communication, health and science literacy, behavioral science, and numeracy research for a set of criteria that reflect the breadth of audiences, topics, and circumstances that public health professionals routinely encounter. Although the Index includes items about how to clearly explain health behaviors, it is not designed to assess the effect of communication on people's health behaviors.

► THE CDC CLEAR COMMUNICATION INDEX

The CDC Index consists of four open-ended introductory questions and 20 scored items that affect information clarity and audience comprehension, according to the scientific literature. The Index questions and items are listed in Table 1. The Index User Guide and fillable score sheet are available at http://www.cdc.gov/healthcommunication/ClearCommunicationIndex/.

CDC staff, contractors, and an expert panel developed the Index through a nine-step, iterative process that involved multiple pretesting and testing activities and engaged scientists and communication professionals inside and outside of CDC. To summarize, the Index process involved CDC subject matter experts in communication and public health, contract support from communication experts, an expert panel of social science researchers, an online consumer panel, and a convenience sample of users of CDC's website (CDC.gov).

TABLE 1
Clear Communication Index Introductory Questions, Scored Items, and Response Options

Introductory Questions	*Response Options*
Who is your primary audience?	Open-ended
What do you know about the health literacy skills of your audience?	Open-ended; default is average to low skills
What is your primary communication objective?	Open-ended
What is the main message of the material?	Open-ended

Index Item	*Yes = 1, No = 0*
Main message and calls to action	
1. Does the material contain one main message?	Yes or No
2. Is the main message at the top, beginning, or front of the material?	Yes or No
3. Is the main message emphasized with visual cues?	Yes or No
4. Does the material contain at least one visual that conveys or supports the main message?	Yes or No
5. Does the material include one or more calls to action for the primary audience?	Yes or No
6. Do both the main message AND the call to action use the active voice?	Yes or No
Language	
7. Does the material *always* use language the primary audience would use?	Yes or No
Information design	
8. Does the material use bulleted or numbered lists?	Yes or No
9. Is the material organized in chunks with headings?	Yes or No
10. Is the most important information the primary audience needs summarized in the first paragraph or section?	Yes or No
State of the science	
11. Does the material explain what authoritative sources know and don't know about the topic?	Yes or No
Part B. Behavioral recommendations	
12. Does the material include one or more behavioral recommendations for the primary audience?	Yes or No
13. Does the material explain why the behavioral recommendation(s) is important?	Yes or No
14. Does the behavioral recommendation(s) include specific directions about how to perform the behavior?	Yes or No
Part C: Numbers	
15. Does the material *always* present numbers the primary audience would use?	Yes or No
16. Does the material *always* explain what the numbers mean?	Yes or No
17. Does the audience have to conduct mathematical calculations?	Yes or No
Part D: Risk	
18. Does the material explain the nature of the risk?	Yes or No
19. Does the material address both the risks and benefits of the recommended behaviors?	Yes, No, or Not Applicable
20. If the material uses numeric probability to describe risk, is the probability also explained with words or a visual?	Yes, No, or Not Applicable

A person using the Index to develop a new material or evaluate an existing material answers the introductory questions and scores each item. The open-ended questions have no numeric value, and each of the 20 items is worth 1 point. For a new material, the person or team creating the material answers the introductory

questions and uses the answers plus the items to help choose which information to include in the material and how it should be presented. For an existing material, the person or team answers the 4 open-ended questions and then answers each item "yes" or "no" to determine if the material conforms or not. The actual points divided by the possible points for the material are converted to a simple percentage. The recommended minimum score is 90. If the material's score is 89 or less, the rater should focus on the underperforming items and use them as a revision guide so that the material does score 90 or higher. Because materials may change as part of a review and approval process, we recommend rescoring the material once all reviews are completed. If changes lower the score, then those involved in developing and reviewing the material can use the Index criteria for a productive discussion about how the changes may affect audience comprehension.

The Index improves on existing clear communication tools in three important ways. First, the Index can be used not only on consumer and patient materials but also on materials for other public health audiences, such as clinicians, public health professionals, first responders, health care administrators, program managers, and policy makers. Second, the Index includes items about risk and the scientific underpinnings of information, both of which are often difficult to explain. Third, the Index item statements do not ask raters to use subjective measures such as "clear, "adequate, "easy to understand," or "easy to read." If readers are the health material developers, their perception of easy to understand may not match the primary audience's, and "easy" is best determined through audience testing. The CDC Index is flexible enough for different primary audiences; addresses health, science, and risk communication together; and reduces subjectivity in the evaluation process.

▶ EVALUATION OF THE INDEX

To test the validity of the CDC Index, the research team fielded an online survey with a consumer Web panel that provided a large sample reflective of U.S. adults. The purpose of the survey was to determine if audiences' opinions are more positive about materials that have been revised using the Index as compared to the original versions of the materials. The survey protocol was reviewed and approved by an institutional review board and the federal Office of Management and Budget. The 10 questions and survey responses are listed in Table 2, along with the corresponding Index questions and items and explanations of how they connect with comprehension.

Respondents were asked to evaluate either the actual CDC material or the material redesigned to address the Index questions and items. These materials were a Frequently Asked Questions about thimerosal in vaccines, a fact sheet on heart disease, and a fact sheet on cell phones and health. These three original materials scored less than 30% on the Index. The revised versions scored 90% or higher.

Respondents were recruited from the eRewards' adult Web panel. The eRewards sample was 870 adults 18 years and older who used the Internet to obtain health information. E-mail invitations were sent to panel members who met the age and Internet use criteria. The survey was fielded from November 5 to November 13, 2012. Respondents were given eRewards credits for gift cards and other rewards as an incentive. Specific quotas were chosen to ensure the sample reflected U.S. adults in terms of sex, education, age, and race/ethnicity. Once eligibility was determined, respondents were assigned to one of six groups: thimerosal original, thimerosal revised, heart disease original, heart disease revised, cell phone original, or cell phone revised.

The eRewards' sample was 52% female, evenly distributed among age-groups, 66% White, 16% Hispanic/ Latino, 13% African American, 3% Asian, and 2% other. Respondents from the Northeast were somewhat underrepresented because the survey was fielded shortly after Hurricane Sandy. Ninety-four percent of the sample said their primary language was English. Because of the difficulty recruiting people with less than a high school degree, we collapsed high school education, GED, and less than high school; 40% percent of the sample had a high school degree, GED, or less education and 60% had some college or more.

Chi-squares were calculated to determine if differences in proportions between respondents who saw original materials versus respondents who saw revised materials were statistically significant at .05 or less. Chi-squares and p values are reported in Table 2. Respondents' answers to the open-ended question about the main message were coded into major themes and compared to the intended main message. Respondents answered the 10 questions in Table 2 about the one material they saw. For 9 out of 10 questions, the materials revised using the Index were rated higher than the original materials. There were no major differences on any question by education level. Regardless of education, respondents rated the revised materials more favorably than the original ones.

Given the importance of an obvious main message and familiar language in helping audiences get the gist of a material, the results for the main message and unfamiliar words and numbers questions are notable.

TABLE 2
Survey Questions, Survey Responses, Index Questions and Items, and Relevance to Comprehension

Online Survey Questions	Online Survey Results (N = 870 Web Panel Respondents Who Viewed 1 of 3 Original or 1 of 3 Revised Materials)	χ^2 and p Values	Index Questions and Items	Relevance to Comprehension
1. What is the main message that this page is trying to get across?	22% more people who saw a revised material correctly identified the main message than those who saw an original material.	p values calculated for correct messages 2 of 4 correct thimerosal messages were significant. $p \leq .001$ 1 of 4 correct heart disease messages was significant. $p = .001$ 2 of 2 correct cell phone messages were significant. $p = .001$	Intro Question 4: What is the main message? Item 1: Does the material contain one main message? Item 2: Is the main message at the top, beginning, or front of the material? Item 3: Is the main message emphasized with visual cues? Item 4: Does the material contain at least one visual that conveys or supports the main message?	People are more likely to find the main message if it is first or noticeable. Extracting the gist, or main idea, is one element of comprehension. People demonstrate comprehension when they can put information in their own words.
2. Does this page use any words or phrases unfamiliar to you?	30% who saw an original material said yes. 15% who saw a revised material said yes.	$\chi^2 = 29.28; p = .001$	Item 7: Does the material *always* use language the primary audience would use?	People comprehend familiar words more quickly. Unfamiliar words can distract. Familiar words vary by audience. Consistency in language aids reading or listening flow.
3. Does this page use any numbers unfamiliar to you?	14% who saw an original material said yes. 6% who saw a revised material said yes.	$\chi^2 = 14.86; p = .001$	Item 15: Does the material *always* present numbers the primary audience would use? Item 16: Does the material *always* explain what the numbers mean? Item 17: Does the audience have to conduct mathematical calculations? Item 18: Does the material explain the nature of the risk? Item 20: If the material uses numeric probability to describe risk, is the probability also explained with words or a visual?	People comprehend familiar numbers more quickly. Unfamiliar numbers can distract. Familiar numbers vary by audience. Consistency in numbers aids reading or listening flow.

(continued)

TABLE 2 (CONTINUED)

Online Survey Questions	Online Survey Results (N = 870 Web Panel Respondents Who Viewed 1 of 3 Original or 1 of 3 Revised Materials)	χ^2 and p Values	Index Questions and Items	Relevance to Comprehension
4. How difficult or easy is it to find information in this page that interests you?	35% who saw an original material said "very easy." 55% who saw a revised material said "very easy."	$\chi^2 = 41.24$; $p = .001$	Item 8: Does the material use bulleted or numbered lists? Item 9: Is the material organized in chunks with headings?	People are attracted to information they perceive as relevant, familiar, and easy to navigate.
5. How well does this page help you decide what to do?	32% who saw an original material said "helped very well." 46% who saw a revised material said "helped very well."	$\chi^2 = 20.25$; $p = .001$	Item 5: Does the material include one or more calls to action for the primary audience? Item 6: Do both the main message and the call to action use the active voice? Item 10: Is the most important information the primary audience needs summarized in the first paragraph or section? Item 12: Does the material include one or more behavioral recommendations for the primary audience? Item 19: Does the material address both the risks and benefits of the recommended behavior?	People are goal-directed in their information use. Action-oriented main messages and calls to action help people decide what to do. People are more likely to notice what comes first.
6. Which of 10 enumerated writing and design problems got in the way of understanding?	40% who saw an original material said something got in the way. 26% who saw a revised material said something got in the way.	7 of the 10 barriers had p values less than .05		Common writing and design problems, such as too much information on a page or small font, can distract or confuse readers or listeners.

(continued)

TABLE 2 (CONTINUED)

Online Survey Questions	Online Survey Results (N = 870 Web Panel Respondents Who Viewed 1 of 3 Original or 1 of 3 Revised Materials)	χ^2 and p Values	Index Questions and Items	Relevance to Comprehension
7. How useful was the information for learning?	39% who saw an original material said it was useful for learning. 49% who saw a revised material said it was useful for learning.	$\chi^2 = 17.40$; $p = .002$	Item 13: Does the material explain why the behavioral recommendation is important? Item 14: Does the behavioral recommendation include specific directions about how to perform the behavior? Item 11: Does the material explain what authoritative sources know and don't about the topic?	Consumer- or patient-directed materials typically have health behavior recommendations. Behavioral theory says that people need not only a recommendation but also the rationale and directions so they are clear about what to do and how to do it. People also can better assess the recommended actions and make informed decisions with full information.
8. How difficult or easy was it to understand this information?	40% who saw an original material said it was "very easy" to understand. 63% who saw a revised material said it was "very easy" to understand.	$\chi^2 = 54.62$; $p = .001$	No Index item because intended audiences, not material developers, are the best judge of easy or difficult.	People assess the ease or difficulty of materials in a matter of seconds and decide if they will invest more time in reading or listening.
9. How effective was the information in helping you understand?	49% who saw an original material said it was "very effective" in helping understanding. 44% who saw a revised material said it was "very effective" in helping understanding.	$\chi^2 = 11.57$; $p = .021$	No Index item because intended audiences, not material developers, are the best judge of effectiveness.	Effectiveness is a global measure of how well someone or something accomplishes the intended purpose.
10. Would you recommend this information to others who need information about this topic?	88% who saw an original material would recommend the material. 91% who saw a revised material would recommend the material.	$\chi^2 = 2.05$; $p = .152$	No Index item because intended audiences, not material developers, are the best judge of what is worth sharing.	People share information they perceive as relevant, interesting, or useful.

Because the main message question was open-ended, we chose the most frequent correct response for each of the three materials and averaged the difference between the revised and original materials (65% vs. 45% thimerosal, 45% vs. 27% heart disease, and 41% vs. 13% cell phones; all were significant at .05 or less). Using this method, on average, 22% more people stated the correct main message when they saw a revised material compared to those who saw an original material. Fewer respondents who saw the revised material said it included words unfamiliar to them compared to those who saw the original material (15% vs. 30%) or numbers unfamiliar to them (6% vs. 14%). More respondents who saw the revised material said it was easy to find information of interest compared to those who saw the original material (55% vs. 35%). More respondents who saw the revised material said the information was easy to understand compared to those who saw the original material (63% vs. 40%). All reported differences were significant at .05 or less.

Respondents identified more problems with the original than revised materials. More respondents who reviewed a revised material reported no barriers to understanding than those who saw an original material. When viewing original materials, more respondents reported that confusing words; confusing numbers; having no pictures, charts, or tables; or having too much information got in the way of understanding the information.

▶ DISCUSSION AND CONCLUSIONS

This survey of the CDC Clear Communication Index and health materials show that an evidence-based scoring rubric can assess and improve the clarity of health materials. The results also support the widely held view that audiences are more positive about clearly designed materials. The results indicate the CDC Index performed as intended and made it more likely that audiences could correctly identify the intended main message and understand words and numbers in the materials. The findings also suggest that further changes to the revised materials to improve clarity might have increased the proportion of those who rated the revised materials highly.

The CDC Index focuses on improving the clarity of health materials because clarity is foundational for accurate, accessible, and actionable health information. Clarity is also a universally appropriate approach for all primary audiences, whether the audience is novice parents looking for their first information about vaccinations, junior legislative staffers who have only 15 minutes to understand the value of evidence-based programs for community health promotion, or experienced health department epidemiologists reading about the latest food-borne outbreak.

The CDC Index offers an opportunity for communication researchers to explore how standard criteria can be applied to create audience-appropriate materials. The Index does not negate the art of communication; rather it clears the way so that the creative side of communication can be most effective. The Index also cannot take the place of formative research or audience pretesting, or replace the practice of using audience insights to decide about message framing (e.g., gain or loss frames) and material formats and channels. Because the Index assesses only if a criterion is addressed, not how well, communication researchers who include the Index in their research may be able to offer additional evidence for Index items, as well as add evidence for new items that currently lack a strong evidence base, such as how to layer information for different audiences and purposes. Researchers also can design studies that test the effect of clear and unclear materials on people's intentions to act or follow recommended health behaviors.

We conclude that the Index offers public health professionals the best option for an evidence-based, flexible tool for developing clear and useful information. The Index reflects the available science on clarity, health and science literacy, numeracy, health behavior, and risk communication as they relate to information comprehension. In addition, public health professionals can use the CDC Index to assess and develop materials for the many audiences they communicate with. CDC's testing results indicate that applying the CDC Index items will help public health professionals provide information that more Americans will find clear and useful.

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