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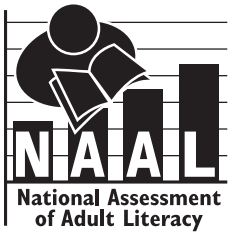
NAAL National Assessment of Adult Literacy

The Health Literacy of America's Adults

Results From the 2003 National Assessment of Adult Literacy

U.S. Department of Education
NCES 2006–483



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September 2006

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Executive Summary

The 2003 National Assessment of Adult Literacy (NAAL) assessed the English literacy of adults in the United States. Included in the assessment were items designed to measure the health literacy of America's adults. The assessment was administered to more than 19,000 adults (ages 16 and older) in households or prisons. Unlike indirect measures of literacy, which rely on self-reports and other subjective evaluations, the assessment measured literacy directly through tasks completed by adults.

The health literacy scale and health literacy tasks were guided by the definition of health literacy used by the Institute of Medicine and *Healthy People 2010* (a set of national disease prevention and health promotion objectives led by the U.S. Department of Health and Human Services). This definition states that 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. (HHS 2000 and Institute of Medicine 2004)

These health literacy tasks represent a range of literacy activities that adults are likely to face in their daily lives. Health literacy is important for all adults. Adults may read an article in a magazine or a pamphlet in their doctor's office about preventive health practices; they may need to fill a prescription, select

and buy an over-the-counter medication, or understand health insurance forms. Parents must manage their children's health care, including getting them immunized, taking them for physicals, and having their illnesses treated. Adult children are often faced with the responsibility of managing their own parents' health care. Older adults must make decisions about Medicare supplementary insurance and prescription drug benefits. Adults without medical insurance may need to determine whether they, their children, or their parents qualify for any public programs. Adults living in older houses and apartments may need to make decisions about the dangers of lead paint or asbestos. All these activities require, or are facilitated by, the ability to read and understand written and printed information.

The health tasks for the 2003 assessment were developed to fit into the NAAL's prose, document, or quantitative scales but were distinguished from the other tasks on those scales by their health content.

- The prose literacy scale measured the knowledge and skills needed to search, comprehend, and use information from texts that were organized in sentences or paragraphs.
- The document literacy scale measured the knowledge and skills needed to search, comprehend, and use information from noncontinuous texts in various formats.
- The quantitative scale measured the knowledge and skills needed to identify and perform computations using numbers embedded in printed materials.

The NAAL health tasks included on the assessment were distributed across three domains of health and health care information and services: *clinical*, *prevention*, and *navigation of the health system*.

This report describes how health literacy varies across the population and where adults with different levels of health literacy obtain information about health issues. The analyses in this report examine differences related to literacy that are based on self-reported background characteristics among groups in 2003. This report discusses only findings that are statistically significant at the .05 level.

Literacy Levels

The National Research Council's Board on Testing and Assessment (BOTA) Committee on Performance Levels for Adult Literacy recommended a set of performance levels for the prose, document, and quantitative scales. The Committee on Performance Levels for Adult Literacy recommended that new literacy levels be established for the 2003 assessment instead of using the same reporting levels used for the 1992 National Adult Literacy Survey (Hauser et al. 2005). Differences between the 1992 and 2003 levels are discussed by the Committee. Drawing on the committee's recommendations, the U.S. Department of Education decided to report the assessment results by using four literacy levels for each scale: *Below Basic*, *Basic*, *Intermediate*, and *Proficient*.

The health literacy tasks were analyzed together and were used to create a health literacy scale. Each health literacy task was also classified as a prose, document, or quantitative task and was included on one of those scales.

The BOTA Committee did not recommend performance levels for the health scale. Because every health literacy task was included on the prose, document, or quantitative scale in addition to the health scale, it was mapped to a performance level (*Below Basic*, *Basic*, *Intermediate*, or *Proficient*) on one of those scales. Tasks were mapped to each scale at the point on the scale where an adult would have a 67 percent

probability of doing the task correctly. Cut-points for the performance levels on the health scale were set so that each task was classified into the same category on the health scale as on the other scale (prose, document, or quantitative) with which the task was associated.

Demographic Characteristics and Health Literacy

- The majority of adults (53 percent) had *Intermediate* health literacy. An additional 12 percent of adults had *Proficient* health literacy. Among the remaining adults, 22 percent had *Basic* health literacy, and 14 percent had *Below Basic* health literacy.
- Women had higher average health literacy than men; 16 percent of men had *Below Basic* health literacy compared with 12 percent of women.
- White and Asian/Pacific Islander adults had higher average health literacy than Black, Hispanic, American Indian/Alaska Native, and Multiracial adults. Hispanic adults had lower average health literacy than adults in any other racial/ethnic group.
- Adults who spoke only English before starting school had higher average health literacy than adults who spoke other languages alone or other languages and English.
- Adults who were ages 65 and older had lower average health literacy than adults in younger age groups. The percentage of adults in the 65 and older age group who had *Intermediate* and *Proficient* health literacy was lower than the comparable percentage of adults in other age groups.
- Starting with adults who had graduated from high school or obtained a GED, average health literacy increased with each higher level of educational attainment. Some 49 percent of adults who had never attended or did not complete high school had *Below Basic* health literacy, compared with 15 percent of adults who ended their education with a high school diploma and 3 percent of adults with a bachelor's degree.
- Adults living below the poverty level had lower average health literacy than adults living above the poverty threshold.

Overall Health, Health Insurance Coverage, and Sources of Information About Health Issues

- At every increasing level of self-reported overall health, adults had higher average health literacy than adults in the next lower level.
- Adults who received health insurance coverage through their employer or a family member's employer or through the military or who privately purchased health insurance had higher average health literacy than adults who received Medicare or Medicaid and adults who had no health insurance coverage. Among adults who received Medicare or Medicaid, 27 percent and 30 percent, respectively, had *Below Basic* health literacy.
- A lower percentage of adults with *Below Basic* health literacy than adults with *Basic*, *Intermediate*, or *Proficient* health literacy got information about health issues from any written sources, including newspapers, magazines, books or brochures, and the Internet. A higher percentage of adults with *Below Basic* and *Basic* health literacy than adults with *Intermediate* and *Proficient* health literacy received a lot of information about health issues from radio and television. With each increasing level of health literacy, a higher percentage of adults got information about health issues from family members, friends, or coworkers.

Acknowledgments

The National Assessment of Adult Literacy (NAAL) is a complex project whose successful completion is due to the work of countless individuals from many organizations. We, at the American Institutes for Research (AIR), especially want to thank the staff at the National Center for Education Statistics (NCES) who have supported the project. Sheida White, the NAAL project officer, has provided substantive guidance and direction to all aspects of the assessment. Her intellectual contributions are reflected throughout the assessment, analyses, and report. Andrew Kolstad, the project's senior technical advisor and project officer of the 1992 National Adult Literacy Survey, provided both technical guidance and an institutional memory throughout the project and helped us reflect on all statistical and technical issues. Steven Gorman also played a key role in guiding all aspects of the assessment, especially those related to the statistical aspects of the assessment.

Peggy Carr, NCES Associate Commissioner for Assessment, provided the project and team members with ongoing support, recommendations, and encouragement. We are very grateful for her leadership. William Tirre and Arnold Goldstein of NCES played invaluable roles in reviewing the report and guiding it through the review process. Their efforts are very much appreciated. We also thank Marilyn Seastrom, NCES Chief Statistician, and members of the NCES/Education Statistics

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Cynthia Baur, Office of Disease Prevention and Health Promotion, Office of Public Health and Science, Office of the Secretary of the Department of Health and Human Services, played a pivotal role in conceptualizing, planning, designing, and reporting on the health literacy component of NAAL. The NAAL health literacy component is based on her intellectual contributions and perseverance. Ron Pugsley, former Director of the Division of Adult Education and Literacy in the Office of Vocational and Adult Education, played a key role in the early planning stages of the health literacy report. Dan Sherman from AIR also provided invaluable guidance to the health literacy analyses and report.

Our colleagues at Westat, Inc., planned, developed, and implemented the complex sampling and weighting necessary for the successful completion of the assessment. Westat also planned and carried out all phases of the data collection, and was responsible for training and managing a group of 400 field data collection staff. This study could not have been successful without the outstanding work of the Westat project director, Martha Berlin, and the Westat team, including Michelle Amsbary, Leyla Mohadjer, and Jacquie Hogan.

Many staff at AIR made substantial contributions to the health literacy report, often under tight timelines. Stéphane Baldi and Justin Baer, senior members of the AIR NAAL team, provided invaluable substantive and technical contributions throughout the duration of the project. Bridget Boyle and Yung-chen Hsu conducted analyses for the authors whenever requested. Rachel Greenberg and Elizabeth Moore provided ongoing research and technical support in developing the assessment, preparing the data and text, and shepherding the report through the revision and review process.

We are especially appreciative of the skills and contributions by Holly Baker, who edited the report through multiple revisions, and by Heather Block, who designed and redesigned the report. We are grateful for their dedication and in awe of their ability to work under often seemingly impossible time constraints. Also, Janan Musa provided the AIR team with invaluable guidance and administrative and logistical support throughout the project.

We also want to acknowledge the essential contributions of three other individuals. Archie Lapointe was an active member of the AIR team during the early stages of the NAAL, and the project greatly benefited from his experience and wisdom. Another former member of the AIR team, Eugene Johnson, who directed the assessment's psychometrics and preliminary analysis activities, played an essential role in the project. We also want to acknowledge the contributions of Richard Venezky, who provided invaluable guidance, support, and friendship, and whose memory we cherish.

Thousands of adults participated in the assessment. Their willingness to spend time answering the background questions and assessment items was essential to ensuring that meaningful data about the literacy of America's adults could be obtained. This study would not have been possible without their participation.

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CHAPTER ONE

Introduction

Understanding the health literacy of America's adults is important because so many aspects of finding health care and health information, and maintaining health, depend on understanding written information. Many reports have suggested that low health literacy is associated with poor communication between patients and health care providers and with poor health outcomes, including increased hospitalization rates, less frequent screening for diseases such as cancer, and disproportionately high rates of disease and mortality (Baker et al. 1998; Berkman et al. 2004; Gordon et al. 2002; Lindau et al. 2001; Rudd et al. 1999; Williams et al. 2002). Low health literacy may also be associated with increased use of emergency rooms for primary care (Baker et al. 2004). These findings have implications for the costs of caring for patients with low health literacy.

As the Committee on Health Literacy of the Institute of Medicine wrote:

> Health literacy is of concern to everyone involved in health promotion and protection, disease prevention and early screening, health care maintenance, and policy making. Health literacy skills are needed for dialogue and discussion, reading health information, interpreting charts, making decisions about participating in research studies, using medical tools for personal or family health care—such as a peak flow meter or thermometer—calculating timing or dosage of medicine, or voting on health or environment issues. (Institute of Medicine 2004, p. 31)

Health literacy is a new component of the 2003 National Assessment of Adult Literacy (NAAL). NAAL assessed the English literacy of adults (ages 16 and older) in the United States. The assessment was administered to more than 19,000 adults (ages 16 and older) in households or prisons.

This report presents the initial findings on health literacy from the assessment. Analyses presented in this report, including those in appendix E, are intended to provide a summary of the relationship between health literacy and background characteristics of adults, preventive health practices, and sources of health information used by adults.

Defining and Measuring Literacy

Defining Literacy

Unlike indirect measures of literacy—which rely on self-reports and other subjective evaluations of literacy and education—the 2003 adult literacy assessment measured literacy directly by tasks representing a range of literacy activities that adults are likely to face in their daily lives.

The literacy tasks in the assessment were drawn from actual texts and documents, which were either used in their original format or reproduced in the assessment booklets. Each question appeared before the materials needed to answer it, thus encouraging respondents to read with purpose.

Respondents could correctly answer many assessment questions by skimming the text or document for the information necessary to perform a given literacy task. None of the tasks were multiple choice tasks with a list of responses provided. Instead, respondents had to determine and write their answers to the questions.

The 2003 assessment used the same definition of literacy as the 1992 National Adult Literacy Survey:

> Using printed and written information to function in society, to achieve one's goals, and to develop one's knowledge and potential.

This definition acknowledges that literacy goes beyond simply being able to sound out or recognize words and understand text. A central feature of the definition is that literacy is related to achieving an objective and that adults often read for a purpose.

Measuring Literacy

Three literacy scales—prose literacy, document literacy, and quantitative literacy—were used in the 2003 assessment:

- *Prose literacy*. The knowledge and skills needed to perform prose tasks (i.e., to search, comprehend, and use information from continuous texts). Prose examples include editorials, news stories, brochures, and instructional materials. Prose texts can be further broken down as expository, narrative, procedural, or persuasive.
- *Document literacy*. The knowledge and skills needed to perform document tasks (i.e., to search, comprehend, and use information from noncontinuous texts in various formats). Document examples include job applications, payroll forms, transportation schedules, maps, tables, and drug and food labels.
- *Quantitative literacy*. The knowledge and skills required to perform quantitative tasks (i.e., to identify and perform computations, either alone or sequentially, using numbers embedded in printed materials). Examples include balancing a checkbook, figuring out a tip, completing an order form, and determining the amount of interest on a loan from an advertisement.

In addition, the assessment included a health literacy scale that consisted of 12 prose, 12 document, and 4 quantitative NAAL items.[1] The health literacy items reflect the definition of health literacy as defined by the Institute of Medicine and Healthy People 2010 (a set of national disease prevention and health promotion objectives led by the U.S. Department of Health and Human Services):

> The degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions. (HHS 2000 and Institute of Medicine 2004)

Tasks used to measure health literacy were organized around three domains of health and health care information and services: *clinical, prevention,* and *navigation of the health care system*. The stimulus materials and the 28 health literacy tasks were designed to elicit respondents' skills for locating and understanding health-related information and services and to represent the three general literacy scales—prose, document, and quantitative—developed to report NAAL results.

The materials were selected to be representative of real-world health-related information, including insurance information, medicine directions, and preventive care information. The Office of Disease Prevention and Health Promotion (ODPHP) within the U.S. Department of Health and Human Services suggested materials and questions based on input from other HHS agencies and stakeholders and experts, and on information from federal health materials and other health-related assessments.

Of the 28 health literacy tasks, 3 represented the *clinical* domain, 14 represented the *prevention* domain, and 11 items represented the *navigation of the health care system* domain. The domains are defined in the following way:

- The *clinical* domain encompasses those activities associated with the health care provider-patient interaction, clinical encounters, diagnosis and treatment of illness, and medication. Tasks from the clinical domain are filling out a patient information form for an office visit, understanding dosing instructions for medication, and following a health care provider's recommendation for a diagnostic test.
- The *prevention* domain encompasses those activities associated with maintaining and improving health, preventing disease, intervening early in emerging health problems, and engaging in self-care and self-management of illness. Examples are following guidelines for age-appropriate preventive health services, identifying signs and symptoms of health problems that should be addressed with a health professional, and understanding how eating and exercise habits decrease risks for developing serious illness.
- The *navigation of the health care system* domain encompasses those activities related to understanding how the health care system works and individual rights and responsibilities. Examples are understanding what a health insurance plan will and will not pay for, determining eligibility for public insurance or assistance programs, and being able to give informed consent for a health care service. (HHS, 2003, p. 37)

The NAAL health literacy scale did not include tasks that did not fit the definitions of prose, document, or quantitative literacy even if they were consistent with the definition of health literacy used by *Healthy People 2010*. For example, none of the NAAL health tasks required knowledge of specialized health termi-

[1] The NAAL health literacy scale was constructed to have a mean of 245 and a standard deviation of 55.

nology. The assessment also did not measure the ability to obtain information from nonprint sources, although questions about the use of all sources of health information—both written and oral—were included on the background questionnaire and are included in this report.

Background Questionnaire

The 2003 National Assessment of Adult Literacy household background questionnaire was used to collect data about various demographic and background characteristics of adults. The questionnaire also included a section of questions specifically related to health status, preventive health practices, health insurance coverage, and sources of information about health issues. A summary of the questions that were used in analyses in this report is presented in appendix B on page 27.

A separate background questionnaire was developed for adults in prison. Questions about health status and sources of information about health issues were included on the prison background questionnaire. The background questionnaire for prison inmates did not include questions about health insurance or about Internet use.

Interpreting Literacy Results

In addition to reporting average literacy scores, another way to report results is by grouping adults with similar scores into a relatively small number of categories, often referred to as performance levels. Performance levels are used to identify and characterize the relative strengths and weaknesses of adults falling within various ranges of literacy ability. Describing the adult population according to such levels allows analysts, policymakers, and others to examine and discuss the typical performance and capabilities of specified groups within the adult population.[2]

The National Research Council's Board on Testing and Assessment (BOTA) Committee on Performance Levels for Adult Literacy recommended a new set of performance levels for the prose, document, and quantitative scales for the NAAL, instead of using the same reporting levels used for the 1992 National Adult Literacy Survey.[3]

Drawing on the committee's recommendations, the U.S. Department of Education decided to report NAAL results for the prose, document, and quantitative scales by using four literacy levels for each scale: *Below Basic, Basic, Intermediate,* and *Proficient*. Table 1-1 summarizes the knowledge, skills, and capabilities that adults needed to demonstrate to be classified into one of the four levels on the prose, document, and quantitative scales. The items used for the health literacy scale were also classified as prose, document, and quantitative items.

The BOTA Committee on Performance Levels for Adult Literacy was not asked to recommend performance levels for the health scale, because every health literacy task was included on the prose, document, or quantitative scale. NCES mapped each health task to the health literacy scale based on their level of difficulty as prose, document, and quantitative items (see figure 1-1). Each health task was mapped to the prose, document, or quantitative scale (depending upon which scale the task fell into) at the point on the scale (i.e., the scale score) where an adult with that scale score would have a 67 percent probability of doing the task correctly. The 67 percent probability convention was used by the BOTA Committee for the prose, document, and quantitative scales. That point on the scale was classified as to whether it fell into the *Below Basic, Basic, Intermediate,* or *Proficient* level. Cut-points for the health scale were established so that each task was classified into the

[2] For more information on NAAL performance levels see White and Dillow (2005).

[3] For a description of the process followed by the BOTA Committee on Performance Levels see Hauser et al. (2005) and White and Dillow (2005).

same level on the health scale as on the respective prose, document, or quantitative scale.

A health literacy task that was mapped to the *Proficient* level on the prose scale was also mapped to the *Proficient* level on the health scale. For example, as shown in figure 1-1, a task that requires a respondent to "evaluate information to determine which legal document is applicable to a specific health care situation" maps to 325 on the health scale, which is at the *Proficient* level. The same task maps to 361 on the prose scale, which is also at the *Proficient* level.

Similarly, as shown in figure 1-1, a task that requires a respondent to "determine a healthy weight range for a person of a specified height, based on a graph that relates height and weight to body mass index (BMI)" mapped to 290 on the health scale. This task was also included on the document scale, where it mapped to 320, or the *Intermediate* level. The cut-points for the

Table 1-1. Overview of the literacy levels

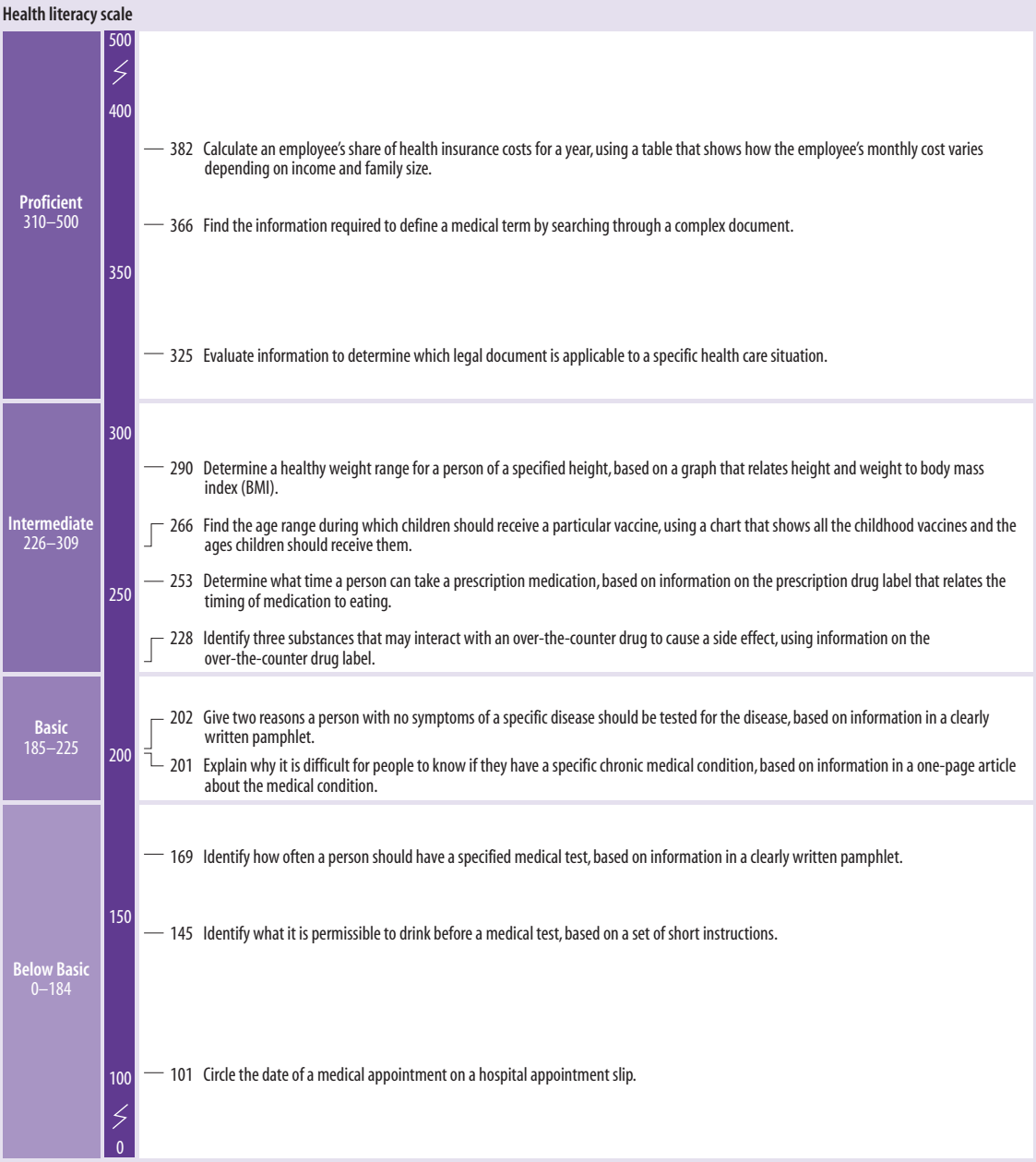
Level and definition	Key abilities associated with level
Below Basic indicates no more than the most simple and concrete literacy skills. Score ranges for *Below Basic*: Prose: 0–209 Document: 0–204 Quantitative: 0–234	Adults at the *Below Basic* level range from being nonliterate in English to having the abilities listed below: ■ locating easily identifiable information in short, commonplace **prose** texts ■ locating easily identifiable information and following written instructions in simple **documents** (e.g., charts or forms) ■ locating numbers and using them to perform simple **quantitative** operations (primarily addition) when the mathematical information is very concrete and familiar
Basic indicates skills necessary to perform simple and everyday literacy activities. Score ranges for *Basic:* Prose: 210–264 Document: 205–249 Quantitative: 235–289	■ reading and understanding information in short, commonplace **prose** texts ■ reading and understanding information in simple **documents** ■ locating easily identifiable **quantitative** information and using it to solve simple, one-step problems when the arithmetic operation is specified or easily inferred
Intermediate indicates skills necessary to perform moderately challenging literacy activities. Score ranges for *Intermediate*: Prose: 265–339 Document: 250–334 Quantitative: 290–349	■ reading and understanding moderately dense, less commonplace **prose** texts as well as summarizing, making simple inferences, determining cause and effect, and recognizing the author's purpose ■ locating information in dense, complex **documents** and making simple inferences about the information ■ locating less familiar **quantitative** information and using it to solve problems when the arithmetic operation is not specified or easily inferred
Proficient indicates skills necessary to perform more complex and challenging literacy activities. Score ranges for *Proficient*: Prose: 340–500 Document: 335–500 Quantitative: 350–500	■ reading lengthy, complex, abstract **prose** texts as well as synthesizing information and making complex inferences ■ integrating, synthesizing, and analyzing multiple pieces of information located in complex **documents** ■ locating more abstract **quantitative** information and using it to solve multistep problems when the arithmetic operations are not easily inferred and the problems are more complex

NOTE: Although the literacy levels share common names with the National Assessment of Educational Progress (NAEP) levels, they do not correspond to the NAEP levels.
SOURCE: Hauser, R.M, Edley, C.F. Jr., Koenig, J.A., and Elliott, S.W. (Eds.). (2005). *Measuring Literacy: Performance Levels for Adults, Interim Report*. Washington, DC: National Academies Press; White, S. and Dillow, S. (2005). *Key Concepts and Features of the 2003 National Assessment of Adult Literacy* (NCES 2006-471). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

health scale were set so that the task would also map to the *Intermediate* level on the health scale.

As shown in figure 1-1, health tasks that mapped to the *Below Basic* level required locating straightforward pieces of information in short simple texts or documents. Health tasks that mapped to the *Basic* level generally required finding information in texts and documents that were somewhat longer than those in the *Below Basic* level, and the information to be found was usually more complex. For example, a task that mapped to the *Basic* level required giving two reasons a person with

Figure 1-1. Difficulty of selected health literacy tasks: 2003



NOTE: The position of a question on the scale represents the average scale score attained by adults who had a 67 percent probability of successfully answering the question. Only selected questions are presented. Scale score ranges for performance levels are referenced on the figure.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

no symptoms of a specific disease should be tested for the disease by using information in a pamphlet, while a task that mapped to the *Below Basic* level required finding one piece of information–the date–on a medical appointment slip that was shorter and simpler than the text in the *Basic* task.

Health tasks that mapped to the *Intermediate* level went beyond simply searching texts and documents to find information. Most health tasks that mapped to the *Intermediate* level required adults to interpret or apply information that was presented in complex graphs, tables, or other health-related texts or documents.

Health tasks that mapped to the *Proficient* level required drawing abstract inferences, comparing or contrasting multiple pieces of information within complex texts or documents, or applying abstract or complicated information from texts or documents.

Conducting the Survey[4]

The 2003 National Assessment of Adult Literacy included two samples: (1) adults ages 16 and older living in households and (2) prison inmates ages 16 and older in federal and state prisons. The assessment was administered to approximately 19,000 adults: 18,000 adults living in households and 1,200 prison inmates.

Each sample was weighted to represent its share of the total population of the United States, and the samples were combined for reporting. Household data collection was conducted from March 2003 through February 2004; prison data collection was conducted from March through July 2004. For the household sample, the screener response rate was 81 percent and the background questionnaire response rate was 77 percent. The final household sample response rate was 62 percent.[4] For the prison sample, 97 percent of prisons that were selected for the study agreed to participate and the background questionnaire response rate for prison inmates was 91 percent. The final prison sample response rate was 88 percent.

Household interviews were conducted in respondents' homes; prison interviews usually took place in a classroom or library in the prison. Whenever possible, interviewers administered the background questionnaire and assessment in a private setting. Assessments were administered one-on-one using a computer-assisted personal interviewing (CAPI) system programmed into laptop computers. Respondents were encouraged to use whatever aids they normally used when reading and when performing quantitative tasks, including eyeglasses, magnifying glasses, rulers, and calculators.

Three percent of adults were unable to participate in the assessment because they could not communicate in either English or Spanish or because they had a mental disability that prevented them from being tested. Literacy scores for these adults could not be estimated, and they are not included in the results presented in this report, or in other NAAL reports.

An additional 3 percent of adults were routed to an alternative assessment (the Adult Literacy Supplemental Assessment, or ALSA) based upon their performance on the seven easy screening tasks at the beginning of the literacy assessment. Because they could be placed on the NAAL scale based on their responses to the seven screening tasks, ALSA participants were classified into the *Below Basic* level on each NAAL literacy scale. Results for the adults who were placed in the ALSA are included in the results presented in this report.

Additional information on ALSA, sampling, response rates, and data collection procedures is in appendix C.

[4] Nonresponse bias analyses are discussed on page 34 of the report. All percentages in this section are weighted. For the unweighted percentages, see tables C-1 and C-2 in appendix C.

Interpretation of Results

The statistics presented in this report are estimates of performance based on a sample of respondents, rather than the values that could be calculated if every person in the nation answered every question on the assessment. Estimates of performance of the population and groups within the population were calculated by using sampling weights to account for the fact that the probabilities of selection were not identical for all respondents. Information about the uncertainty of each statistic that takes into account the complex sample design was estimated by using Taylor series procedures to estimate standard errors.

The analyses in this report examine differences related to literacy based on self-reported background characteristics among groups in 2003, by using standard *t* tests to determine statistical significance. Statistical significance is reported at $p < .05$. Differences between averages or percentages that are statistically significant are discussed by using comparative terms such as *higher* or *lower*. Differences that are not statistically significant either are not discussed or are referred to as "not statistically significant." Failure to find a statistically significant difference should not be interpreted as meaning that the estimates are the same; rather, failure to find a difference may also be due to measurement error or sampling.

Detailed tables with estimates and standard errors for all tables and figures in this report are in appendices D and E. Appendix C includes more information about the weights used for the sample and the procedures used to estimate standard errors and statistical significance.

Cautions in Interpretation

The purpose of this report is to examine the relationship between health literacy and various self-reported background factors. This report is purely descriptive in nature. Readers are cautioned not to draw causal inferences based solely on the results presented here. It is important to note that many of the variables examined in this report are related to one another, and complex interactions and relationships have not been explored here.

Organization of the Report

Chapter 2 of this report examines how health literacy varied across groups with different demographic characteristics, as well as the relationship between health literacy and highest level of educational attainment and poverty status.

Chapter 3 explores the relationship between literacy and overall health. The analyses in the chapter also examine the literacy of adults who have different types of health insurance or no health insurance. The chapter concludes with an examination of the relationship between literacy and sources of printed and nonprinted information used by adults.

CHAPTER TWO

Demographic Characteristics and Health Literacy

Data from the 2003 National Assessment of Adult Literacy (NAAL) allow examinations of the relationships between demographic characteristics and literacy. Analyses from the assessment showed differences in prose, document, and quantitative literacy for adults with different demographic characteristics. For example, women had higher prose and document literacy than men, while women's average quantitative literacy was lower than men's. The average prose, document, and quantitative literacy of White adults was higher than the average literacy of adults of other races or ethnicities. Adults 65 years of age and older had the lowest average prose, document, and quantitative scores among all age groups (Kutner et al. 2005).

The relationships between health literacy and demographic characteristics of adults are examined in this chapter. Also examined are the relationships between health literacy and highest level of educational attainment and poverty. All the analyses in this chapter are based on the combined household and prison samples.

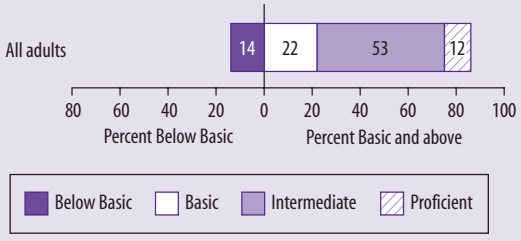
Total Population

The majority of adults, 53 percent, had *Intermediate* health literacy (figure 2-1). An additional 22 percent of adults had *Basic* health literacy, 14 percent had *Below Basic* health literacy, and 12 percent had *Proficient* health literacy. The distribution of adults among the different health literacy levels is similar, although not identical, to the distribution of adults among the levels of the prose, document, and quantitative scales (Kutner et al. 2005).

Gender

The average health literacy score for women was 248, which is 6 points higher than the average health literacy score for men (figure 2-2). A higher percentage of men than women had *Below Basic* health literacy, by a margin of 4 percentage points. The percentage of women with *Intermediate* health literacy was 4 percentage points higher than the percentage of men at the same level (figure 2-3). There were no significant differences in the percentages of men and women with *Basic* or *Proficient* health literacy.

Figure 2-1. Percentage of adults in each health literacy level: 2003

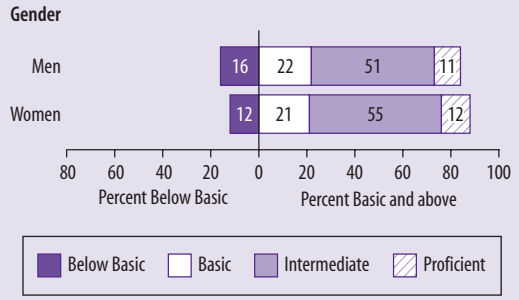


NOTE: Detail may not sum to totals because of rounding. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Figure 2-2. Average health literacy scores of adults, by gender: 2003

NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Figure 2-3. Percentage of adults in each health literacy level, by gender: 2003



NOTE: Detail may not sum to totals because of rounding. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Race and Ethnicity

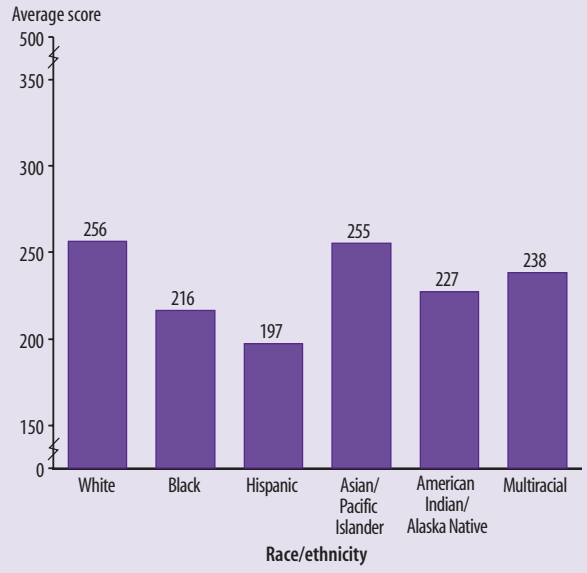
The average health literacy scores for different racial/ethnic groups are shown in figure 2-4. White and Asian/Pacific Islander adults had higher average health literacy than Black, Hispanic, American Indian/Alaska Native, and Multiracial adults. Hispanic adults had lower average health literacy than adults in any of the other racial/ethnic groups. There was no significant difference in average health literacy between White and Asian/Pacific Islander adults. There was also no significant difference in average health literacy between Black and American Indian/Alaska Native adults.

The percentages of White and Asian/Pacific Islander adults with *Proficient* health literacy were higher than the percentages of Black, Hispanic, American Indian/Alaska Native, or Multiracial adults with *Proficient* health literacy (figure 2-5).

Fifty-eight percent of White, 52 percent of Asian/Pacific Islander, and 59 percent of Multiracial adults had *Intermediate* health literacy, compared with 41 percent of Black adults and 31 percent of Hispanic adults. Conversely, higher percentages of Black and Hispanic adults than White, Asian/Pacific Islander, or Multiracial adults had *Below Basic* health literacy.

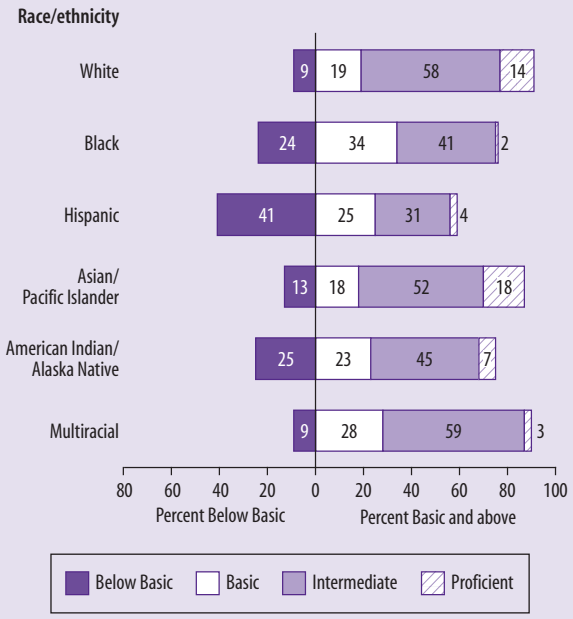
The percentages of Black, Hispanic, and Multiracial adults with *Basic* health literacy were higher than the percentages of White or Asian/Pacific Islander adults with *Basic* health literacy.

Figure 2-4. Average health literacy scores of adults, by race/ethnicity: 2003



NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure. All adults of Hispanic origin are classified as Hispanic, regardless of race. The Asian/Pacific Islander category includes Native Hawaiians. Black includes African American, and Hispanic includes Latino.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Figure 2-5. Percentage of adults in each health literacy level, by race/ethnicity: 2003



NOTE: Detail may not sum to totals because of rounding. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure. All adults of Hispanic origin are classified as Hispanic, regardless of race. The Asian/Pacific Islander category includes Native Hawaiians. Black includes African American, and Hispanic includes Latino.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Language Spoken Before Starting School

Adults who spoke only English before starting school had higher average health literacy than adults who spoke only a language other than English before starting school (table 2-1). The average health literacy score of adults who spoke only English before starting school was at the *Intermediate* level, as were the average health literacy scores of adults who spoke English and Spanish or English and another language. Adults who spoke only Spanish before starting school had the lowest average health literacy, equivalent to *Below Basic* health literacy.

Age

Adults in the oldest age group—65 and older—had lower average health literacy than adults in younger age groups (figure 2-6). Adults ages 25 to 39 had higher average health literacy than adults in other age groups.

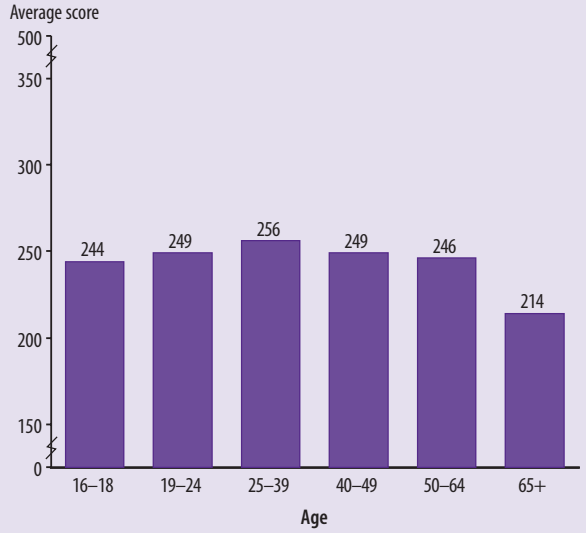
The percentages of adults with *Intermediate* health literacy in all age groups, except 65 and older, ranged from 53 to 58 percent. Among adults ages 65 and older, 38 percent had *Intermediate* health literacy. A higher percentage of adults ages 65 or older had *Below Basic* or *Basic* health literacy than adults in any of the younger age groups (figure 2-7). Moreover, the percentages of adults in the 65 and older age group who

Table 2-1. Average health literacy scores of adults, by language spoken before starting school: 2003

Language spoken before starting school	Average
English only	251
English and Spanish	232
English and other	244
Spanish	174
Other language	229

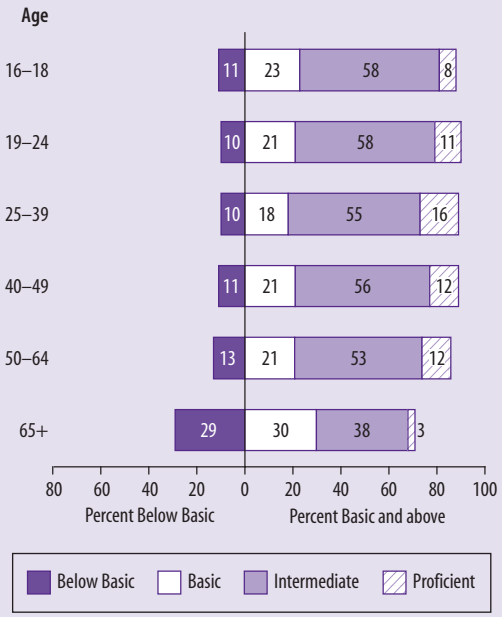
NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. The English and Spanish category includes adults who spoke languages in addition to both English and Spanish. The Spanish category includes adults who spoke Spanish and additional non-English languages.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Figure 2-6. Average health literacy scores of adults, by age: 2003



NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Figure 2-7. Percentage of adults in each health literacy level, by age: 2003



NOTE: Detail may not sum to totals because of rounding. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

had *Intermediate* or *Proficient* health literacy were lower than the percentages of adults in the other age groups who had health literacy in those levels. A higher percentage of 25- to 39-year-old adults than adults in any of the other age groups had *Proficient* health literacy.

The youngest adults, adults ages 16 to 18, were less likely to have *Proficient* health literacy than adults ages 25 to 39 or adults ages 50 to 64.

Highest Level of Educational Attainment

Starting with adults who had graduated from high school or obtained a GED, average health literacy increased with each higher level of educational attainment (figure 2-8). Adults who had not attended or completed high school, and were not currently enrolled in school, had lower average health literacy than adults with higher levels of education or adults who were currently enrolled in high school.

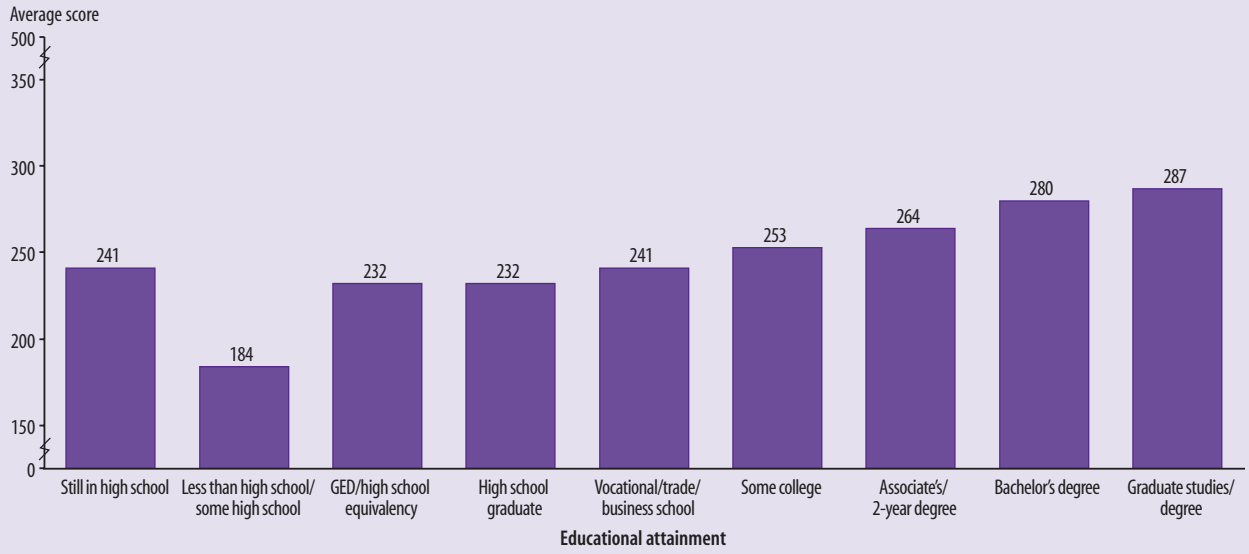
A higher percentage of adults who had not attended or completed high school had *Below Basic* health literacy than adults in any other educational group (figure 2-9).

These same adults—adults who had not attended or completed high school and were not currently enrolled in school—were less likely than all other adults, except for those who had a GED or high school equivalency certificate, to have *Proficient* health literacy.

Higher percentages of adults who had taken some graduate classes or completed a graduate degree, and adults who had graduated from a 4-year college, had *Proficient* health literacy than adults with lower levels of education. However, there were no significant differences between the two highest educational groups (adults with a bachelor's degree and adults with graduate studies or a graduate degree) in the percentages of adults falling in each of the four health literacy tasks.

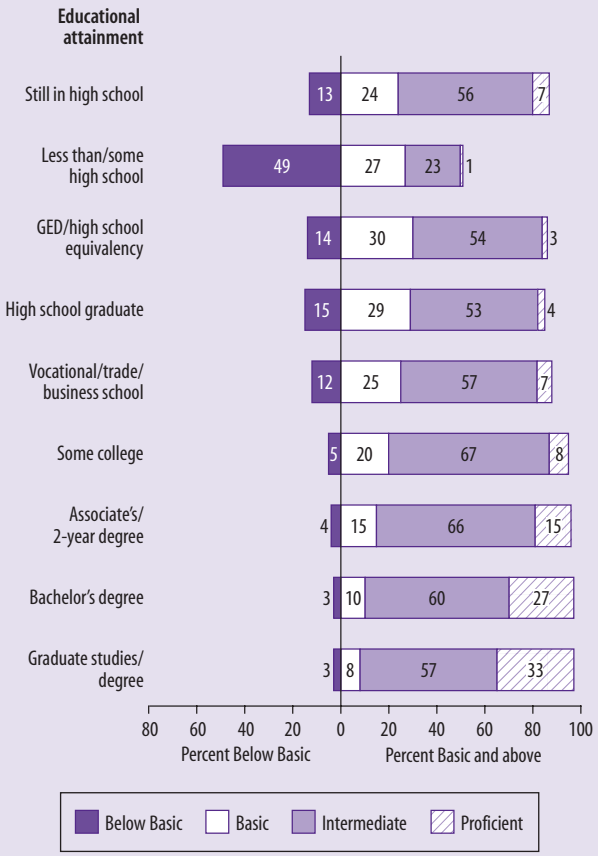
Four percent of adults with an associate's or 2-year degree and 3 percent of adults with a 4-year college degree or graduate studies had *Below Basic* health literacy, while 12 to 15 percent of adults who were still in high school, had obtained a high school diploma, had obtained a GED certificate, or had taken some vocational, trade, or business classes after high school had *Below Basic* health literacy.

Figure 2-8. Average health literacy scores of adults, by highest educational attainment: 2003



NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Figure 2-9. Percentage of adults in each health literacy level, by highest educational attainment: 2003



NOTE: Detail may not sum to totals because of rounding. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Poverty Threshold

Adults living below the poverty level had an average health literacy score of 205, while adults living at the poverty level or up to 125 percent of the poverty level had an average health literacy score of 222 (table 2-2). Both of these average literacy scores are in the *Basic* health literacy level. Average health literacy was highest for adults who were above 175 percent of the poverty threshold; in this group, average health literacy was in the *Intermediate* range.[5]

[5] Analysis of average health literacy by occupation is presented in appendix E.

Table 2-2. Average health literacy scores of adults, by poverty threshold: 2003

Poverty threshold	Average
Below poverty threshold	205
100–125% of poverty threshold	222
126–150% of poverty threshold	224
151–175% of poverty threshold	231
Above 175% of poverty threshold	261

NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. Poverty thresholds are determined by the U.S. Census Bureau and are based on family income, family size, and the ages of family members. Because adults provided their income in ranges rather than by precise dollar figures, adults could not be exactly matched to a federal poverty category. The categories shown in this table represent the best matches possible based on the categorical data.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Summary

The majority of adults, 53 percent, had *Intermediate* health literacy. An additional 22 percent of adults had *Basic* health literacy. Fewer than 15 percent of adults had either *Below Basic* or *Proficient* health literacy. Starting with adults who had graduated from high school, or obtained a GED or high school equivalency certificate, average health literacy increased with each higher level of education. Adults living below the poverty level had lower average health literacy than adults living above the poverty threshold.

Women had higher average health literacy than men. White and Asian/Pacific Islander adults had higher average health literacy than Black, Hispanic, American Indian/Alaska Native, and Multiracial adults. Hispanic adults had lower average health literacy than adults in any of the other racial/ethnic groups. Adults who spoke only English before starting school had a higher average health literacy than adults who spoke only Spanish or another non-English language. Adults ages 65 and older had lower average health literacy than adults in younger age groups. More adults ages 65 and older also had *Below Basic* health literacy than adults in any of the younger age groups.

Overall Health, Health Insurance Coverage, and Sources of Information About Health Issues

Health literacy is of interest to providers of health outreach programs for different segments of the population. These providers may include health insurance companies and people who are designing educational programs related to health maintenance and improvement. A review of medical and public health literature noted that literacy has a direct influence on patient "access to crucial information about their rights and their health care, whether it involves following instruction for care, taking medicine, comprehending disease-related information, or learning about disease prevention and health promotion" (Rudd et al. 1999).

This chapter examines the health literacy levels of different populations who may be targeted by health outreach programs, including adults with different levels of overall health and adults who have different types of health insurance coverage or no health insurance coverage at all. The analyses in the chapter also explore where adults with different levels of health literacy get information about health issues.

The analyses of the literacy of adults who received various types of health insurance are based on the household sample only. Analyses of adults who received information about health issues from the Internet are also based on the household sample only

because prison inmates generally do not have access to the Internet. All other analyses in this chapter are based on the combined household and prison samples.

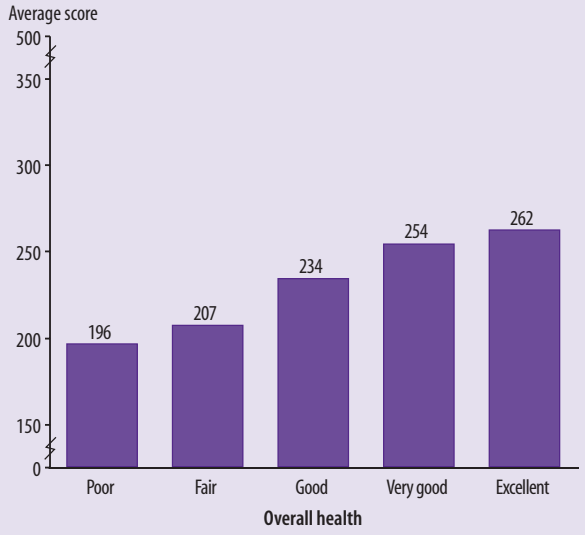
This chapter focuses on the relationship between health literacy and self-reported overall health, health insurance coverage, and sources of information about health issues. As shown in chapter 2, health literacy varies across demographic groups (i.e., by sex, race/ethnicity, age, and education). Overall health, health insurance coverage, and sources of information about health issues are also likely to vary across these same demographic groups. Because of that, supplemental analyses showing the relationships between health literacy and self-reported overall health, health insurance coverage, and sources of information about health issues broken out by demographic groups are provided in appendix E.

Self-Assessment of Overall Health

Figure 3-1 summarizes the average health literacy scores for adults with different levels of self-reported overall health. At each higher level of self-reported level of overall health, adults had higher average health literacy than adults in the next lower level. The average health literacy score of adults who reported excellent health was 262. Adults who reported they had very good health had average health literacy scores of 254; adults with self-reported good health had average health literacy scores of 234; adults with self-reported fair health had average health literacy scores of 207; and adults with self-reported poor health had average health literacy scores of 196 (figure 3-1).

Smaller percentages of adults who reported their health was excellent or very good than adults who reported their health was poor, fair, or good had *Below Basic* health literacy (figure 3-2). Conversely, higher percentages of adults who reported their overall health

Figure 3-1. Average health literacy scores of adults, by self-assessment of overall health: 2003



NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Figure 3-2. Percentage of adults in each health literacy level, by self-assessment of overall health: 2003

NOTE: Detail may not sum to totals because of rounding. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

was very good or excellent had *Intermediate* or *Proficient* health literacy than adults who said their overall health was poor, fair, or good.

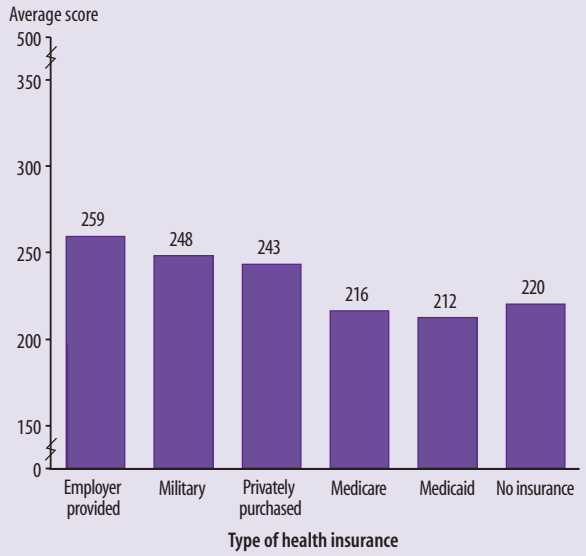
Most differences within health literacy levels in figure 3-2 are significant. However, significant differences were not detected between the percentages of adults with self-reported excellent health and very good health with *Below Basic* and *Intermediate* health literacy, between the percentages of adults with self-reported good health and poor health with *Basic* health literacy, and between the percentages of adults with self-reported fair health and poor health with *Proficient* health literacy.

Health Insurance

Adults in the United States may receive health insurance through a variety of public and private sources. These include group insurance that is provided through an employer of the individual or a family member, military insurance for active or retired service members and their families, privately purchased individual insurance policies, or insurance through a government program. The two major government programs that provide health insurance are Medicare and Medicaid. Medicare provides coverage for most adults ages 65 and older in the United States, in addition to some younger adults with disabilities. Medicaid coverage is limited to low-income adults who also meet other criteria that vary by state.

Adults who received health insurance through an employer had higher average health literacy than adults who received health insurance through other sources or adults who had no health insurance (figure 3-3). Adults who received Medicare or Medicaid and adults who had no health insurance coverage had lower average health literacy than adults who were covered by other types of health insurance.

Figure 3-3. Average health literacy scores of adults, by type of health insurance coverage: 2003

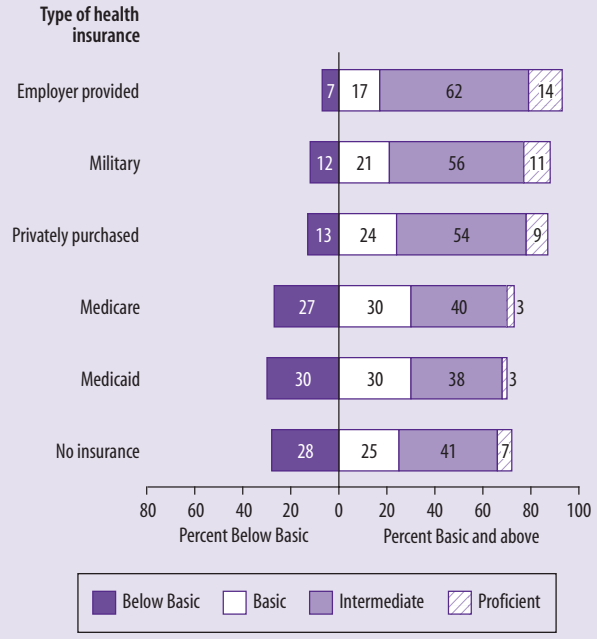


NOTE: Adults are defined as people 16 years of age and older living in households. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure. Adults who reported they had more than one type of health insurance are included in each applicable category in this figure.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Among adults who received Medicare or Medicaid, 27 percent and 30 percent, respectively, had *Below Basic* health literacy (figure 3-4). Twenty-eight percent of adults who had no health insurance had *Below Basic* health literacy. Among adults who received employer-provided, military, or privately purchased health insurance, the percentages with *Below Basic* health literacy were lower, 7 percent, 12 percent, and 13 percent, respectively.

Among adults who received employer-provided health insurance, 62 percent had *Intermediate* health literacy and 14 percent had *Proficient* health literacy (figure 3-4). The percentages of adults who received Medicare or Medicaid and had *Intermediate* or *Proficient* health literacy were lower than those who received other types of health insurance.

Figure 3-4. Percentage of adults in each health literacy level, by type of health insurance coverage: 2003



NOTE: Detail may not sum to totals because of rounding. Adults are defined as people 16 years of age and older living in households. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure. Adults who reported they had more than one type of health insurance are included in each applicable category in this figure.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Sources of Information About Health Issues

Adults may get health information in a variety of ways, including through traditional (newspapers, magazines, and books or brochures) and nontraditional (the Internet) forms of print media and through nonprint media (radio and television). Adults may also get information about health issues from conversations with family, friends, or coworkers or conversations with health care professionals.

Printed and Written Media

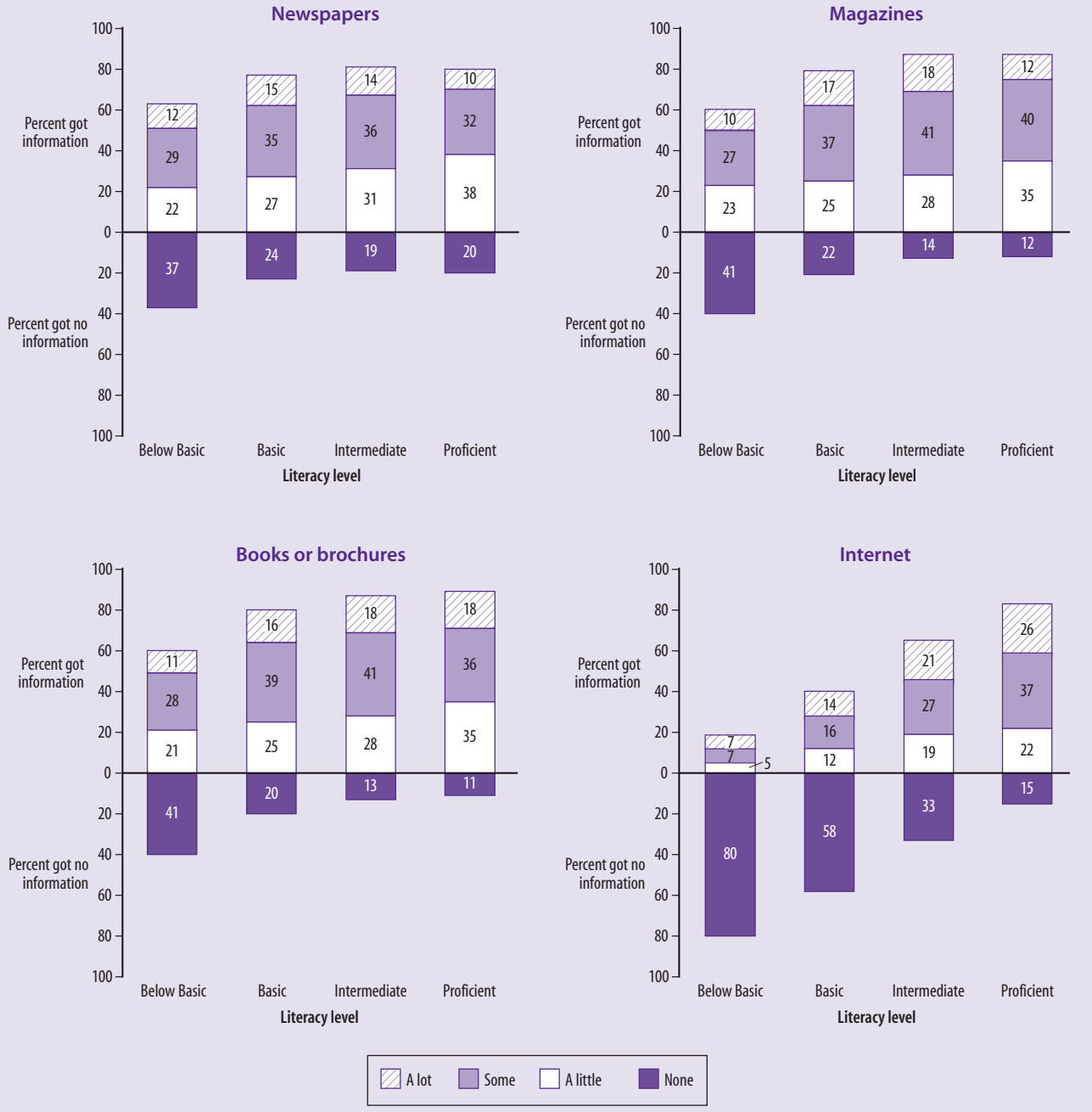
Many adults receive information about health issues from such traditional printed sources as newspapers, magazines, and books or brochures. America's adults also have access to a huge amount of written health information on the Internet. A recent Harris Poll estimates that roughly 100 million adults go online to find health information (Taylor 2001). Another study found that 70 percent of consumers reported having made a health care decision on the basis of information they found online (Fox and Rainie 2000).

Lower percentages of adults with *Below Basic* health literacy than adults with *Basic*, *Intermediate*, or *Proficient* health literacy reported that they got information about health issues from any written sources, including newspapers, magazines, books or brochures, and the Internet (figure 3-5). Twenty percent of adults with *Below Basic* health literacy got information about health issues from the Internet, compared with 42 percent of adults with *Basic* health literacy, 67 percent of adults with *Intermediate* health literacy, and 85 percent of adults with *Proficient* health literacy. Lower percentages of adults with *Below Basic*, *Basic*, or *Intermediate* health literacy got information about health issues from the Internet than from other written sources (figure 3-5).

A higher percentage of adults with *Proficient* health literacy than adults with lower levels of health literacy got a lot of information about health issues from the Internet. Higher percentages of adults with *Basic* or *Intermediate* health literacy than adults with either lower (*Below Basic*) or higher (*Proficient*) health literacy got a lot of information about health issues from newspapers and magazines. Higher percentages of adults with *Basic*, *Intermediate*, or *Proficient* health literacy than adults with *Below Basic* health literacy got a lot of information about health issues from books or brochures.

Higher percentages of adults with *Proficient* health literacy got information about health issues from books or brochures than from newspapers or the Internet. Additionally, higher percentages of adults

Figure 3-5. Percentage of adults who got information about health issues from printed and written media: newspapers, magazines, books or brochures, and the Internet, by health literacy level: 2003



NOTE: Detail may not sum to totals because of rounding. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure. Prison inmates are not included in the Internet category because they do not have access to the Internet.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

with *Proficient* health literacy got information about health issues from the Internet than from newspapers.

Nonprint Media

Higher percentages of adults with *Below Basic* or *Basic* health literacy than adults with *Intermediate* health literacy received a lot of information about health issues from radio and television. Adults with *Proficient* health literacy were least likely to receive a lot of information about health issues from those same nonprint media sources (figure 3-6).

Personal Contacts

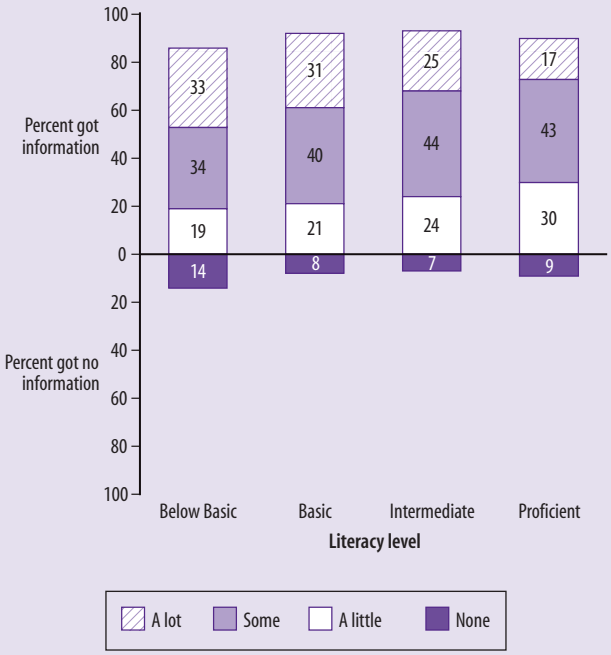
With each higher level of health literacy, a higher percentage of adults got information about health issues from family members, friends, or coworkers (or, in the case of prison inmates, from family members, friends, other inmates, or staff) (figure 3-7).

Higher percentages of adults with *Intermediate* or *Proficient* health literacy than adults with *Basic* health literacy got any information about health issues from health care professionals, including doctors, nurses, therapists, and psychologists. A higher percentage of adults with *Basic* health literacy than adults with *Below Basic* health literacy got any information about these issues from health care professionals.

Summary

At every higher self-reported level of overall health (poor, fair, good, very good, excellent), adults had higher average health literacy than adults in the next lower level. Smaller percentages of adults who reported that their overall health was very good or excellent had *Below Basic* health literacy than other adults.

Figure 3-6. Percentage of adults who got information about health issues from nonprint media: radio and television, by health literacy level: 2003

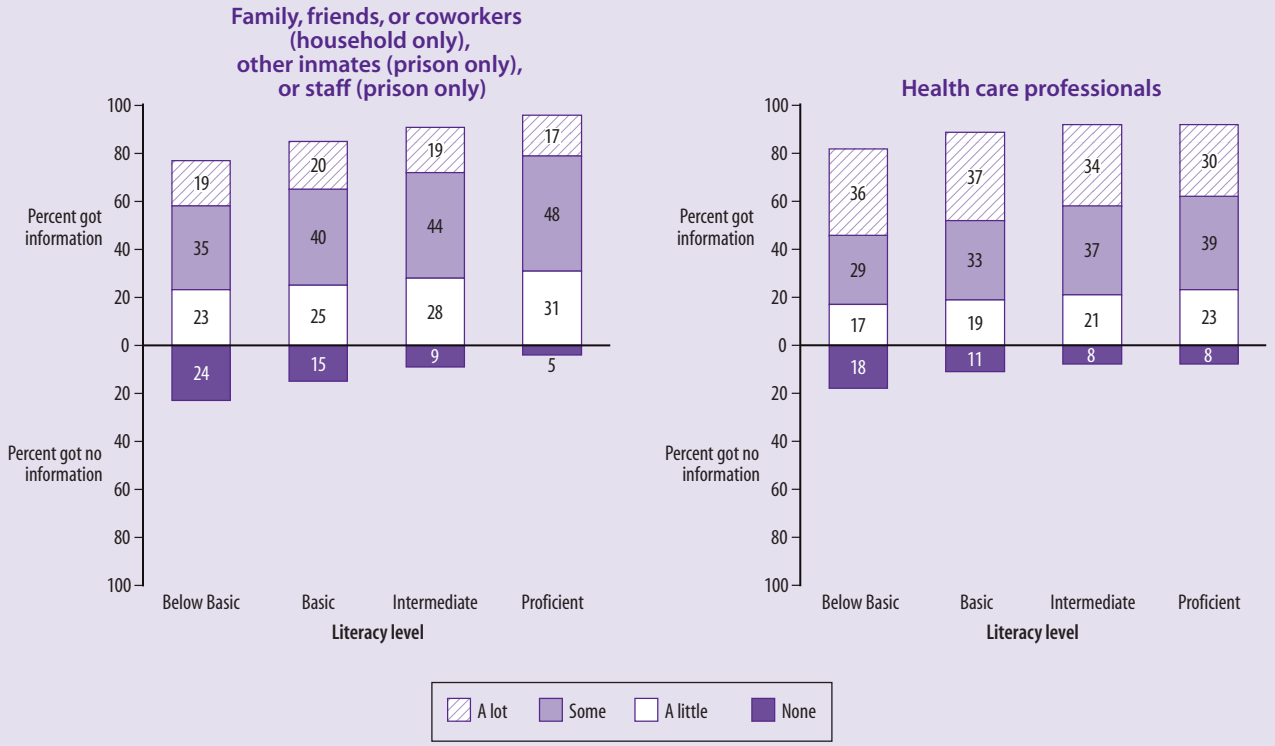


NOTE: Detail may not sum to totals because of rounding. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Adults who received Medicare or Medicaid or who had no health insurance had lower average health literacy than adults who received insurance through an employer or the military or adults who purchased private insurance. Among adults who received Medicare and Medicaid, 27 percent and 30 percent, respectively, had *Below Basic* health literacy.

A lower percentage of adults with *Below Basic* health literacy than adults with *Basic*, *Intermediate*, or *Proficient* health literacy reported that they got information about health issues from any written sources, including newspapers, magazines, books or brochures, and

Figure 3-7. Percentage of adults who got information about health issues from personal contacts: family, friends, or coworkers; or health care professionals, by health literacy level: 2003



NOTE: Detail may not sum to totals because of rounding. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure. Adults living in households were asked about getting information from "family members, friends, or coworkers"; prison inmates were asked about getting information from "family members, friends, other inmates, or staff."
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

the Internet. A higher percentage of adults with *Proficient* health literacy than adults with lower levels of health literacy got a lot of information about health issues from the Internet. A lower percentage of adults with *Below Basic*, *Basic*, and *Intermediate* health literacy got information about health issues from the Internet than from other written sources.

A lower percentage of adults with *Proficient* health literacy than adults with *Intermediate* health literacy received a lot of information about health issues from radio or television, and a lower percentage of adults with *Intermediate* health literacy than adults with *Basic* or *Below Basic* health literacy received a lot of information about health issues from radio or television.

With each higher level of health literacy, the percentage of adults who got information about health issues from personal contacts other than health care professionals was higher.

Sample Health Literacy Assessment Question

Respondents who participated in the 2003 assessment were asked to complete prose, document, and quantitative literacy tasks of varying levels of difficulty. The sample question on the following page illustrates the type of task used to measure the health literacy of America's adults. This question was originally developed for the 1992 survey and reused in 2003.

Consistent with the design of the assessment, the sample question appears before the text needed to answer the question. The percentage of respondents who answered the question correctly is reported, as well as the percentage of correct responses for each of the four health literacy assessment levels.

More information about the sample assessment questions can be found on the Internet at http://nces.ed.gov/naal.

Prose and Health Literacy Question

Refer to the article on the next page to answer the following question.

According to the brochure, why is it difficult for people to know if they have high blood pressure?

_____

_____

Correct answer

Any statement such as the following:
- **Symptoms are not usually present**
- **High blood pressure is silent**

Percentage of adults who answered the question correctly, health literacy scale: 2003

All Adults	*Below Basic*	*Basic*	*Intermediate*	*Proficient*
74	10	71	94	100

NOTE: Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from these data.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

TOO MANY BLACK ADULTS DIE FROM THE EFFECTS OF HIGH BLOOD PRESSURE

DID YOU KNOW?

More than one out of every four Black adults has high blood pressure, according to a two-year survey by Public Health Service in the 1960's. Other studies show as many as one out of three Black adults has high blood pressure.

High blood pressure is the most common chronic disease treated by practitioners in the Black community.

More Black people die as a result of high blood pressure than any other disease.

For every Black person who dies of sickle-cell anemia, at least 100 others die from the effects of high blood pressure.

The rate of death from the effects of high blood pressure for Black people is nearly one and one-half times the rate for White people.

High blood pressure, along with cigarette smoking, contributes greatly to the apparent increased number of heart attacks among Black adults.

If high blood pressure is controlled, strokes, heart attacks and kidney disease can be substantially reduced.

YES, HIGH BLOOD PRESSURE CAN BE TREATED…
AND CONTROLLED.

WHAT YOU CAN DO

Have your blood pressure checked regularly

Unfortunately, high blood pressure is a silent killer and crippler. At least half of the people who have high blood pressure don't know it because symptoms usually are not present. The only way you can be sure is to have the doctor check your blood pressure. You should have your blood pressure checked at least once a year, especially if: (1) you are Black, (2) if you are over 40, (3) if members of your family or close relatives have had high blood pressure or the complications of high blood pressure (stroke, heart attack, or kidney disease), or (4) if you have frequent headaches, dizziness, or other symptoms that may occasionally be related to high blood pressure.

Follow your doctor's instructions

High blood pressure can't be cured, but it can be kept under control. Control means keeping your blood pressure as close to normal as possible. That's very important to you — it can prevent a crippling stroke or other serious illness in the future.

The doctor will find a way to control your blood pressure that's most comfortable for you. Then it will be up to you — to take the medicine and follow the prescribed diet, to follow the instructions carefully and to come back regularly for checkups.

Yes, high blood pressure can be controlled, but only if *you* cooperate fully with your doctor.

Definitions of All Subpopulations and Background Variables Reported

For the exact wording of background questions, see http://nces.ed.gov/naal.

Chapter 2

Total Population

The 2003 National Assessment of Adult Literacy included two samples: (1) adults ages 16 and older living in households and (2) inmates ages 16 and older in federal and state prisons. The household sample also included adults in six states that chose to participate in a concurrent State Assessment of Adult Literacy: Kentucky, Maryland, Massachusetts, Missouri, Oklahoma, and New York. Each sample was weighted to represent its share of the total population of the United States (99 percent for the household sample and 1 percent for the prison sample). The household and prison samples were combined to create a nationally representative sample of America's adults. Household data collection was conducted from March 2003 through February 2004; prison data collection was conducted from March through July 2004.

Gender

Interviewers recorded the gender of each respondent.

Race and Ethnicity

In 2003, all respondents were asked two or three questions about their race and ethnicity. The first question asked them to indicate whether they were Hispanic or Latino.

If a respondent answered that he or she was Hispanic or Latino, the respondent was asked to choose one or more of the following groups to describe his or her Hispanic origin:

- Mexican, Mexican American, or Chicano
- Puerto Rican or Puerto Rican American
- Cuban or Cuban American
- Central or South American
- Other Hispanic or Latino background

Respondents who identified more than one of the groups to describe their Hispanic origin were classified as "Other Hispanic or Latino background."

Then, all respondents, including those who indicated they were Hispanic or Latino, were asked to choose one or more of the following groups to describe themselves:

- White
- Black or African American
- Asian
- American Indian or Alaska Native
- Native Hawaiian or other Pacific Islander

Individuals who responded "yes" to the first question were coded as Hispanic, regardless of their answer to the second question. Individuals who identified more than one group on the second question were coded as Multiracial. Respondents of Native Hawaiian or Pacific Islander origin were grouped with those of Asian origin. The White, Black, and Hispanic groups are reported separately. The interviewer recorded the race/ethnicity of respondents who refused to answer the question.

Age

All respondents were asked to report their birth dates, and this information was used to calculate their age. Age groups reported are 16 to 18, 19 to 24, 25 to 39, 40 to 49, 50 to 64, and 65 and older. Age groups were selected to correspond to key life stages of many adults:

16-18: Completion of secondary education

19-24: College or job training

25-39: Early career

40-49: Mid-career

50-64: Late career

65 and older: Retirement

Highest Level of Educational Attainment

All respondents were asked to indicate the highest level of education they had completed. The following options were provided:

- Still in high school
- Less than high school
- Some high school
- GED or high school equivalency
- High school graduate
- Vocational, trade, or business school after high school
- College: less than 2 years
- College: Associate's degree (A.A.)
- College: 2 or more years, no degree
- College graduate (B.A. or B.S.)

- Postgraduate, no degree
- Postgraduate degree (M.S., M.A., Ph.D., M.D., etc.)

Respondents who reported less than high school or some high school were asked how many years of education they completed. For certain analyses, some of these groups were collapsed. For example, respondents who reported some postgraduate study but no degree were generally combined with those who had completed a postgraduate degree.

Chapter 3

Self-Assessment of Overall Health

Respondents were asked how, in general, they would rate their overall health. They were given the following response options: excellent, very good, good, fair, poor.

Health Insurance

Respondents were asked whether they received the following types of health insurance: health insurance through your work (school) or a family member's work, Medicare, health insurance you or someone else in your family purchased directly from an insurance company or other organization that is not related to past or current employment, health insurance provided as part of military service, Medicaid. Respondents could indicate that they received multiple types of health insurance. Adults who received more than one type of health insurance were included in multiple categories for the analyses in this report. Adults in prisons were not asked this question and they are not included in the analyses.

Sources of Information About Health Issues

Household respondents were asked how much information about health issues, such as diet, exercise, disease prevention, or a specific disease or health condition, they got from newspapers, magazines, the Internet, radio and television, books or brochures; family members, friends, or coworkers; or talking to doctors, nurses, therapists, or psychologists. They were given the following response options: a lot, some, a little, none. Prison respondents were asked the same question, but instead of "family members, friends, or coworkers," they were asked about "family members, friends, other inmates, or staff." Prison respondents were not asked about the Internet because most prison inmates do not have access to the Internet.

Technical Notes

This appendix describes the sampling, data collection, weighting and variance estimation, scaling, and statistical testing procedures used to collect and analyze the data for the 2003 National Assessment of Adult Literacy (NAAL). Household data collection was conducted from March 2003 through February 2004; prison data collection was conducted from March through July 2004.

Sampling

The 2003 National Assessment of Adult Literacy included two samples: (1) adults ages 16 and older living in households (99 percent of the sample weighted) and (2) inmates ages 16 and older in federal and state prisons (1 percent of the sample weighted). Each sample was weighted to represent its share of the total population of the United States, and the samples were combined for reporting.

Household Sample

The 2003 National Assessment of Adult Literacy household sample included a nationally representative probability sample of 35,365 households. The household sample was selected on the basis of a four-stage, stratified area sample: (1) primary sampling units (PSUs) consisting of counties or groups of contiguous counties; (2) secondary sampling units (referred to as segments) consisting of area blocks; (3) housing units containing households; and (4) eligible persons within households. Person-level data were collected through a screener,

a background questionnaire, the literacy assessment, and the oral module. Of the 35,365 sampled households, 4,671 were either vacant or not a dwelling unit, resulting in a sample of 30,694 households.[1] A total of 25,123 households completed the screener, which was used to select survey respondents. The final screener response rate was 81.2 percent weighted.

On the basis of the screener data, 23,732 respondents ages 16 and older were selected to complete the background questionnaire and the assessment; 18,186 actually completed the background questionnaire. Of the 5,546 respondents who did not complete the background questionnaire, 355 were unable to do so because of a literacy-related barrier, either the inability to communicate in English or Spanish (the two languages in which the background questionnaire was administered) or a mental disability.

The final response rate for the background questionnaire, which included respondents who completed the background questionnaire and respondents who were unable to complete the background questionnaire because of language problems or a mental disability, was 76.6 percent weighted. Of the 18,186 adults ages 16 and older who completed the background questionnaire, 17,178 completed at least one question on each of the three scales—prose, document, and quantitative—measured in the adult literacy assessment. An additional 149 were unable to answer at least one question on each of the three scales for literacy-related reasons.[2] The final response rate for the literacy assessment, which included respondents who answered at least one question on each scale plus the 149 respondents who were unable to do so because of language problems or a mental disability, was 96.6 percent weighted.

Cases were considered complete if the respondent completed the background questionnaire and at least one question on each of the three scales or if the respondent was unable to answer any questions because of language issues (an inability to communicate in English or Spanish) or a mental disability. All other cases that did not include a complete screener, a background questionnaire, and responses to at least one question on each of the three literacy scales were considered incomplete or missing. Before imputation, the overall response rate for the household sample was 60.1 percent weighted.

For respondents who did not complete any literacy tasks on any scale, no information is available about their performance on the literacy scale they were missing. Completely omitting these individuals from the analyses would have resulted in unknown biases in estimates of the literacy skills of the national population because refusals cannot be assumed to have occurred randomly. For 859 respondents[3] who answered the background questionnaire but refused to complete the assessment for reasons other than language issues or a mental disability, regression-based imputation procedures were applied to impute responses to one assessment item on each scale by using the NAAL background data on age, gender, race/ethnicity, education level, country of birth, census region, and metropolitan statistical area status.

On the prose and quantitative scales, a response was imputed for the easiest task on each scale. On the

[1]To increase the number of Black and Hispanic adults in the NAAL sample, segments with moderate to high concentrations of Black and Hispanic adults were given a higher selection probability. Segments in which Blacks or Hispanics accounted for 25 percent or more of the population were oversampled at a rate up to three times that of the remainder of the segments.

[2] Of the 149 respondents who were unable to answer at least one question on each of the three scales for literacy-related reasons, 65 respondents answered at least one question on one scale. The remaining 84 respondents did not answer any questions on any scale.

[3] Of the 18,186 household respondents who completed the background questionnaire, 17,178 completed at least one question on each of the three scales and 149 were unable to answer at least one question on one or more of the scales for literacy-related reasons. The remaining 859 respondents completed the background questionnaire but refused to complete the assessment.

document scale, a response was imputed for the second easiest task because that task was also included on the health literacy scale. In each of the logistic regression models, the estimated regression coefficients were used to predict missing values of the item to be imputed. For each nonrespondent, the probability of answering the item correctly was computed and then compared with a randomly generated number between 0 and 1. If the probability of getting a correct answer was greater than the random number, the imputed value for the item was 1 (correct). Otherwise it was 0 (wrong). In addition, a wrong response on each scale was imputed for 65 respondents who started to answer the assessment but were unable to answer at least one question on each scale because of language issues or a mental disability.[4]

The final household reporting sample—including the imputed cases—consisted of 18,102 respondents. These 18,102 respondents are the 17,178 respondents who completed the background questionnaire and the assessment, plus the 859 respondents who completed the background questionnaire but refused to do the assessment for non-literacy-related reasons and have imputed responses to one item on each scale, plus the 65 respondents who started to answer the assessment items but were unable to answer at least one question on each scale because of language issues or a mental disability. After including the cases for which responses to the assessment questions were imputed, the weighted response rate for the household sample was 62.1 percent (18,102 cases with complete or imputed data and an additional 439 cases that had no assessment data because of language issues or a mental disability).[5]

[4] For a more detailed discussion of imputation see Little and Rubin (2002).

[5] The 439 cases that had no assessment data because of language issues or a mental disability include the 355 respondents who were unable to complete the background questionnaire for one of these reasons, plus the 84 respondents who did not answer any questions on any scale because of language issues or a mental disability.

The household sample was subject to unit nonresponse from the screener, background questionnaire, literacy assessment, and oral module and to item nonresponse to background questionnaire items. Although all background questionnaire items had response rates of more than 85 percent, two stages of data collection—the screener and the background questionnaire—had unit response rates below 85 percent and thus required an analysis of the potential for nonresponse bias.

Table C-1 presents a summary of the household response rate.

Table C-1. Weighted and unweighted household response rate, by survey component: 2003

Survey component	Weighted Response rate (percent)	Unweighted Response rate (percent)
Screener	81.2	81.8
Background questionnaire	76.6	78.1
Literacy assessment	96.6	97.2
Overall response rate before imputation	60.1	62.1
Overall response rate after imputation	62.1	63.9

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Prison Sample

The 2003 assessment also included a nationally representative probability sample of inmates in federal and state prisons. A total of 114 prisons were selected to participate in the adult literacy assessment. Of these 114 prisons, 107 agreed to participate, 3 refused, and 4 were ineligible. The final prison response rate was 97.3 percent weighted. From among the inmates in those prisons, 1,298 inmates ages 16 and older were randomly selected to complete the background questionnaire and assessment. Of those 1,298 selected inmates, 1,161 completed the background questionnaire. Of the 137 who did not complete the background questionnaire, 12 were unable to do so because of a literacy-related barrier, either the inabil-

ity to communicate in English or Spanish (the two languages in which the background questionnaire was administered) or a mental disability.

The final response rate for the prison background questionnaire, which included respondents who completed the background questionnaire and respondents who were unable to complete the background questionnaire because of language problems or a mental disability, was 90.6 percent weighted. Of the 1,161 inmates who completed the background questionnaire, 1,125 completed at least one question on each of the three scales—prose, document, and quantitative—measured in the adult literacy assessment. An additional eight were unable to answer at least one question on each of the three scales for literacy-related reasons. The final response rate for the literacy assessment, which included respondents who answered at least one question on each scale or were unable to do so because of language problems or a mental disability, was 98.9 percent weighted.

The same definition of a complete case used for the household sample was also used for the prison sample, and the same rules were followed for imputation. Before imputation, the final response rate for the prison sample was 87.2 percent weighted.

One response on each scale was imputed on the basis of background characteristics for 28 inmates who completed the background questionnaire but had incomplete or missing assessments for reasons that were not literacy related. The statistical imputation procedures were the same as for the household sample. The background characteristics used for the missing data imputation for the prison sample were prison security level, region of country/prison type, age, gender, educational attainment, country of birth, race/ethnicity, and marital status. A wrong response on each scale was imputed for the three inmates who started to answer the assessment but were unable to answer at least one question on each scale because of language issues or a mental disability. The final prison reporting sample—including the imputed cases—consisted of 1,156 respondents. After the cases for which responses to the assessment questions were imputed were included, the weighted response rate for the prison sample was 88.3 percent (1,156 cases with complete or imputed data and an additional 17 cases that had no assessment data because of language issues or a mental disability).

Table C-2 presents a summary of the prison response rate.

Table C-2. Weighted and unweighted prison response rate, by survey component: 2003

Survey component	Weighted Response rate (percent)	Unweighted Response rate (percent)
Prison	97.3	97.3
Background questionnaire	90.6	90.4
Literacy assessment	98.9	98.8
Overall response rate before imputation	87.2	86.8
Overall response rate after imputation	88.3	87.9

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Nonresponse Bias

NCES statistical standards require a nonresponse bias analysis when the unit response rate for a sample is less than 85 percent. The nonresponse bias analysis of the household sample revealed differences in the background characteristics of respondents who participated in the assessment compared with those who refused.

In bivariate unit-level analyses at the screener and background questionnaire stages, estimated percentages for respondents were compared with those for the total eligible sample to identify any potential bias owing to nonresponse. Although some statistically significant differences existed, the potential for bias was small because the absolute difference between estimated percentages was less than 2 percent for all domains considered. Multivariate analyses were con-

ducted to further explore the potential for nonresponse bias by identifying the domains with the most differential response rates. These analyses revealed that the lowest response rates for the screener were among dwelling units in segments with high median income, small average household size, and a large proportion of renters. The lowest response rates for the background questionnaire were among males ages 30 and older in segments with high median income. However, the variables used to define these areas and other pockets with low response rates were used in weighting adjustments. The analysis showed that weighting adjustments was highly effective in reducing the bias. The general conclusion was that the potential amount of nonresponse bias attributable to unit nonresponse at the screener and background questionnaire stages was likely to be negligible.

Data Collection

Household interviews took place in respondents' homes; prison interviews generally took place in a classroom or library in the prison. Whenever possible, interviewers administered the background questionnaire and assessment in a private setting. Unless there were security concerns, a guard was not present in the room when inmates were interviewed.

Interviewers used a computer-assisted personal interviewing (CAPI) system programmed into laptop computers. The interviewers read the background questions from the computer screen and entered all responses directly into the computer. Skip patterns and follow-up probes for contradictory or out-of-range responses were programmed into the computer.

After completing the background questionnaire, respondents were handed a booklet with the assessment questions. The interviewers followed a script that introduced the assessment booklet and guided the respondent through the assessment.

Each assessment booklet began with the same seven questions. After the respondent completed those questions, the interviewer asked the respondent for the book and used an algorithm to determine on the basis of the responses to the first seven questions whether the respondent should continue in the main assessment or be placed in the Adult Literacy Supplemental Assessment (ALSA). Three percent of adults weighted (5 percent unweighted) were placed in the ALSA.

ALSA was a performance-based assessment that allowed adults with marginal literacy to demonstrate what they could and could not do when asked to make sense of various forms of print. The ALSA started with simple identification tasks and sight words and moved to connected text, using authentic, highly contextualized material commonly found at home or in the community. Respondents placed in the ALSA are included in the NAAL sample based on their responses to the seven questions Because the ALSA respondents got most or all of the seven questions at the beginning of the assessment wrong, they would have been classified into the *Below Basic* level on the health scale.

A respondent who continued in the main assessment was given back the assessment booklet, and the interviewer asked the respondent to complete the tasks in the booklet and guided the respondent through the tasks. The main assessment consisted of 12 blocks of tasks with approximately 11 questions in each block, but each assessment booklet included only 3 blocks of questions. The blocks were spiraled so that across the 26 different configurations of the assessment booklet, each block was paired with every other block and each block appeared in each of the three positions (first, middle, last) in a booklet.

For ALSA interviews, the interviewer read the ALSA script from a printed booklet and classified the respondent's answers into the response categories in

the printed booklet. ALSA respondents were handed the materials they were asked to read

Following the main assessment or ALSA, all respondents were administered the oral fluency assessment (not discussed in this report). Respondents were handed a booklet with passages, number lists, letter lists, word lists, and pseudoword lists to read orally. Respondents read into a microphone that recorded their responses on the laptop computer.

Weighting and Variance Estimation

A complex sample design was used to select assessment respondents. The properties of a sample selected through a complex design could be very different from those of a simple random sample in which every individual in the target population has an equal chance of selection and in which the observations from different sampled individuals can be considered to be statistically independent of one another. Therefore, the properties of the sample for the complex data collection design were taken into account during the analysis of the data. Standard errors calculated as though the data had been collected from a simple random sample would generally underestimate sampling errors. One way of addressing the properties of the sample design was by using sampling weights to account for the fact that the probabilities of selection were not identical for all respondents. All population and subpopulation characteristics based on the NAAL data used sampling weights in their estimation.

The statistics presented in this report are estimates of group and subgroup performance based on a sample of respondents, rather than the values that could be calculated if every person in the nation answered every question on the instrument. It is therefore important to have measures of the degree of uncertainty of the estimates. Accordingly, in addition to providing estimates of percentages of respondents and their average scale score, this report provides information about the uncertainty of each statistic.

Because the assessment used clustered sampling, conventional formulas for estimating sampling variability that assume simple random sampling and hence independence of observations are inappropriate. For this reason, the NAAL assessment uses a Taylor series procedure based on the *sandwich estimator* to estimate standard errors (Binder 1983).

Scaling

As discussed above, each respondent to the NAAL received a booklet that included 3 of the 13 assessments blocks. Because each respondent did not answer all of the NAAL items, item response theory (IRT) methods were used to estimate average scores on the health, prose, document, and quantitative literacy scales; a simple average percent correct would not allow for reporting results that are comparable for all respondents. IRT models the probability of answering a question correctly as a mathematical function of proficiency or skill. The main purpose of IRT analysis is to provide a common scale on which performance on some latent trait can be compared across groups, such as those defined by sex, race/ethnicity, or place of birth (Hambleton and Swaminathan 1985).

IRT models assume that an examinee's performance on each item reflects characteristics of the item and characteristics of the examinee. All models assume that all items on a scale measure a common latent ability or proficiency dimension (e.g., prose literacy) and that the probability of a correct response on an item is uncorrelated with the probability of a correct response on another item given fixed values of the latent trait. Items are measured in terms of their difficulty as well as their ability to discriminate among examinees of varying ability.

The assessment used two types of IRT models to estimate scale scores. The two-parameter logistic (2PL) model, which was used for dichotomous items (that is, items that are scored either right or wrong) takes the form

$$P(x_{ij}=1 \mid \theta_j, a_i, b_i) = \frac{1}{1+e^{-1.7a_i(\theta_j - b_i)}},$$

where x_{ij} is the response of person j to item i, θ_j is the proficiency of person j, a_i is the *slope* or *discrimination* parameter for item i, and b_i is the *location* or *difficulty* parameter for item i.

For the partial credit items, the graded response logistic (GRL) model was used. This model follows the 2PL model for the probability of a score of 1 (at least partially correct):

$$P(x_{ij} \geq 1 \mid \theta_j, a_i, b_{i1}) = \frac{1}{1+e^{-1.7a_i(\theta_j - b_{i1})}}.$$

It also follows the 2PL model for the probability of a score of 2 (completely correct):

$$P(x_{ij}=2 \mid \theta_j, a_i, b_{i2}) = \frac{1}{1+e^{-1.7a_i(\theta_j - b_{i2})}}.$$

In the equations above, b_{i1} and b_{i2} are the step parameters corresponding to the response categories of partially or fully correct.

The scale indeterminacy was solved by setting an origin and unit size to the reported scale means and standard deviations from the 1992 assessment.[6] Linear transformation was performed to transform the original scale metric to the final reporting metric.

Levels were set and items were mapped to scales based on the scores corresponding to a 67 percent success rate on the tasks.

Statistical Testing

The statistical comparisons in this report were based on the *t* statistic. Statistical significance was determined by calculating a *t* value for the difference between a pair of means, or proportions, and comparing this value with published tables of values at a certain level of significance, called alpha level. The alpha level is an a priori statement of the probability of inferring that a difference exists when, in fact, it does not. The alpha level used in this report is .05, based on a two-tailed test. The formula used to compute the *t* statistic was as follows:

$$t = \frac{(P_1 - P_2)}{\sqrt{(\mathrm{SE}_1^2 + \mathrm{SE}_2^2)}},$$

where P_1 and P_2 are the estimates to be compared and SE_1 and SE_2 are their corresponding standard errors.

[6] The means for the 1992 assessment were 276 for prose, 271 for document, and 275 for quantitative. The standard deviations for the 1992 assessment were 61 for prose, 61 for document, and 66 for quantitative. The standard deviations for the 2003 assessment were 59 for prose, 57 for document, and 61 for quantitative.

APPENDIX D

Standard Errors for Tables and Figures

Table D2-1. Estimates and standard errors for Figure 2-1. Percentage of adults in each health literacy level: 2003

Literacy level	Percentage
Below Basic	14 (0.5)
Basic	22 (0.4)
Intermediate	53 (0.6)
Proficient	12 (0.5)

NOTE: Detail may not sum to totals because of rounding. Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table D2-2. Estimates and standard errors for Figure 2-2. Average health literacy scores of adults, by gender: 2003

Gender	Average
Men	242 (1.3)
Women	248 (1.5)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table D2-3. Estimates and standard errors for Figure 2-3. Percentage of adults in each health literacy level, by gender: 2003

Gender	Below Basic	Basic	Intermediate	Proficient
Men	16 (0.6)	22 (0.4)	51 (0.7)	11 (0.5)
Women	12 (0.7)	21 (0.6)	55 (0.8)	12 (0.7)

NOTE: Detail may not sum to totals because of rounding. Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table D2-4. Estimates and standard errors for Figure 2-4. Average health literacy scores of adults, by race/ethnicity: 2003

Race/ethnicity	Average
White	256 (1.4)
Black	216 (2.1)
Hispanic	197 (3.3)
Asian/Pacific Islander	255 (5.6)
American Indian/Alaska Native	227 (10.3)
Multiracial	238 (3.9)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. All adults of Hispanic origin are classified as Hispanic, regardless of race. The Asian/Pacific Islander category includes Native Hawaiians.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table D2-5. Estimates and standard errors for Figure 2-5. Percentage of adults in each health literacy level, by race/ethnicity: 2003

Race/ethnicity	Below Basic	Basic	Intermediate	Proficient
White	9 (0.6)	19 (0.7)	58 (0.9)	14 (0.9)
Black	24 (2.1)	34 (1.5)	41 (2.3)	2 (0.5)
Hispanic	41 (1.7)	25 (0.6)	31 (1.2)	4 (0.4)
Asian/Pacific Islander	13 (2.1)	18 (1.6)	52 (2.4)	18 (2.5)
American Indian/Alaska Native	25 (5.4)	23 (2.8)	45 (5.2)	7 (2.9)
Multiracial	9 (3.7)	28 (4.7)	59 (6.1)	3 (2.3)

NOTE: Detail may not sum to totals because of rounding. Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. All adults of Hispanic origin are classified as Hispanic, regardless of race. The Asian/Pacific Islander category includes Native Hawaiians.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table D2-6. Estimates and standard errors for Table 2-1. Average health literacy scores of adults, by language spoken before starting school: 2003

Language spoken before starting school	Average
English only	251 (1.2)
English and Spanish	232 (3.6)
English and other	244 (4.3)
Spanish	174 (4.2)
Other language	229 (6.4)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. The English and Spanish category includes adults who spoke languages in addition to both English and Spanish. The Spanish category includes adults who spoke Spanish and additional non-English languages.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table D2-7. Estimates and standard errors for Figure 2-6. Average health literacy scores of adults, by age: 2003

Age	Average
16–18	244 (3.6)
19–24	249 (2.5)
25–39	256 (1.6)
40–49	249 (1.9)
50–64	246 (2.1)
65+	214 (2.0)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table D2-8. Estimates and standard errors for Figure 2-7. Percentage of adults in each health literacy level, by age: 2003

Age	Below Basic	Basic	Intermediate	Proficient
16–18	11 (2.0)	23 (2.3)	58 (2.9)	8 (2.0)
19–24	10 (1.2)	21 (1.2)	58 (1.7)	11 (1.4)
25–39	10 (0.6)	18 (0.6)	55 (0.9)	16 (0.9)
40–49	11 (0.9)	21 (0.9)	56 (1.2)	12 (1.0)
50–64	13 (0.9)	21 (0.7)	53 (1.1)	12 (0.9)
65+	29 (1.4)	30 (0.8)	38 (1.3)	3 (0.5)

NOTE: Detail may not sum to totals because of rounding. Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table D2-9. Estimates and standard errors for Figure 2-8. Average health literacy scores of adults, by highest educational attainment: 2003

Educational attainment	Average
Still in high school	241 (4.6)
Less than/some high school	184 (2.6)
GED/high school equivalency	232 (2.8)
High school graduate	232 (1.8)
Vocational/trade/business school	241 (2.9)
Some college	253 (1.6)
Associate's/2-year degree	264 (2.3)
College graduate	280 (2.2)
Graduate studies/degree	287 (2.4)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table D2-10. Estimates and standard errors for Table 2-2. Average health literacy scores of adults, by poverty threshold: 2003

Poverty threshold	Average
Below poverty threshold	205 (2.6)
100–125% of poverty threshold	222 (3.0)
126–150% of poverty threshold	224 (3.6)
151–175% of poverty threshold	231 (3.1)
Above 175% of poverty threshold	261 (1.2)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. Poverty thresholds are determined by the U.S. Census Bureau and are based on family income, family size, and the ages of family members. Because adults provided their income in ranges rather than by precise dollar figures, adults could not be exactly matched to a federal poverty category. The categories shown in this table represent the best matches possible based on the categorical data.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table D2-11. Estimates and standard errors for Figure 2-9. Percentage of adults in each health literacy level, by highest educational attainment: 2003

Educational attainment	Below Basic	Basic	Intermediate	Proficient
Still in high school	13 (2.7)	24 (2.5)	56 (3.5)	7 (2.2)
Less than/some high school	49 (1.6)	27 (0.8)	23 (1.2)	1 (0.2)
GED/high school equivalency	14 (2.4)	30 (2.8)	54 (3.6)	3 (1.2)
High school graduate	15 (1.4)	29 (1.4)	53 (1.9)	4 (0.7)
Vocational/trade/business school	12 (1.8)	25 (2.1)	57 (2.7)	7 (1.6)
Some college	5 (0.9)	20 (1.6)	67 (2.0)	8 (1.4)
Associate's/2-year degree	4 (0.9)	15 (1.7)	66 (2.2)	15 (2.3)
College graduate	3 (0.5)	10 (0.9)	60 (1.8)	27 (2.2)
Graduate studies/degree	3 (0.5)	8 (0.9)	57 (2.0)	33 (2.4)

NOTE: Detail may not sum to totals because of rounding. Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table D3-1. Estimates and standard errors for Figure 3-1. Average health literacy scores of adults, by self-assessment of overall health: 2003

Self-assessment of overall health	Average
Excellent	262 (1.8)
Very good	254 (1.4)
Good	234 (1.7)
Fair	207 (2.5)
Poor	196 (3.9)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 1992 National Adult Literacy Survey and 2003 National Assessment of Adult Literacy.

Table D3-2. Estimates and standard errors for Figure 3-2. Percentage of adults in each health literacy level, by self-assessment of overall health: 2003

Self-assessment of overall health	Below Basic	Basic	Intermediate	Proficient
Excellent	8 (0.6)	17 (0.7)	57 (1.0)	19 (1.1)
Very good	9 (0.7)	19 (0.7)	59 (0.9)	13 (0.9)
Good	16 (1.1)	27 (0.9)	51 (1.3)	6 (0.7)
Fair	33 (1.7)	30 (1.0)	34 (1.6)	3 (0.5)
Poor	42 (2.3)	27 (1.3)	29 (1.8)	3 (0.6)

NOTE: Detail may not sum to totals because of rounding. Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table D3-3. Estimates and standard errors for Figure 3-3. Average health literacy scores of adults, by type of health insurance coverage: 2003

Type of health insurance	Average
Employer provided	259 (1.2)
Military	248 (4.3)
Privately purchased	243 (2.3)
Medicare	216 (1.9)
Medicaid	212 (2.7)
No insurance	220 (2.4)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure. Adults who reported they had more than one type of health insurance are included in each applicable category in this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table D3-4. Estimates and standard errors for Figure 3-4. Percentage of adults in each health literacy level, by type of health insurance coverage: 2003

Type of health insurance	Below Basic	Basic	Intermediate	Proficient
Employer provided	7 (0.5)	17 (0.6)	62 (0.9)	14 (0.9)
Military	12 (2.1)	21 (2.0)	56 (2.7)	11 (2.2)
Privately purchased	13 (1.2)	24 (1.2)	54 (1.6)	9 (1.2)
Medicare	27 (1.4)	30 (0.9)	40 (1.4)	3 (0.5)
Medicaid	30 (1.8)	30 (1.0)	38 (1.7)	3 (0.6)
No insurance	28 (1.3)	25 (0.6)	41 (1.1)	7 (0.5)

NOTE: Detail may not sum to totals because of rounding. Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this figure. Adults who reported they had more than one type of health insurance are included in each applicable category in this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table D3-5. Estimates and standard errors for Figure 3-5. Percentage of adults who got information about health issues from printed and written media: newspapers, magazines, books or brochures, and the Internet, by health literacy level: 2003

Sources and literacy level	None	A little	Some	A lot
Newspapers				
Below Basic	37 (1.6)	22 (1.4)	29 (1.5)	12 (1.0)
Basic	24 (0.9)	27 (0.9)	35 (1.0)	15 (0.8)
Intermediate	19 (0.7)	31 (0.7)	36 (0.8)	14 (0.5)
Proficient	20 (1.3)	38 (1.9)	32 (1.7)	10 (1.2)
Magazines				
Below Basic	41 (1.7)	23 (1.4)	27 (1.5)	10 (1.0)
Basic	22 (0.8)	25 (0.9)	37 (1.1)	17 (0.9)
Intermediate	14 (0.6)	28 (0.7)	41 (0.8)	18 (0.7)
Proficient	12 (1.1)	35 (1.9)	40 (2.1)	12 (1.5)
Books or brochures				
Below Basic	41 (1.6)	21 (1.3)	28 (1.5)	11 (0.9)
Basic	20 (0.8)	25 (0.9)	39 (1.1)	16 (0.8)
Intermediate	13 (0.5)	28 (0.7)	41 (0.8)	18 (0.6)
Proficient	11 (1.0)	35 (2.0)	36 (2.1)	18 (1.5)
Internet				
Below Basic	80 (1.5)	5 (0.9)	7 (1.1)	7 (0.8)
Basic	58 (1.5)	12 (1.0)	16 (1.2)	14 (0.8)
Intermediate	33 (1.1)	19 (0.7)	27 (0.9)	21 (0.6)
Proficient	15 (1.5)	22 (2.4)	37 (2.7)	26 (2.1)

NOTE: Detail may not sum to totals because of rounding. Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. Prison inmates are not included in the Internet category because they do not have access to the Internet.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table D3-6. Estimates and standard errors for Figure 3-6. Percentage of adults who got information about health issues from nonprint media: radio and television, by health literacy level: 2003

Literacy level	None	A little	Some	A lot
Below Basic	14 (0.9)	19 (1.3)	34 (1.7)	33 (1.8)
Basic	8 (0.4)	21 (0.9)	40 (1.1)	31 (1.1)
Intermediate	7 (0.3)	24 (0.7)	44 (0.8)	25 (0.8)
Proficient	9 (0.8)	30 (1.8)	43 (2.0)	17 (1.6)

NOTE: Detail may not sum to totals because of rounding. Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 1992 National Adult Literacy Survey and 2003 National Assessment of Adult Literacy.

Table D3-7. Estimates and standard errors for Figure 3-7. Percentage of adults who got information about health issues from personal contacts: family, friends, or coworkers; or health care professionals, by health literacy level: 2003

Sources and literacy level	None	A little	Some	A lot
Family, friends, or coworkers				
Below Basic	24 (1.4)	23 (1.4)	35 (1.7)	19 (1.3)
Basic	15 (0.7)	25 (0.9)	40 (1.0)	20 (0.8)
Intermediate	9 (0.4)	28 (0.7)	44 (0.8)	19 (0.6)
Proficient	5 (0.6)	31 (2.0)	48 (2.0)	17 (1.4)
Health care professionals				
Below Basic	18 (1.1)	17 (1.2)	29 (1.6)	36 (1.6)
Basic	11 (0.5)	19 (0.8)	33 (1.1)	37 (1.1)
Intermediate	8 (0.4)	21 (0.6)	37 (0.8)	34 (0.9)
Proficient	8 (0.7)	23 (1.7)	39 (2.1)	30 (1.7)

NOTE: Detail may not sum to totals because of rounding. Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. Adults living in households were asked about getting information from "family members, friends, or coworkers"; prison inmates were asked about getting information from "family members, friends, other inmates, or staff."
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Additional Analyses

Health Literacy by Occupation

Table E-1. Average health literacy scores of adults, by occupational group: 2003

Occupational group	Average
Management, business, and financial	275 (3.1)
Professional and related	281 (1.8)
Service	233 (2.5)
Sales and related	253 (2.7)
Office and administrative support	255 (2.1)
Farming, fishing, and forestry	191 (11.6)
Construction and extraction	228 (3.6)
Installation, maintenance, and repair	244 (3.6)
Production	228 (2.9)
Transportation and material moving	226 (2.9)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Health Literacy by Self-Assessment of Overall Health

Table E-2. Average health literacy scores of adults, by self-assessment of overall health and gender: 2003

Self-assessment of overall health	Men	Women
Poor	186 (6.4)	205 (5.4)
Fair	204 (3.4)	210 (3.0)
Good	232 (2.7)	235 (1.8)
Very good	251 (2.0)	257 (1.9)
Excellent	257 (2.6)	267 (2.6)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table E-3. Average health literacy scores of adults, by self-assessment of overall health and race/ethnicity: 2003

Self-assessment of overall health	White	Black	Hispanic	Other
Poor	206 (5.2)	175 (6.6)	157 (9.2)	179 (17.2)
Fair	219 (3.0)	193 (4.1)	155 (6.4)	210 (5.4)
Good	242 (2.1)	216 (2.6)	187 (5.1)	244 (5.8)
Very good	264 (1.7)	225 (2.6)	211 (4.1)	254 (7.8)
Excellent	274 (2.1)	223 (3.2)	212 (4.2)	259 (8.5)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. The "Other" category includes Asians, Pacific Islanders, Native Hawaiians, American Indians, Alaska Natives, and multiracial adults. All adults of Hispanic origin are classified as Hispanic, regardless of race.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table E-4. Average health literacy scores of adults, by self-assessment of overall health and age: 2003

Self-assessment of overall health	16–24	25–39	40–49	50–64	65+
Poor	—	227 (14.2)	189 (7.4)	201 (7.3)	179 (8.6)
Fair	226 (8.1)	207 (6.0)	214 (6.0)	215 (4.8)	192 (3.8)
Good	235 (4.8)	243 (2.8)	238 (3.1)	238 (3.0)	213 (3.2)
Very good	252 (3.0)	262 (2.9)	257 (2.7)	255 (3.2)	232 (4.0)
Excellent	252 (3.7)	268 (2.8)	266 (3.8)	273 (4.0)	231 (6.4)

—Not available due to small sample size.
NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table E-5. Average health literacy scores of adults, by self-assessment of overall health and highest educational attainment: 2003

Self-assessment of overall health	Less than/ some high school	High school graduate/GED/ high school equivalency	At least some college	College graduate/ graduate studies/degree
Poor	155 (5.6)	207 (6.3)	234 (9.6)	217 (22.8)
Fair	168 (4.3)	211 (3.0)	233 (4.4)	256 (6.5)
Good	185 (3.9)	226 (2.3)	246 (2.6)	273 (3.9)
Very good	202 (3.4)	242 (2.4)	261 (2.2)	285 (3.4)
Excellent	189 (3.6)	241 (3.8)	262 (2.3)	291 (2.9)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Health Literacy by Health Insurance Status

Table E-6. Average health literacy scores of adults, by type of health insurance coverage and gender: 2003

Type of health insurance	Men	Women
Employer provided	255 (1.4)	262 (1.7)
Military	243 (5.0)	258 (5.3)
Privately purchased	244 (4.0)	241 (2.6)
Medicare	215 (3.1)	217 (2.3)
Medicaid	201 (5.1)	217 (2.7)
No insurance	216 (3.1)	224 (3.1)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. Adults who reported they had more than one type of health insurance are included in each applicable category in this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table E-7. Average health literacy scores of adults, by type of health insurance coverage and race/ethnicity: 2003

Type of health insurance	White	Black	Hispanic	Other
Employer provided	266 (1.4)	226 (2.5)	229 (2.6)	258 (4.4)
Military	255 (5.1)	224 (6.8)	225 (10.1)	—
Privately purchased	246 (2.4)	212 (4.3)	224 (8.8)	243 (9.0)
Medicare	222 (2.2)	178 (5.3)	161 (7.6)	—
Medicaid	224 (4.4)	202 (3.1)	181 (4.7)	228 (10.2)
No insurance	241 (2.5)	212 (2.8)	170 (5.2)	229 (10.6)

—Not available due to small sample size.
NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. All adults of Hispanic origin are classified as Hispanic, regardless of race. Adults who reported they had more than one type of health insurance are included in each applicable category in this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table E-8. Average health literacy scores of adults, by type of health insurance coverage and age: 2003

Type of health insurance	16–24	25–39	40–49	50–64	65+
Employer provided	258 (3.1)	269 (1.7)	259 (2.0)	257 (2.3)	231 (3.3)
Military	262 (11.9)	277 (5.1)	271 (12.5)	240 (6.1)	224 (8.2)
Privately purchased	261 (8.2)	266 (6.5)	263 (8.1)	252 (4.1)	219 (3.4)
Medicare	—	239 (11.1)	220 (6.4)	214 (6.5)	216 (2.1)
Medicaid	224 (4.2)	229 (4.0)	201 (5.6)	192 (5.8)	185 (8.0)
No insurance	227 (3.9)	221 (3.1)	224 (4.9)	207 (5.1)	169 (9.5)

—Not available due to small sample size.
NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. Adults who reported they had more than one type of health insurance are included in each applicable category in this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table E-9. Average health literacy scores of adults, by type of health insurance coverage and highest educational attainment: 2003

Type of health insurance	Less than/ some high school	High school graduate/GED/ high school equivalency	At least some college	College graduate/ graduate studies/degree
Employer provided	205 (3.5)	241 (2.0)	261 (1.5)	288 (1.9)
Military	206 (13.5)	233 (8.5)	257 (6.7)	272 (9.3)
Privately purchased	193 (6.2)	228 (3.1)	253 (4.0)	272 (4.6)
Medicare	171 (4.5)	215 (2.5)	229 (3.4)	251 (4.5)
Medicaid	177 (4.9)	221 (3.5)	237 (4.0)	247 (13.4)
No insurance	171 (4.5)	223 (2.9)	246 (3.0)	262 (7.4)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. Adults who reported they had more than one type of health insurance are included in each applicable category in this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Health Literacy by Sources of Health Information

Printed and Written Information

Table E-10. Average health literacy scores of adults who got information about health issues from newspapers, magazines, and books or brochures, by gender: 2003

Source and amount of information	Men	Women
Newspapers		
None	228 (3.2)	232 (2.5)
A little	249 (2.3)	258 (2.4)
Some	245 (1.6)	248 (1.8)
A lot	241 (3.3)	245 (2.3)
Magazines		
None	219 (2.9)	214 (3.6)
A little	250 (2.3)	254 (2.7)
Some	249 (2.2)	252 (1.7)
A lot	243 (2.7)	251 (1.9)
Books or brochures		
None	218 (3.0)	208 (3.7)
A little	252 (2.0)	253 (2.8)
Some	245 (1.8)	251 (1.9)
A lot	246 (2.5)	255 (2.2)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table E-11. Average health literacy scores of adults who got information about health issues from the Internet, by gender: 2003

Amount of information from the Internet	Men	Women
None	213 (1.8)	220 (1.9)
A little	259 (2.9)	267 (2.8)
Some	265 (2.4)	266 (2.0)
A lot	264 (2.8)	262 (2.1)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. Prison inmates are not included in the Internet category because they do not have access to the Internet.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table E-12. Average health literacy scores of adults who got information about health issues from newspapers, magazines, and books or brochures, by race/ethnicity: 2003

Source and amount of information	White	Black	Hispanic	Other
Newspapers				
None	246 (2.4)	202 (3.8)	172 (5.1)	242 (8.1)
A little	264 (2.0)	222 (2.9)	203 (5.4)	248 (6.5)
Some	255 (1.8)	220 (2.1)	213 (2.8)	249 (7.5)
A lot	253 (2.6)	216 (4.1)	207 (5.9)	240 (9.1)
Magazines				
None	234 (2.8)	193 (3.5)	163 (5.7)	218 (12.5)
A little	262 (2.2)	219 (3.1)	197 (4.9)	247 (6.9)
Some	259 (1.8)	222 (2.3)	215 (3.3)	255 (6.0)
A lot	258 (2.2)	223 (3.6)	221 (5.6)	241 (8.2)
Books or brochures				
None	231 (3.0)	188 (5.9)	159 (5.6)	225 (15.0)
A little	262 (2.0)	219 (3.0)	202 (5.8)	245 (5.8)
Some	257 (1.9)	221 (2.5)	212 (3.4)	249 (7.3)
A lot	262 (2.3)	222 (3.6)	225 (4.2)	257 (7.5)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. The "Other" category includes Asians, Pacific Islanders, Native Hawaiians, American Indians, Alaska Natives, and multiracial adults. All adults of Hispanic origin are classified as Hispanic, regardless of race.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table E-13. Average health literacy scores of adults who got information about health issues from the Internet, by race/ethnicity: 2003

Amount of information from the Internet	White	Black	Hispanic	Other
None	229 (1.5)	198 (2.7)	162 (4.0)	221 (9.4)
A little	270 (2.6)	230 (3.9)	239 (5.2)	255 (8.9)
Some	273 (2.1)	232 (3.3)	234 (3.7)	268 (7.9)
A lot	272 (2.1)	234 (3.0)	235 (4.0)	249 (6.3)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. The "Other" category includes Asians, Pacific Islanders, Native Hawaiians, American Indians, Alaska Natives, and multiracial adults. All adults of Hispanic origin are classified as Hispanic, regardless of race. Prison inmates are not included in the Internet category because they do not have access to the Internet.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table E-14. Average health literacy scores of adults who got information about health issues from newspapers, magazines, and books or brochures, by age: 2003

Source and amount of information	16–24	25–39	40–49	50–64	65+
Newspapers					
None	241 (4.2)	245 (3.0)	229 (4.4)	217 (3.6)	182 (5.7)
A little	256 (3.7)	267 (2.5)	260 (3.5)	250 (3.5)	208 (3.8)
Some	243 (3.2)	256 (2.4)	251 (2.6)	252 (3.5)	222 (2.7)
A lot	243 (5.8)	242 (4.2)	247 (4.3)	254 (4.2)	227 (4.9)
Magazines					
None	236 (4.5)	232 (3.9)	218 (4.3)	207 (4.8)	171 (4.5)
A little	247 (3.4)	263 (2.9)	260 (3.6)	251 (4.6)	213 (4.6)
Some	253 (3.6)	259 (2.2)	254 (2.6)	253 (3.1)	227 (2.6)
A lot	252 (3.5)	261 (3.6)	248 (3.7)	251 (4.1)	223 (3.6)
Books or brochures					
None	236 (4.6)	222 (3.4)	221 (6.0)	198 (4.8)	172 (5.1)
A little	254 (4.0)	265 (3.1)	248 (4.0)	253 (4.6)	217 (4.0)
Some	246 (3.5)	258 (2.4)	254 (2.9)	252 (2.7)	223 (2.3)
A lot	253 (5.7)	266 (3.4)	255 (4.6)	249 (3.7)	228 (4.3)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table E-15. Average health literacy scores of adults who got information about health issues from the Internet, by age: 2003

Amount of information from the Internet	16–24	25–39	40–49	50–64	65+
None	224 (4.3)	222 (3.2)	218 (2.4)	222 (2.5)	203 (2.2)
A little	257 (3.7)	262 (3.4)	272 (5.0)	270 (4.7)	249 (7.5)
Some	257 (3.8)	274 (3.2)	266 (2.9)	266 (3.7)	250 (5.1)
A lot	255 (4.0)	274 (2.7)	262 (4.1)	260 (4.5)	235 (6.1)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. Prison inmates are not included in the Internet category because they do not have access to the Internet.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table E-16. Average health literacy scores of adults who got information about health issues from newspapers, magazines, and books or brochures, by highest educational attainment: 2003

Source and amount of information	Less than/ some high school	High school graduate/GED/ high school equivalency	At least some college	College graduate/ graduate studies/degree
Newspapers				
None	167 (4.5)	228 (2.3)	252 (2.2)	280 (5.2)
A little	192 (4.0)	238 (2.9)	262 (2.4)	289 (3.2)
Some	195 (3.0)	230 (2.2)	255 (1.9)	281 (3.0)
A lot	191 (3.7)	229 (3.7)	245 (3.5)	281 (4.6)
Magazines				
None	160 (3.4)	223 (2.7)	244 (3.3)	273 (6.2)
A little	194 (4.2)	237 (3.0)	261 (2.3)	289 (3.8)
Some	196 (3.3)	234 (2.2)	256 (1.8)	283 (2.7)
A lot	203 (3.8)	229 (3.0)	253 (2.9)	280 (3.1)
Books or brochures				
None	162 (3.6)	221 (2.6)	241 (4.1)	267 (7.2)
A little	194 (4.7)	239 (3.2)	258 (1.6)	289 (3.3)
Some	194 (3.2)	232 (2.2)	256 (2.2)	284 (3.0)
A lot	204 (3.6)	232 (3.3)	258 (2.9)	281 (3.7)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table E-17. Average health literacy scores of adults who got information about health issues from the Internet, by highest educational attainment: 2003

Amount of information from the Internet	Less than/ some high school	High school graduate/GED/ high school equivalency	At least some college	College graduate/ graduate studies/degree
None	172 (2.7)	220 (1.5)	237 (2.2)	258 (3.0)
A little	217 (5.7)	253 (4.0)	260 (2.7)	289 (4.1)
Some	210 (4.6)	244 (3.0)	266 (2.9)	291 (2.9)
A lot	221 (5.6)	244 (4.2)	264 (2.3)	288 (3.5)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. Prison inmates are not included in the Internet category because they do not have access to the Internet.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Nonprint Media

Table E-18. Average health literacy scores of adults who got information about health issues from radio and television, by gender: 2003

Amount of information from radio and television	Men	Women
None	237 (4.6)	234 (4.6)
A little	249 (2.5)	256 (2.8)
Some	247 (1.8)	251 (1.9)
A lot	229 (2.3)	239 (2.8)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table E-19. Average health literacy scores of adults who got information about health issues from radio and television, by race/ethnicity: 2003

Amount of information from radio and television	White	Black	Hispanic	Other
None	249 (3.8)	202 (5.4)	195 (6.3)	223 (11.9)
A little	262 (2.2)	220 (3.8)	203 (5.8)	243 (7.3)
Some	258 (1.8)	219 (2.5)	202 (4.1)	257 (6.4)
A lot	247 (2.0)	214 (3.5)	187 (4.9)	239 (5.9)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. The "Other" category includes Asians, Pacific Islanders, Native Hawaiians, American Indians, Alaska Natives, and multiracial adults. All adults of Hispanic origin are classified as Hispanic, regardless of race.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table E-20. Average health literacy scores of adults who got information about health issues from radio and television, by age: 2003

Amount of information from radio and television	16–24	25–39	40–49	50–64	65+
None	246 (6.4)	252 (6.3)	245 (6.2)	223 (5.9)	192 (6.9)
A little	248 (4.4)	265 (3.9)	258 (3.6)	254 (4.1)	223 (4.7)
Some	252 (3.6)	257 (2.3)	253 (2.9)	253 (2.7)	219 (2.7)
A lot	240 (3.7)	246 (3.0)	237 (3.3)	231 (3.0)	204 (3.5)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table E-21. Average health literacy scores of adults who got information about health issues from radio and television, by highest educational attainment: 2003

Amount of information from radio and television	Less than/ some high school	High school graduate/GED/ high school equivalency	At least some college	College graduate/ graduate studies/degree
None	172 (5.5)	219 (5.2)	256 (4.4)	282 (7.7)
A little	186 (5.1)	238 (3.0)	258 (2.6)	289 (2.9)
Some	187 (3.3)	235 (2.1)	257 (1.9)	283 (2.7)
A lot	183 (3.4)	227 (2.9)	250 (2.9)	277 (4.8)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Personal Contacts

Table E-22. Average health literacy scores of adults who got information about health issues from family, friends, or coworkers, by gender: 2003

Amount of information from family, friends, or coworkers	Men	Women
None	215 (3.3)	217 (3.0)
A little	249 (2.2)	251 (2.6)
Some	246 (2.0)	253 (1.8)
A lot	240 (2.5)	245 (2.3)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. Adults living in households were asked about getting information from "family members, friends, or coworkers"; prison inmates were asked about getting information from "family members, friends, other inmates, or staff."
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table E-23. Average health literacy scores of adults who got information about health issues from health care professionals, by gender: 2003

Amount of information from health care professionals	Men	Women
None	228 (3.6)	223 (4.4)
A little	249 (2.5)	252 (2.9)
Some	248 (2.3)	251 (2.3)
A lot	236 (1.7)	245 (1.8)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table E-24. Average health literacy scores of adults who got information about health issues from family, friends, or coworkers, by race/ethnicity: 2003

Amount of information from family, friends, or coworkers	White	Black	Hispanic	Other
None	229 (2.8)	200 (4.9)	170 (5.3)	219 (11.6)
A little	260 (2.5)	224 (3.2)	201 (4.5)	243 (7.3)
Some	259 (1.6)	220 (3.1)	203 (4.3)	257 (7.1)
A lot	255 (2.3)	212 (2.7)	198 (6.2)	244 (6.5)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table." The "Other" category includes Asians, Pacific Islanders, Native Hawaiians, American Indians, Alaska Natives, and multiracial adults. All adults of Hispanic origin are classified as Hispanic, regardless of race. Adults living in households were asked about getting information from "family members, friends, or coworkers"; prison inmates were asked about getting information from "family members, friends, other inmates, or staff."
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table E-25. Average health literacy scores of adults who got information about health issues from health care professionals, by race/ethnicity: 2003

Amount of information from health care professionals	White	Black	Hispanic	Other
None	246 (3.4)	208 (3.2)	172 (5.7)	231 (10.2)
A little	260 (2.2)	221 (3.9)	196 (4.7)	252 (10.0)
Some	259 (2.1)	220 (2.7)	199 (4.1)	252 (7.7)
A lot	252 (1.6)	215 (2.9)	209 (5.0)	240 (5.2)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. The "Other" category includes Asians, Pacific Islanders, Native Hawaiians, American Indians, Alaska Natives, and multiracial adults. All adults of Hispanic origin are classified as Hispanic, regardless of race.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table E-26. Average health literacy scores of adults who got information about health issues from family, friends, or coworkers, by age: 2003

Amount of information from family, friends, or coworkers	16–24	25–39	40–49	50–64	65+
None	218 (5.5)	227 (5.6)	229 (5.4)	219 (4.3)	197 (3.4)
A little	252 (4.6)	258 (3.7)	255 (3.3)	252 (3.4)	222 (4.5)
Some	251 (3.0)	261 (2.3)	252 (2.6)	250 (3.2)	219 (3.0)
A lot	246 (3.3)	253 (3.3)	239 (4.6)	242 (4.4)	209 (5.1)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. Adults living in households were asked about getting information from "family members, friends, or coworkers"; prison inmates were asked about getting information from "family members, friends, other inmates, or staff."
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table E-27. Average health literacy scores of adults who got information about health issues from health care professionals, by age: 2003

Amount of information from health care professionals	16–24	25–39	40–49	50–64	65+
None	239 (5.1)	230 (4.5)	230 (5.7)	221 (6.4)	178 (6.6)
A little	255 (4.2)	254 (2.9)	251 (3.7)	256 (4.8)	213 (5.8)
Some	249 (4.1)	263 (2.9)	253 (3.0)	253 (3.8)	218 (3.0)
A lot	242 (3.0)	258 (2.3)	247 (2.5)	238 (3.3)	216 (2.3)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table E-28. Average health literacy scores of adults who got information about health issues from family, friends, or coworkers, by highest educational attainment: 2003

Amount of information from family, friends, or coworkers	Less than/ some high school	High school graduate/GED/ high school equivalency	At least some college	College graduate/ graduate studies/degree
None	166 (3.7)	214 (3.1)	239 (4.2)	255 (4.7)
A little	184 (4.0)	235 (2.5)	258 (2.2)	288 (3.8)
Some	190 (3.8)	235 (2.6)	257 (1.8)	287 (2.6)
A lot	188 (4.8)	233 (2.7)	254 (3.0)	282 (4.2)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table. Adults living in households were asked about getting information from "family members, friends, or coworkers;" prison inmates were asked about getting information from "family members, friends, other inmates, or staff."
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

Table E-29. Average health literacy scores of adults who got information about health issues from health care professionals, by highest educational attainment: 2003

Amount of information from health care professionals	Less than/ some high school	High school graduate/GED/ high school equivalency	At least some college	College graduate/ graduate studies/degree
None	167 (5.2)	225 (4.4)	251 (4.6)	280 (9.0)
A little	185 (5.3)	243 (3.5)	258 (2.6)	284 (3.4)
Some	184 (3.7)	234 (2.2)	259 (1.7)	285 (2.7)
A lot	190 (3.6)	226 (2.3)	251 (2.1)	283 (2.7)

NOTE: Standard errors are in parentheses. Adults are defined as people 16 years of age and older living in households or prisons. Adults who could not be interviewed because of language spoken or cognitive or mental disabilities (3 percent in 2003) are excluded from this table.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2003 National Assessment of Adult Literacy.

References

Baker, D.W., Gazmararian, J.A., Williams, M.V., Scott, T., Parker, R.M., Green, D., Ren, J., and Peel, J. (2004). Health Literacy and Use of Outpatient Physician Services by Medicare Managed Care Enrollees. *Journal of General Internal Medicine, 19*(3): 215–220.

Baker, D.W., Parker, R.M., Williams, M.V., and Clark, W.S. (1998). Health Literacy and the Risk of Hospitalization. *Journal of General Internal Medicine, 13*(12): 791–798.

Berkman, N.D., DeWalt, D.A., Pignone, M.P., Sheridan, S.L., Lohr, K.N., Lux, L., Sutton, S.F., Swinson, T., Bonito, A.J. (2004) *Literacy and Health Outcomes.* Evidence Report/Technology Assessment No. 87 (Prepared by RTI International—University of North Carolina Evidence-based Practice Center under Contract No. 290-02-0016). AHRQ Publication No. 04-E007-2. Rockville, MD: Agency for Healthcare Research and Quality.

Binder, D.A. (1983). On the Variances of Asymptotically Normal Estimates for Complex Surveys. *International Statistical Review, 51*(3): 279–292.

Fox, S., and Rainie, L. (2000). *The Online Health Care Revolution: How the Web Helps Americans Take Better Care of Themselves.* Washington, DC: Pew Charitable Trusts.

Gordon, M.M., Hampson, R., Capell, H.A., and Madhok, R. (2002). Illiteracy in Rheumatoid Arthritis Patients as Determined by the Rapid Estimate of Adult Literacy in Medicine (REALM) Score. *Rheumatology (Oxford), 41*(7): 750–754.

Hambleton, R.K., and Swaminathan, H. (1985). *Item Response Theory: Principles and Applications.* Boston: Kluwer-Nijhoff Publishing.

Hauser, R.M., Edley, C.F. Jr., Koenig, J.A., and Elliott, S.W. (Eds.). (2005). *Measuring Literacy: Performance Levels for Adults, Interim Report*. Washington, DC: National Academies Press.

Institute of Medicine (2004). *Health Literacy: A Prescription to End Confusion*. Washington, DC: Institute of Medicine, Board on Neuroscience and Behavioral Health, Committee on Health Literacy.

Kutner, M., Greenberg, E., and Baer, J., (2005). *A First Look at the Literacy of America's Adults in the 21st Century* (NCES 2006-470). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Lindau, S.T., Tomori, C., McCarville, M.A., and Bennett, C.L. (2001). Improving Rates of Cervical Cancer Screening and Pap Smear Follow-Up for Low-Income Women With Limited Health Literacy. *Cancer Investigation, 19*(3): 316–323.

Little, R.J.A., and Rubin, D.B. (2002). *Statistical Analysis with Missing Data*. Hoboken, New Jersey: Wiley.

Rudd, R.E., Moeykens, B.A., and Colton, T.C. (1999). Health and Literacy: A Review of Medical and Public Health Literature. *Review of Adult Learning and Literacy*, Volume 1. San Francisco, CA: Jossey-Bass.

Taylor, H. (2001). *The Harris Poll #19: Cyberchondriacs Update*. Retrieved November 5, 2003, from http://www.harrisinteractive.com/harris_poll/printerfriend/index.asp?PID=229.

U.S. Department of Health and Human Services (HHS). (2000). *Healthy People 2010: Understanding and Improving Health*. Washington, DC: Author.

U.S. Department of Health and Human Services (HHS). (2003). *Communicating Health: Priorities and Strategies for Progress.* Washington, DC. Retrieved June 15, 2006 from http://odphp.osophs.dhhs.gov/projects/HealthComm/.

White, S., and Dillow, S. (2005). *Key Concepts and Features of the 2003 National Assessment of Adult Literacy* (NCES 2006-471). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Williams, M.V., Davis, T., Parker, R.M., and Weiss, B.D. (2002). The Role of Health Literacy in Patient-Physician Communication. *Family Medicine, 34*(5): 383–389.