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The Literacy Problem

*"Where are all the
people who can't read?
We don't see them in
our practice."*

A typical scenario in hospitals and clinics across the United States:

DOCTOR: Do you understand what to do when you get home?
PATIENT: Oh, yes.
DOCTOR: Well, here's a pamphlet with all the facts. Read this if you have
any questions.

The doctor's comments sound reasonable enough, but literacy authorities tell us that 27 million American adults—nearly one out of five—may not be able to read a pamphlet. A recent survey by the National Center for Educational Statistics shows that 40 to 44 million adults have literacy competency skills at the lowest level. They can understand only the simplest written instructions.[1]

Limitations of Low Literacy Patients

Those with low literacy skills can't read pamphlets or booklets, directions on a bottle of aspirin, or the explanations for a food exchange list. Vocabulary is not their only limitation; often they can't understand the illustrations and medical pictures used in health-care materials.

They have no visible signs of literacy disability—you cannot identify them by appearance or casual conversation. They may be poor or affluent, native born or immigrant, and they are found everywhere. Health care providers treat them by the tens of thousands every day.

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The good news is that the great majority of this population is deficient only in literacy skills—not in intelligence. They can learn from nearly any health instruction that is designed and presented in ways suitable for them. Unhappily, a great many health care instructions fall far short of being suitable and thus are not understood and accepted by patients.

The purpose of this book is to provide ideas, information, guidelines, and examples that will help you design and present health messages suitable for all segments of the public—your patient population.

This chapter addresses the mismatch between the literacy skills of Americans and the literacy demands of their health care instructions. Subsequent chapters deal with how health care providers can cope with the literacy mismatch. This chapter discusses:

- The magnitude of the literacy problem and what it means to you
- Differences between skilled and unskilled readers and the impact on health care
- Myths about literacy
- Research and trends to reduce the impact of illiteracy on health care

Who Is Literate?

Until a few years ago, literacy skills were universally measured in terms of **grade level**—the average reading skill achieved at each year of schooling in the American public school system. Readability levels of texts were also rated by school grade level. A person who can read at the 5th-grade level or higher was considered literate. Those who read at less than 5th-grade level are sometimes referred to as functionally illiterate.

More recently, an alternative method of defining literacy skills came into use: **functional competency levels.** This method measures the ability of people to perform literacy tasks over a range of difficulty levels. People are said to be functionally competent (in literacy) when their literacy skills permit them to fully function in society. Functional competency is assessed by means of a multi-task literacy test, the results of which are scored on a scale of 0 to 500.

For ease of understanding, the numerical data (0 to 500) from literacy surveys are also reported in five groups or levels. Level 1 is the lowest and level 5 is the highest. Functional competency measures are used in literacy surveys sponsored by government agencies.

These two literacy measures, grade level and functional competency, use different measurement criteria and there is no direct conversion between them. However, as a rough approximation, one may say that those who read below 5th-grade level correspond with those whose literacy skills fall in level 1 in terms of functional competency in literacy tasks.

Regardless of which literacy definition is used, state and national surveys indicate that a large number of adult Americans, roughly one out of five, have serious literacy limitations.

The Magnitude of the Literacy Problem

In summary, the following statements describe a literacy cross section of adult Americans—a cross section of the average adult patient population:

- The *average* reading level is at the 8th- to 9th-grade level (between levels 2 and 3 in functional competency measures).
- About *one out of five* read at the 5th-grade level and below (in functional competency terms, at about level 1).
- For older Americans (65 and over) and for inner-city minorities almost *two out of five* read below the 5th-grade level (at level 1).

Figure 1-1 shows, in graphic format, the profiles of the literacy skills of Americans. Additional data from national literacy surveys are given in Appendix A.

What do these charts mean? They tell us that the lowest group—about 20 percent of adult Americans—is functionally illiterate. They can't read most newspapers (these are at 9th- to 12th-grade readability levels) or directions on a box of cake mix. The charts also tell us that another group—about 30 percent—has *marginal* reading skills. Most written health care instructions available today are at readability levels that are "over the heads" of both groups.

Impact of Literacy Skills on Health Care

Like all people, those with low literacy skills get sick, go to doctors and clinics, sometimes are hospitalized, and most of all, like the rest of us, they want to recover as quickly as possible. The challenge faced by health practitioners
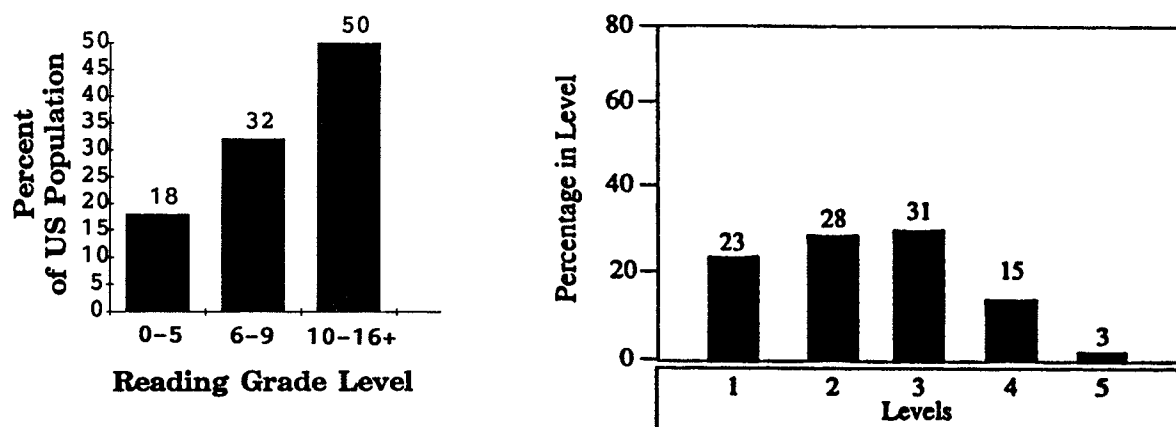
FIGURE 1-1

Reading skills of adult Americans by **grade levels** *(left graph)* and **functional competency** *(right graph)*

is how to cope with a large patient population that does not have well-developed skills in reading, writing, listening, or speaking. The task is to work around the literacy barriers so that these patients can carry out at least a critical minimum set of instructions to manage their health care.

Low literacy has an impact on the cost of health care. Weiss et al. (1993) found that those with the lowest literacy skills required far greater medical care than those with even marginal literacy skills.[2] People with low literacy skills seem to put off disease prevention actions and to wait longer before seeking medical help. The former point was reinforced by the health officer for Washington, DC, who reported that parents with the lowest literacy skills are far more likely to ignore written notices to bring their infants to a clinic for immunizations.

Differences Between Skilled and Poor Readers

Poor readers obtain much less from health care instructions than do skilled readers. This is true even for materials that have fairly low readability levels.[3] Poor readers may read most or all of the words in an instruction and still obtain little or no meaning from the text. The reasons for this are outlined in Table 1-1, along with strategies that health practitioners can use to manage these literacy problems.

Poor readers take instructions literally without interpreting them differently for new situations.

Treatment and health care management may be unfamiliar subjects to many patients. Without a broader context or an explanation of the limitations or circumstances, a patient may follow the instruction to the letter, even when it makes no sense. For example, in order for the patient to examine her stools over the following weeks for a black color that might indicate intestinal bleeding, the doctor told the patient not to eat beets. The patient never ate beets again for the remaining 15 years of her life. A more tragic example told by a physician is as follows:

A baby was brought to the clinic with diarrhea. I treated the baby and told the mother to "push fluids" with the baby. That was about 8 A.M. The mother brought the baby home, and at noon the baby was dead. The mother had literally pushed fluids by tipping the baby's bottle upside-down and forcing the fluid when the baby's responses began to slow down. The baby suffocated.[4]

TABLE 1-1

Differences between good and poor readers—and how you can manage the problems

SKILLED READERS	POOR READERS	MANAGING THE PROBLEMS
Interpret meaning	Take words literally	Explain the meaning
Read with fluency	Read slowly, miss meaning	Use common words, examples
Get help for uncommon word	Skip over the word	Use examples, review
Grasp the context	Miss the context	Tell context first, use visuals
Persistent reader	Tire quickly	Short segments, easy layout

To the patient who is motivated to follow instructions, the literal meaning may be the only message that comes across.

Poor readers often read (decode) one word at a time.

When people read one word at a time they often forget the preceding words by the time they get to the end of the sentence. Thus, the text they've read provides no meaning. Anderson et al. (1985) observe that "poor readers read at a rate so slow as to interfere with comprehension even of easy materials."[5]

For example, it is not difficult to imagine that the instruction, "Alcoholic ingestion superimposed upon inadequate dietary intake can precipitate acute hyperglycemia," will make little sense to many readers—even those with good reading skills. A simpler instruction might say: "Don't drink alcohol on an empty stomach. It can cause hyperglycemia." But even simple sentences, with just one or two uncommon words, can have the same slowing-down effect on poor readers.

Poor readers don't think in terms of classes of information or categories, and they skip over uncommon words.

Patients may think in terms of the individual items rather than a class of information; they may not know the meaning of category words used in health care instructions.

For example, many cannot use the yellow pages of the telephone book because they do not understand the category words used in the listings. The grouping of foods into the four food groups or classes is also difficult for many. Even common category words may not be understood. After reading a paragraph that said to eat red meat and to avoid shellfish and poultry, one patient on dialysis mentioned that he eats lots of fried chicken. When asked, "What about poultry?" he replied, "Oh, I never eat poultry. We're not supposed to have that!"

Poor readers may miss the context and not make inferences from factual data.

Poor readers may not make inferences as to changes in their own behaviors that are *implied* in displays of statistical information or disease etiology.

For example, the patient cited in the exchange with the doctor at the beginning of this chapter may not perceive that the factual data in the pamphlet (what happened to other people) have any connection with his own life unless this is explained.

In summary, although many people with low literacy skills have adequate intelligence, they tend to have less well-developed skills in reading, and in analysis and synthesis.

Common Myths About Literacy/Illiteracy

MYTH: *"Illiterates are dumb and learn slowly, if at all."* — *FALSE*

> Throughout the world almost 800 million people are illiterate, mainly due to economic reasons rather than because of low intelligence. Most people with low literacy skills have average IQs and function quite well by compensating in other ways for the lack of reading skills.

MYTH: *"Most illiterates are poor, immigrants, or minorities."* — *FALSE*

> In terms of the U.S. population, most are white native-born Americans, and are found in every walk of life. On a percentage basis, more minorities and immigrants do have reading difficulties.

MYTH: *"People will tell you if they can't read."* — *FALSE*

> Since there is a strong social stigma attached to illiteracy, nearly all nonreaders or poor readers will seek to conceal this fact. They will use ruses such as, "I forgot my glasses," or, "I'll have to take this home for my husband (wife) to see it first," or, "My eyes are tired." Consequences can be serious if medication directions are not followed, or merely inconvenient for the patient who could not read a sign.

> I had to go to the clinic for x-rays. The girl at the desk told me which room to go to and I went in and sat down. Quite a few people came in. Pretty soon I saw that those who came after me were called, but I never was. I sat there for nearly an hour before I asked the nurse when my turn was. She asked if I had signed the register. When I said, "No," she pointed to the sign at the front of her desk and she read, "Please sign the register when you come in." I didn't tell her I couldn't read. She took me next. (personal communication from Literacy Volunteers of America Inc., 1980)

MYTH: *"Years of schooling is a good measure of literacy level."* — *FALSE*

> Years of schooling tells what people have been exposed to, not what reading skill they acquired. Surveys have shown that, on average, adults currently read three to five grade levels lower than the years of schooling completed.[6] Through disuse, the reading skills of many adults have atrophied.

Trends in Health Education That Address Low Literacy Issues

> Over the past several years there has been a broad societal movement toward simpler text. The movement is seen in the Plain Language Laws passed by many state legislatures. Simplified directives have also been promulgated at

the federal level. President Carter signed Executive Order 12044 to mandate the use of plain language in all government departments.

Do good readers feel "talked down to" by simply written health materials? On the contrary, people at all literacy levels can better understand and indeed have a preference for simpler rather than more complex written materials.[7]

Throughout American industry, literacy and skills training programs are now common.[8] As a part of these programs, extensive effort is also going into task analysis inherent in work elements and the assessment of literacy skills required to perform each task. These task analysis methods could also be applied by health practitioners to assess the literacy demand of tasks assigned to patients.

The health community has also taken action. Since 1993, the Joint Commission of Accreditation of Health Organizations (JCAHO) has included in the accreditation scoring how well patients *understand* their health care instructions. Health organizations are now scored on how well their patients understand:

- The safe and effective use of medication
- The safe and effective use of medical equipment
- Potential food–drug interactions
- When and how to obtain further treatment

Additional factors have been added to the above JCAHO standards for 1994 and 1995.

Federal agencies have been active in meeting the health needs of low literacy clients. In 1992 the U.S. Public Health Service funded several million dollars in grants to study ways to more effectively communicate with and motivate those with low literacy skills. The National Cancer Institute, Office of Cancer Communication, has established a National Work Group on Cancer and Literacy. The Centers for Disease Control has issued a reference work on literacy and health and a resource book on effective nonprint health instructions.[9,10]

The Agency for Health Care Policy and Research is developing an extensive series of health care instructions for the public at easy-to-read levels. The Indian Health Service has developed a series of seven easy-to-read (3rd- to 5th-grade levels) diabetes prevention and treatment booklets for Native Americans (Figure 1-2).

Research on methods to cope with the literacy problem in a health context is increasing rapidly. The frequency of this topic at conference sessions, workshops, and technical paper presentations is testimony to its broad interest.

Some health care organizations have established working relationships with national literacy organizations. One cancer information center has developed easy-to-read cancer prevention materials that can be used as adult texts for those studying reading in Adult Basic Education (ABE) classes.[11] The Area Health Education Center (AHEC) in Maine enlists literacy educators as co-authors of new health care materials and has arranged for ABE class participants to pretest the draft health care materials for comprehension.[12]

To reach poor readers, nonprint media are increasingly being used. Rap-song audiotapes on breast self-examination, immunization, nutrition, and

FIGURE 1-2

Easy-to-read diabetes booklets. (*Source:* Indian Health Service)
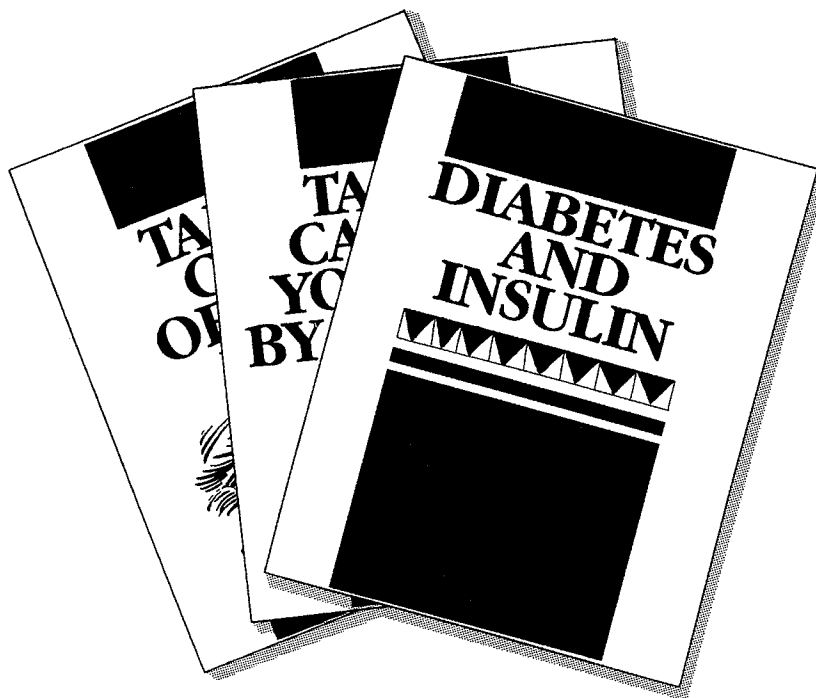
other topics have been developed during the past few years.[13,14] Videos are now available to communicate AIDS (acquired immune deficiency syndrome) prevention via a story line, provide prenatal nutrition instruction to pregnant teenagers, and teach cooking to reduce fat.[15,16,17]

Much is being done and progress is being made. A long-term goal of the U.S. educational system is to raise the country's literacy skills. Until this goal is achieved, the health care community must make health instructions easier to understand. This book is about simplifying health care instructions in practical ways that are within the limits of our time and other resources.

Summary

Literacy skills of Americans range from the nonreader to the highly literate. Half the U.S. population read at the 9th-grade level or lower. Most current health care instructions are above that level.

Those with the lowest literacy skills will understand few written health care materials. For those with the lowest literacy skills alternative (nonprint) formats may be better understood, including audiotapes, simple sketches to show desired behaviors, videotapes, and games. Low reading levels are more common among those over 65 and among inner-city populations of all ages. The key information about the low literacy populations may be summarized as follows:

- About one out of five adult Americans read below the 5th-grade level.
- They do not look to print materials for health information.

- They try to hide their literacy deficiency and usually succeed in doing so.
- Their IQs are adequate. They can learn anything needed for their health care if it is appropriately taught.

The nation's health organizations are increasingly aware of the impact of literacy on health care and health costs. Many have undertaken initiatives to increase awareness of the problem and to improve comprehension of patient instructions. In the chapters that follow, methods are presented that can help make health care instructions easier to understand for all patients.

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2

Applying Theory in Practice

Introduction

Theories are a generalized set of rules, and Hochbaum (1992) tells us "they become instruments to search for answers" for patient learning and motivation.[1] They help us predict the consequences of a health education intervention and can save the practitioner from "learning the hard way" that a planned intervention is likely to turn out badly. The need for useful theory has been with us for a long time. Nyswander (1956) says, "For it is in new situations that a good theory is needed by any and all of us.[2]

Theories can provide you with a workable basis for an education action you wish to undertake. This is especially important when teaching low literacy clients whose educational needs may be less predictable. For health educators, the advantages of theories are:

1. They provide a predictable framework to plan education interventions that are more likely to succeed.
2. They offer a means to explain and justify the intervention to colleagues.
3. They give us a blueprint to replicate successful educational interventions.
4. They offer a systematic process to analyze success or failure.

We recognize that practitioners are often too busy to consider the dozens of learning and behavior theories before planning an education intervention. An alternative is suggested. Since there is interrelation and overlap between most theories and models, one need consider only a handful of theories on an everyday basis. In this chapter, we have selected, summarized, and interpreted the

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most relevant theories to teach patients with low literacy skills. The reader is advised that such summarization has limitations and must omit many details. The full texts on these behavior and learning theories are listed in the References.

The theory and guidelines provide a framework for both teaching and the development of health education materials that are covered in the chapters that follow. This chapter is in two parts. Part 1 deals with theory and how it can be applied; Part 2 translates theory into practice via a set of practical guidelines.

In **Part 1,** we seek to show how theory can help us solve health education problems and answer such practical questions as:

- Which theories should I consider applying during the planning and development of a new or revised health care instruction? How could these theories apply to health education interventions for low literacy clients?
- How do I go about applying these theories?
- How will theory help me deal with instructions for another culture?
- How do the theories apply to clients who have low literacy skills?

In **Part 2,** we present practical guidelines from the theories in Part 1. The guidelines are a "shorthand" way to apply the theories to a wide range of common health education questions. Typical of these are:

- How much can I expect most clients to be able to cope with in one session?
- How much should I include about the medical concepts; the medical vocabulary? What is the best sequence for these topics?
- How can I determine that my patients understand their instructions?
- What must I include in the instruction so it will build a feeling of self-efficacy and acceptance by my clients so they are more likely to comply?

Part 1: The Role of Theory

As with any set of rules, theories should not be followed blindly. Theories are validated under research conditions where nearly all of the variables are held constant. For this reason, one must be careful in applying theories when different variables are operative or when they are used with a different population, situation, or problem than the one originally studied. You must be the judge of how well a given theory applies to your task, situation, and patient population; or whether the theory applies at all. This chapter provides you with advice to help you make that judgment.

Theory you can use

A summary of the theories that are likely to be most useful to you and where they apply are presented in Table 2-1. The table can serve as a quick checklist when you are developing a new health education intervention. In the pages following this table, each theory and its applications are discussed.

TABLE 2-1

A summary of key education and behavior theories and their applications

THEORY NAME	PROPONENTS	DESCRIPTION	APPLICATION
Health Belief Model	Hochbaum Becker Rosenstock Greene	Explains people's health behaviors: why they may accept preventive health services or adopt healthy behaviors.	A behavior research tool, but can imply best content and topic sequence for educ. mat'ls.
Self-Efficacy	Bandura Adams Beyer	People are more likely to adopt a health behavior if they think they can do it.	Intervention should give people confidence by building up to behavior step by step. Give them many little "successes" in the behavior change process.
Locus of Control Theory	Wollston	People who believe *they* are in control of their own health status are more likely to change behaviors in response to health ed. facts. The converse is also true.	For people who believe they are *not* in control, build more support into health ed. programs.
Cognitive Dissonance Theory	Festinger Lewin	A high level of unhappiness (dissonance) is more likely to lead to behavior change. Theory points to readiness to change, and how to cut probability of relapse.	Design intervention to foster unhappiness with present behavior status. To reduce relapse, reinforce to keep dissonance low.
Diffusion Theory	Rogers Shoemaker Preston	Some people will adopt new behaviors early, some late. Early adopters can influence others. Applies to a community or population.	Foster early adoption by making intervention consistent with beliefs, values, social system of target population.
Stages of Readiness	Prochaska	A person goes thru stages of readiness to adopt and to maintain a new health behavior. Ed. interventions work best if they match a person's stage of readiness.	Design intervention to fit the stages of readiness of your client population. If many stages are present, the intervention may need several different messages.
Adult Ed. Theories	Bruner Bradford Coleman Knowles	Main concern of adults is solving & managing their own problems. They care about self-fulfillment. Adults need active participation. Adults are less interested in facts about health as a *subject*.	1) Design ed. intervention to address the solution to their health problem. Give less info about other topics. 2) Build on adult's experience. 3) "Talk it out", teach via demos., discussion and examples.

The Health Belief Model

Description: The Health Belief Model (HBM) tells us that as a general rule, people will respond best to messages on health promotion or disease prevention when they perceive that they are susceptible (at risk), that the risk is serious, that they will receive benefits from a behavior change, and that the barriers to behavior change are not too great.[3–6] The authors believe that to change behaviors, health education interventions are likely to be more effective when the intervention addresses these perceptions. Thus, a logical construct for health education interventions for behavior change is to include the topics shown in Box 2-1.

HBM does *not* tell us that for behavior change we must include such topics as the Greek or Latin derivation of the name of the disease; a description of the disease process; or the national statistics on morbidity or mortality. Unfortunately many of today's health instructions do include these topics.

Exceptions to the content and sequence of information shown in Box 2-1 would include detailed procedures and administrative instructions. Often, for safety or legal reasons, other topics must also be included, such as side effects of medication, and where to go for services. If necessary, consider including such topics *after* the HMB sequence.

Application: The HBM applies where we want to understand what is needed for the patient to make a behavior change. It applies to individuals and groups of people. The HBM offers insights as to the content and sequence of topics in health instructions and, by implication, what not to include.

Health care providers tend to have empathy for their clients and do not like to do anything to raise their anxiety. Janis and Feshbach (1953) tell us that we may need to raise the clients' anxiety (via the "I'm at risk") in order to obtain a certain behavior change.[7] "It is knowing the threat and knowing the concrete ways to cope with it that provide lasting action."[8]

How does the application of the HBM-derived topics in Box 2-1 benefit patients with low literacy skills?

- They provide motivation to change.
- They focus on behavior—"what I can do about it"—so that people know what to do to reduce the risk of anxiety.
- Because simple vocabulary and context can be used to describe behaviors, information about behavior is easier to understand than information about disease processes, physiology, and statistics.

When behavior change is the focus of the education intervention, you can often eliminate complex topics that may be expressed in lists, graphs, charts, and drawings whose formats may be unfamiliar to patients.

BOX 2-1

Content and sequence of topics for health behavior change

- I perceive that I am personally at risk, and the risk is serious.
- I see a way to reduce my risk, and I believe I will benefit if I do it.
- The barriers (pain, cost, etc,) are not too high for me to do it.

Self-Efficacy Theory (the "doability" factor)

Description: The theory addresses the role of people's confidence that they could carry out the behavior asked of them. A person with low self-efficacy is less likely to try to carry out a new health care behavior, or to change an ingrained behavior. Using this theory, the education intervention should build clients' self-confidence that they can do the behavior asked of them. Indeed, Bandura and Adams (1982) suggest that the most important precondition for behavior change is self-efficacy.[9] Rosenstock and others have revised and expanded the HBM to include it.[10]

Factors that help build a patient's self-efficacy are:

- The patient's initial perception or experience is that the task is doable.
- The task, especially a complex task or behavior, is partitioned into smaller, easier-to-do subtasks. This allows many small successes to be experienced during the learning process.
- There is repetition of the task or behavior.
- There is recognition, reward, and reinforcement for doing the task.

Application: Except possibly for the initial client perception of doability, the factors listed above are under the control of the health care provider. You can build these factors into your educational interventions, and often this can be done quite easily.

Initial perception or self-confidence that patients can do a task (or change a behavior) is influenced by the way the topic is introduced and pre-sented. This may be a deciding factor in whether or not clients will pay atten-tion and try to learn from the education intervention. For example, to increase clients' perception of doability, you could begin by mentioning the similarity of the task to something they can already do, by explaining that the task can be done one step at a time, and then citing testimonials from other patients who have done it.

To build self-efficacy, the first step is to partition a complex task (or concept) into subtasks that appear easy to the client. The second step is to offer feedback (reinforcement) to the client after each step.

From the client's viewpoint, what is a complex task or concept? That depends on the client's knowledge, skills, and experience. For example, for many literate people, taking and understanding their own blood pressure is complex. Consider the blood pressure instruction in Table 2-2: the original, and a rewritten version with the same concept divided into two parts. In the rewritten version, note also that interaction has been added. In Part 2 of this chapter, we will say more about the benefits of interaction.

Repetitions build self-confidence and skill—and hence, self-efficacy. Some examples to build self-confidence are: practicing insulin injections; clients showing the dietitian how they can select several low-sodium foods from a list; demonstrating a rehabilitation exercise.

TABLE 2-2
Blood pressure instruction

ORIGINAL	REWRITTEN
WHAT DO THE NUMBERS MEAN?	**WHAT DO THE NUMBERS MEAN?**
When a health professional takes your blood pressure, it is reported in two numbers such as 120/80. The first number is called the systolic pressure and represents the pressure against the artery walls when the heart beats. The second number, the diastolic pressure, represents the pressure against the artery walls when the heart is resting between beats.	When your blood pressure is taken, you get two numbers—like 120/80.
	The *first number* is your blood pressure when your heart beats to push your blood. This is the larger number. What is your pressure when your heart beats? Write it here_____.
	The *second number* is your blood pressure between beats. This is the smaller number. What is your blood pressure between heart beats? Write it here_____.
	Now you have both numbers: _____ over _____.

Recognition, reward, or reinforcement for the accomplishment of sub-tasks can build self-esteem and self-confidence. This is especially important for clients who have low literacy skills because during their lives they have often guessed wrong, and hence are more likely to have low self-confidence that they can perform the tasks asked of them. A sincere "Good, you're beginning to get the idea!" or "You've got it right!" from a health care provider, or even a positive response from a computer-aided instruction, can help immensely.

Locus of Control Theory

Description: The theory addresses the impact of how much control people believe they have over their own health. Those who believe or feel that their health is in the hands of God/fate or the doctors (external control) are less inclined to take preventive health actions. The converse is also true: those who feel that they are in charge of their health condition (internal control) are likely to adopt healthy behaviors.

This theory is especially significant for some cultures, and for those who have low literacy skills. The latter, in the past, seldom understood health care instructions. Thus, they feel that managing their own health is beyond their understanding. But external locus of control is not restricted to those with low literacy skills. Even people with high literacy skills may "assign" external locus of control to others in health matters. For example, a college-educated person declined to participate in the agency's wellness program and gave his reason as, "Wellness is not my responsibility; that's my doctor's job. He's supposed to keep me healthy."

Application: How does the health care provider know the locus of control for a given patient? Upon initial contact with a new client, you usually can't

tell. People with external locus of control may be difficult to motivate to adopt new health behaviors. The safest course to take in designing or presenting a health education intervention is to frame your message in terms of what actions to take (and that they are doable) rather than in terms of "It's your responsibility to take action."

Cognitive Dissonance Theory

Description: This theory is useful for education interventions to get a person to the point of making a decision and to maintain the behavior once it has been decided. Festinger (1962) defines cognitive dissonance as information or behavior that doesn't fit or is at odds with our overall knowledge, behaviors, or decisions.[11] In other words, we don't feel good when we keep doing things that we know are bad for us. For example, a person who is painfully aware that smoking is unhealthy and wants to quit would likely suffer some cognitive dissonance (mental discomfort) upon realizing he was opening a third pack of cigarettes for the day.

The more important the knowledge, behavior, or decision is to a person, the greater the potential cognitive dissonance. *The theory says that when these pressures are experienced, people seek ways to reduce them.* These pressures may be either positive or negative in terms of health behaviors. In the example cited above, the person might seek to temporarily reduce the cognitive dissonance by promising himself that he will quit smoking tomorrow. The tenets of this theory are summarized in the statements below.

Cognitive Dissonance Theory (CDT)

- People try to reduce the cognitive dissonance in their lives.
- The greater the dissonance, the greater the pressure to make a change that will reduce it. But there is often resistance to doing this. One type of resistance is the freezing effect to stick by our original decisions.
- After patients have made a good decision, reinforcement is needed to keep them from regressing. Reinforcement may take the form of additional supporting information, role models, and addressing environmental factors.
- Changes in behavior lead to changes in attitude to conform to the behavior.

Application: The theory follows the common-sense notion that people prefer to be comfortable in their minds, and when there is discomfort they try to reduce it. Two applications of CDT might be (1) by deliberately increasing patient discomfort about an undesirable behavior, health educators may cause a behavior change, and (2) after the patient has made the desired behavior change, multiple reinforcements of the decision are needed to maintain it.

An increase in mental conflict might arise from peer group pressure to revert to the old, unhealthy behavior. When that happens, reinforcements can serve to lower the mental conflict. A good example of how this can be done is shown in a video instruction on eating right for pregnant teenagers. One sequence shows a peer pressure situation where a pregnant teenager is urged

to eat junk food. The video shows a way to respond to that peer pressure and also to build self-esteem by selecting healthy food alternatives.[12]

Diffusion Theory

Description: Diffusion theory deals with the ways that new ideas are communicated (diffused) and adopted throughout a community or a population. The theory recognizes that information paths may be centralized (top down from an authority figure) or diffused (horizontally from a series of peers). Rogers and Shoemaker (1971) tell us that regardless of how the information is communicated, we should not expect everyone to accept a new health behavior recommendation at the same time.[13]

The first people to adopt a new idea are those who are secure enough to feel comfortable in making a change. They tend to be innovators. They may serve as models or "change agents" for others who follow. The next group is the early adopters. Both groups tend to make decisions based on rational thinking and expectancies. To convince the innovators and early adopters to change a health behavior, your message needs to be logical and must present the rationale and proof of results.

Other people will adopt much later. Those who are last to do so, the "late adopters," are likely to be more conservative, impoverished, or less secure. They are moved to adopt more by social influences (local organizations, friends, models) than by rational thinking. For late adopters, health information heard at a neighborhood party is likely to have more influence than advice from a health expert seen on television.[14]

Application: Diffusion theory can help health educators to set more realistic goals and time frames for their programs. The health educator can speed up the process of diffusion (adoption) of a health behavior by initially targeting the health message to the innovators and early adopters in the community. These may be political figures, teachers, successful businesspeople, the socially prominent, or sports stars. The message should include a rational description of health risks, the rationale for change, and the benefits. The health belief model is a suitable format.

Later, when early adopters have made the desired behavior changes, the message may be revised to (1) stress the social influences for the desired behaviors, and (2) target the local community organizations including peer role models.

Stages of Readiness Theory

Description: Prochaska and DiClemente (1985) tell us that a person goes through stages in adopting a new belief or behavior.[15] Thus, the health education intervention should address the needs at the current stage of readiness. These stages are defined as:

1. **Precontemplative:** not aware or not considering a change

2. **Contemplative:** thinking about change, but not taking action
3. **Action:** has made behavior change and is practicing it
4. **Maintenance:** retaining the behavior via reinforcement or learning
5. **Termination:** the end of intervention; the behavior is a part of life and is no longer seen as a change that needs attention or reinforcement

Application: The content of your health message must be geared to the patient's present state of readiness. Your objective is to move the client along to the next stage—perhaps from the contemplative stage to the action stage. For example, it would not be surprising that most newly diagnosed diabetics are likely to be ready to take action to control their condition, so the health messages need to deal with knowledge and skill building to enable them to do so. In many cases, the patient's stage of readiness will not be so obvious.

One way to find out where the patients are in terms of readiness is to set up a small focus group of patients to elicit from them how they view the "problem," their current behavior toward the problem, and what they see as actions that could be taken. (See Chapter 10 for discussion of focus groups.)

People with low literacy skills are less likely than others to obtain health information from written materials. If they are not aware of a health problem (such as the importance of immunization for infants) they are likely to be in the precontemplative stage, and the health education intervention should include awareness topics.

Sometimes the instruction must be suitable for clients at several stages of readiness. In such cases, the instruction must include topics suitable for each of these stages. If you are designing a new instruction (pamphlet, audio-tape, videotape, or verbal instruction), decide on the readiness stages of your target audience, and include the content they require.

Adult education

Description: In keeping with the summary nature of this chapter, we will narrow the field of education theory to give emphasis to those theories and research findings dealing with adults with low literacy skills. Having said that, it is important to note that nearly all education methods that work well for those with low literacy skills also work well for those with higher literacy skills.

Characteristics of adult learners

Adults have a large base of life experiences to build upon. They generally know what they want from an educational experience. Cheatham (1993) points out that those with low literacy skills approach education with apprehension.[16] In the past, they have had many failures at learning—sometimes to their embarrassment. The health educator must design the instruction to reduce this apprehension. For instance, an easy-to-use audiotape or computer-aided instruction may be helpful. Research in adult education identifies the characteristics of the adult learner:[17–20]

How we learn

Derryberry and Skinner (1954) suggest we consider the learning conditions in terms of the following factors:[21]

MOTIVATION AND INTEREST

Learning takes place due to motivation within the person, not an outside force. Thus, no matter how clever we are at teaching, our efforts are likely to fail unless the person wants to learn. The patient in a clinic may want to learn because he believes he has a health problem.

This point was further elaborated upon by Roberts (1956), who states that, "The interplay between what people know and how anxious they feel about it determine what action they take. People without the anxiety phenomenon are more likely to delay taking any action."[22] (And that includes learning.)

LEARNING METHODS AND EXPECTATIONS

Learning is an active process. It is a result of our own efforts to learn. So long as a patient is passive about learning, he will learn little. Thus, teaching methods need to include ways to gain attention and must actively involve the patient. Being told what to do, or being given a pamphlet, does not meet this requirement.

INTERPRETATION AND EVALUATION

We interpret new information based on our past experience. What is learned and how it is learned differs from one person to another. Each comes to a learning situation with his or her own unique set of backgrounds and points of view.

People will change behavior only when they understand what to do and can see that taking the action to change behavior furthers achievement of their goals. In health terms, it means knowing what action to take and how it relates to solving their health problem or reducing their health anxiety.

The attitudes of the groups to which the patient belongs are a significant force. Most people tend to conform to the accepted standards and sanctions of family and friends. These may determine whether information is accepted and learned and whether a person takes action.

These characteristics affect both the content and teaching methods of adults and lead to the following suggestions for teaching. (See other tips on teaching in Chapter 9.)

1. *Tell patients that the instruction is aimed at solving/managing their health problem.* Ask about what they know, and then outline the topics you are going to cover in the instruction.
2. *Get to the point quickly.* Patients with low literacy skills tend to have short attention spans and lose interest rapidly. Present the information in the context of benefits in their lives—not in the medical context. Contrast the following statements that illustrate these two contexts: "If you take these

pills every day, you will feel better and you can stay on your job," rather than "I'll give you a prescription for a new medication we're having good clinical results with."

3. *Ask patients to solve a problem with the new information:* ask them to tell or show you how they will use the information just learned. Listen and offer words of encouragement. For example, after instruction but prior to hospital discharge you might ask the patient, "You'll be changing your dressings at home now. If your wife asks you how you will do that, how will you explain to her what you have to do?"

These three suggestions are consistent with the proverbial teaching dictum: "Tell me and I'll forget. Show me and I may remember. Let me do it and I'll learn."

Part 1 has provided an overview of learning and behavior theory as applied to adult patients—including those with low literacy skills. Lewin said that, "There is nothing so practical as a good principle or theory." How can you use these theories on a day-to-day basis?

Steps in applying theory

- When you initiate a new health care instruction, review the theories in Table 2-1.
- Which theories apply to what you're about to do? To your objective; to your client population; to their situation; to their environment?
- What do the theories tell you to consider?

We ask you to stop at this point and take a few minutes to apply the three actions above to the last health instruction you developed or presented. Referring to the theories in Table 2-1, which would apply to your instruction? What do these theories tell you to do to improve the effectiveness of this instruction the next time?

Part 2: Applying Theory to Practice

The initiative to develop a new health care instruction may come from a variety of sources. At the grassroots level, you may do so in response to a new procedure or to a lack of understanding or knowledge on the part of patients. At the national level, legislation has required that standardized health instructions be developed and made available nationwide.[23]

To assure the medical quality of new health care instructions, it is standard procedure for the medical accuracy to be carefully checked. The quality of the learning aspects of the instruction must receive the same careful attention. To move a step closer to that objective, in Part 2 we present a set of guidelines for health instruction materials and teaching that will lead to an increase in their educational quality.

Guidelines for health instructions

The guidelines apply to any instructional media: print, audio, visual, demonstrations. These guidelines can be used with both individual and group instructions. It is not surprising that a common set of guidelines apply to all media because the human brain processes information and stores (learns) it according to a structured set of rules. This chapter deals with those key learning rules that should be built into almost any health education material to make it simple and understandable.

Over the past several years one can observe a broad societal movement toward simpler text. The federal government as well as 25 states have passed legislation toward this end. The legal profession as well has begun to recognize the need for plain English.[24] A frequently asked question is, "But won't people with high literacy skills feel talked down to by instructions that are simple?" There is evidence that people at all knowledge and literacy levels prefer and better understand materials that are simple.[25,26]

One must make a distinction between literature and written information. Health instructions fall in the latter category. Literature can be complex and is often enhanced by allusions, metaphors, and other devices that invite linguistic exploration. The intended outcome is satisfaction and joy. Informational reading, on the other hand, is intended to inform or empower. The language and visuals need to be clear and simple, and the text well organized. This is a formula for health instructions that will be understood by many. Box 2-2 presents guidelines for development of health instruction materials for patients who have low literacy skills.

BOX 2-2

Guidelines for health education methods and materials

1. **SET REALISTIC OBJECTIVE(S)**

   — Limit the objective to what the majority of the target population needs now.
   — Use a planning sheet to write down the objective and key points.

2. **TO CHANGE HEALTH BEHAVIORS, FOCUS ON BEHAVIORS AND SKILLS**

   — Emphasize behaviors and skills rather than facts.
   — Consider the sequence for the topics shown in Box 2-1. Otherwise, consider placing the key points first and last.

3. **PRESENT CONTEXT FIRST (BEFORE GIVING NEW INFORMATION)**

   — State the purpose or use for new content information before presenting it.
   — Relate new information to the context of patients' lives.

4. **PARTITION COMPLEX INSTRUCTIONS**

   — Break instruction into easy-to-understand parts.
   — Provide opportunities for small successes.

5. **MAKE IT INTERACTIVE**

   — Consider including an interaction after each key topic. The patient must: write, tell, show, demonstrate, select, or solve a problem.

Limit the objectives to one or two for most instructions intended for patients and for the general public. If additional objectives are necessary, consider scheduling a separate session or using an additional instructional material.

The objectives should state exactly what actions or behaviors you want to see from the education intervention. To develop an instruction that makes the objective relevant for patients, objectives should be expressed in terms of the *patients' objective* (i.e., translate an objective to lower blood pressure to: "to help you to live to see your grandkids grow up").

It is important to keep the *education objective(s)* separate from other objectives. Otherwise, one may assign objectives to the education intervention that education cannot achieve. The patient may "fail" to comply with the education actions because noneducation objectives or conditions are not met. For instance, an education intervention may have convinced a woman to have a mammogram, but she may fail to do so for environmental, cultural, or economic reasons.

To change behaviors, focus the content on behaviors rather than on facts or principles. Facts and principles may imply what a patient's behavior should be, but low literacy patients may not see the implication. Rely on your objective(s) to decide what outcomes are desired for the patients. Then focus the instruction's content on the behaviors that will lead to these outcomes.

Patients do not need to learn the underlying principles to understand and carry out the behaviors.[27,28,29] This has an important impact on the content of your instructions. To obtain the patient behavior outcomes you seek, you rarely have to include the complex underlying physiological reasons for those behaviors. Thus, your instruction can be both easier to prepare and more understandable by your patient population.

Present the context first—i.e., the framework or purpose of the new information. The context is the part the patient already knows.[30] All of us understand better when we are given the framework or context first, and then the new information. When writing a paragraph, consider making the first sentence or first clause tell where/how the information fits or is to be applied. (For example, in the previous sentence, the first four words, "When writing a paragraph," provide the context for what is to come afterward in the sentence. You know what a paragraph is, so you have a mental framework to contain the information that follows these words.)

For instance, rather than writing, "Broccoli, carrots, sweet potatoes, peas, spinach, cabbage, beets, and squash have many nutrients," it is better to say, "Vegetables with many nutrients are broccoli, carrots, etc. In the former sentence the readers/listeners must try to carry the whole list in memory as individual items with no framework as to how they fit together until they arrive at the end of the sentence. By that time they may have forgotten most or all of the items. On the surface this may seem like a trivial grammatical transposition, but the research shows that it can make a huge difference in patient comprehension and recall.

Partition complex instructions. Think of ways to divide your instruction into a number of small, logical pieces. Procedures and health care lists that exceed seven items are unlikely to be remembered regardless of a person's

education or skill level.[31] Such procedures require partitioning or "chunking." For most people three to five items per chunk may be a reasonable limit.

As a way to remember a series of steps in a complex task, consider an easy-to-remember mnemonic. For example, it is easy to remember the three steps in cardiopulmonary resuscitation (CPR) by the instructional mnemonic "A,B,C": Airway, Breathing, Compressions.

Make instructions interactive—i.e., the patient must do, write, say, or show something in response to the instruction. This greatly increases interest in and recall of information, and should be a standard feature in the design of nearly all instructions.[32,33] Medical science has shown that interaction causes a protein change in the brain that stimulates information retention for long-term memory.[34] (See also Chapter 5, The Comprehension Process.)

Effective interactions can be incorporated into health care instructions in any medium. A recent series of 24 nutrition materials (using print, visuals, or video) developed by expert panels for the National Cancer Institute included reader/viewer interactions in each material.[35] When these materials were field tested with sample populations, respondents said they enjoyed, learned, and were motivated by the interactions.[36] Methods to incorporate interaction into text are described in Chapter 6.

For video instructions, interaction should be designed into the programming so that the questions or situations used to obtain interaction follow the information sequence naturally and permit sufficient time for the viewer to interact. A worksheet or checksheet can provide the viewer with a supplemental means to interact with the video. If the instructional videos that you are using do not have interaction built in, you can add it by preparing a worksheet to be used by the patients who view the video. Additional means of interaction are presented in Chapters 7 and 8.

Summary

The five guidelines (Box 2-2) offer a framework for the design of health instructions in any medium. If you use these guidelines in the design and development of your instructions, your patients will more likely understand and accept them. Chapters 6, 7, and 8 show examples in a variety of media that apply the guidelines.

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3

Testing Literacy Skills of Patients

Testing patients' ability to read and to comprehend written health care instructions is becoming more widespread. Health care providers realize that this information can help them to be more effective in teaching their patients. Knowing your patients' levels of literacy skill and comprehension helps you to:

1. Match the readability level of materials to the reading skills of patients
2. Know whether supplemental teaching is needed when using health care material
3. Know when it is necessary to employ nonprint media such as visuals, demonstration, audiotapes, and videotapes
4. Verify that patients understand their instructions in accordance with the new directives from the Joint Commission on Accreditation of Health Organizations (JCAHO)

   This chapter describes several tests that directly measure patient literacy skills. Most of the tests were developed in the field of education and have been in use for many years. Learning to use these testing methods takes very little time: the word recognition tests can be learned in less than an hour, and testing a patient takes no more than 5 minutes. The authors and others who have used these test methods have found that most patients enjoy the attention they receive during the test and they participate willingly.

Additional Rationale for Testing Patients' Literacy Skills

Nurses, doctors, and other health professionals have high literacy skills compared to the population as a whole and therefore they may overestimate the literacy skills of their patients. The assumption is often made that adult patients can read at levels equal to the level of schooling they have completed. This assumption is not supported by literacy surveys, which show that, among the general public, literacy skills are much lower—on the average, about five grade levels lower than the last school year completed.[1] A possible explanation for this gap is that since reading is a skill it atrophies with disuse, as do most other learned skills.

Since years of schooling is not a reliable indicator for literacy skills, why not just ask patients if they read well? Unfortunately, this question is not likely to be productive. In the National Adult Literacy Survey, over two-thirds of those who tested at the very lowest reading level reported that they "read well" or "read very well."[2]

Your purpose in testing a patient population may be (1) to obtain a *profile* of the reading skills (collectively) of your patient population, or (2) to determine the reading skills of *individual* patients. In most cases the testing methods will be the same; only the end uses of the data are different.

A profile of your patient population is useful in planning new or revised education programs. The profile can point to the average readability level needed for instructional materials for your patient population.

On the other hand, testing every patient can help you select the best method to teach an individual patient. You can find out whether an individual has sufficient skill to read instruction materials given to him or her.

Methods to Measure Patient Reading and Comprehension Skills

The ability to read material does not guarantee that the material is understood. Reading and understanding call on different skills. A patient may be able to read all the words in a sentence but not understand its meaning.

Two methods to test patients' reading skills and two methods to test their comprehension are presented in this chapter (see Box 3-1). The *reading skill tests* deal with the ability to decode the words. Decoding is the process of transforming the letters into words and being able to pronounce them correctly. This is an essential step in reading. The *comprehension tests* deals with how much the patient understands from reading.

BOX 3-1

Reading and comprehension tests

I. Reading skill tests
   1. Wide range achievement test (WRAT)
   2. Rapid Estimate of Adult Literacy in Medicine (REALM)

II. Comprehension skill tests
   1. Reading comprehension: Cloze test
   2. Listening comprehension test

In addition to the methods shown in Box 3-1, there are indirect ways to obtain an approximate assessment of patient literacy skills. One approach is to ask your patient to read a short passage from a readability graded health instruction—no more than a page or two. Then ask the patient a few detailed questions about the content of the passage. If the patient can respond correctly to the questions, you can assume that he or she can read text at least at the grade level of the instruction used.

Why not test patients for functional competency in reading with the methods used in the National Adult Literacy Survey (NALS)?[3] We do not recommend this method because the combined test time for prose and document testing of 40 minutes is likely to be too long for most health care settings. A further problem with the use of NALS methods in a health care setting is pointed out in Appendix A.

Part 1: Measuring Reading Skills

The reading process

The reading process is complex. It involves a merging of both language and thinking skills with what we commonly think of as reading. Oral language is the base for reading. To read, we must make the shift from speech to print using a process called *decoding*. The position of decoding in the reading process is shown in Figure 3-1. Decoding is the skill that is measured by the WRAT and the REALM tests mentioned earlier.

Literal comprehension is a step beyond decoding the words—it means that we understand what we read. The Cloze test and the listening test measure comprehension. Another good way to measure whether or not comprehension has taken place is to ask the patient to transform what was read into other words or other formats. That is, to tell you in his own words what the text means, or to demonstrate the procedure described in the text.

FIGURE 3-1

Levels in the reading process. (*Source: Tutor,* Literacy Volunteers of America Inc., Syracuse, NY, 1972, p. 49)
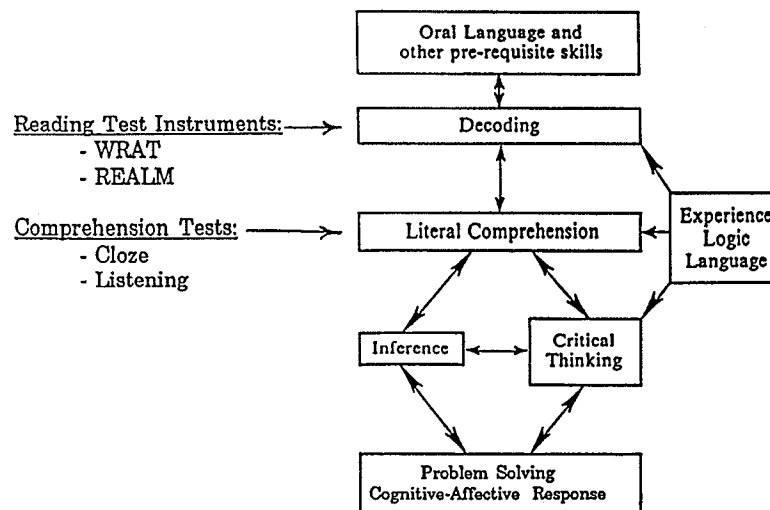
As shown in Figure 3-1, making inferences and problem solving are steps beyond decoding (reading) and literal comprehension. As noted in Chapter 1, many readers with low literacy skills take words literally, and do not draw inferences from written information and data.

Selecting a test method

The **reading skill tests** (part I of Box 3-1) may be used to:

1. Provide a profile of the reading skills of a patient population
2. Provide a reading skill level of individual patients so that teaching materials and methods appropriate to their skill levels are used
3. Serve as a screening threshold for further tests such as the Cloze or to select patients able to read and respond to a questionnaire
4. Provide literacy data for health education research purposes

Although either the WRAT or the REALM could be applied to the four purposes stated above, the REALM may be the most convenient for the first two, and the WRAT more appropriate for the last two because of its higher precision. Since both WRAT and REALM call for reading word lists aloud, the tests must be conducted on an individual rather than a group basis.

Administering the tests: the importance of the introduction

The authors have conducted reading tests with patients in hospital waiting rooms, at bedside, and in the cafeteria. Others have successfully tested people at community centers and on the street.[4] The willingness of people to undergo these tests, and the way they feel after taking them, depend on how they are introduced. Patients are almost always willing to participate if you explain the purpose of the test and ask for their help. It is best to be honest about the purpose. You may start with a statement such as:

"We want to make our instructions easy to understand, so I need to find out how well you can read. To do this I need your help to read some words. It will only take a few minutes. Will you help me?"

The key phrase in the above introduction is "Will you help me?" After the patient agrees, explain briefly what you want her to do, show her the test sheet, and proceed with the test.

Occasionally patients may be confused or reluctant to take the test. For these few it is best not to proceed, but to withdraw the test graciously. Instead, you may consider using the indirect test method mentioned earlier in this chapter. Do not be dismayed if you can't conduct a reading test on every patient. Once in a while, you may find a patient who, for any of a variety of reasons, does not want to be tested at that time.

The WRAT 3 Test (Wide-Range Achievement Test)

The WRAT[5] has been widely normalized with thousands of subjects and has been used to test reading skills in school systems throughout the United States for over 40 years. The current version, WRAT 3, was copyrighted in 1993, and costs about US$99 for a package containing an administration manual, test cards, and scoring sheets. In this test patients read aloud from a list of words of progressive difficulty. The more words they can pronounce correctly, the higher their reading skill.
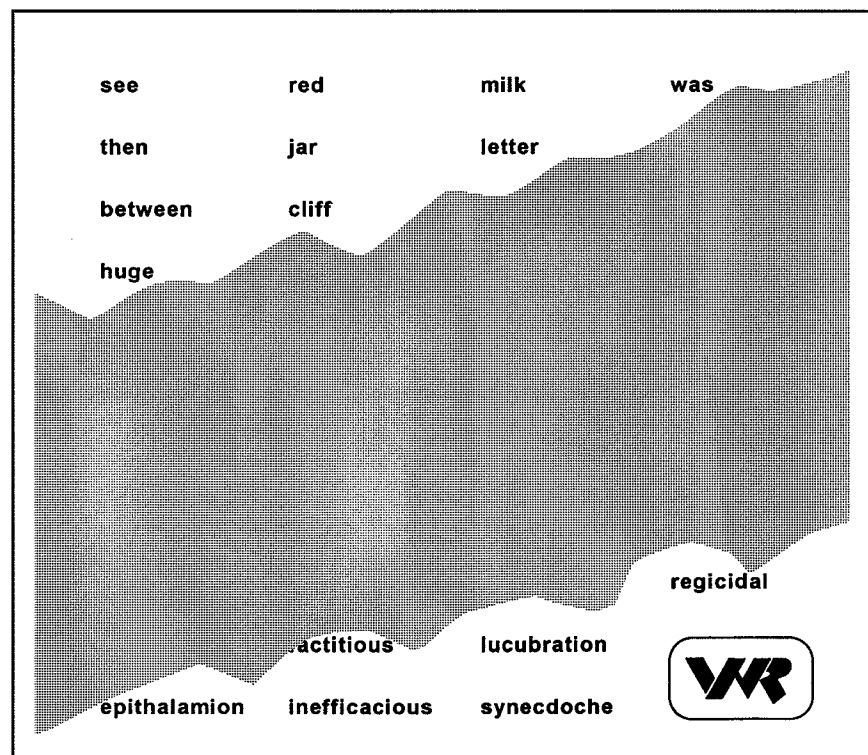
Many studies that first identified the gap between readability levels of health care materials and reading skills of patients were done by testing patients using the *Reading* portion of the WRAT.[6,7,8] (Other portions of WRAT address writing and numeracy skills.)

To administer the WRAT 3 reading test, explain the purpose of the test as illustrated above. Then present the patient with the card containing the list of words (see Figure 3-2). The patient is asked to read each word aloud, starting with the easiest word on the list of 42 words. The tester listens carefully, following along on a separate word list, and making a check mark over each word that is pronounced incorrectly until 10 consecutive words are mispronounced. Then the test is stopped, the patient is thanked and may be dismissed, and the test is scored.

The *WRAT 3 Manual* provides a reference for correct pronunciation; however, regional and ethnic accent differences are allowed. The *WRAT 3 Administration Manual* is used to convert the number of words pronounced correctly during the test to a reading grade-level score for the patient tested.

FIGURE 3-2

WRAT 3 reading test, partial word list. (© Wide Range Inc., Wilmington, Delaware)

see	red	milk	was
then	jar	letter	
between	cliff		
huge			

factitious   lucubration   regicidal

epithalamion   inefficacious   synecdoche

ALTERNATE "STOP" CRITERIA FOR **WRAT**

Many patients, especially those with low literacy skills, may feel anxious when they see they are getting over their heads as the words on the WRAT 3 list become more difficult. They may recall the many times they felt badly in school when asked to read aloud. Yet the procedure requires them to continue the WRAT 3 test to the embarrassment of making 10 consecutive errors. The health care setting is a different environment than a classroom and they may feel demeaned and resentful. It may be worthwhile to trade off some of the precision attainable using the "10 stop" criterion (which was established for use in school systems) for the lesser precision required in most health care settings.

Adequate accuracy can be obtained when you stop the test after five errors in a row. Using the "stop at five" criterion, the error is less than one grade level compared to going all the way to 10 errors in a row.[9] The precision of the test can be further improved. After patients have made five errors in a row, ask them to look ahead to see if there are additional words they can pronounce. If any are found these are added to the patients' scores.

The REALM Test (Rapid Estimate of Adult Literacy in Medicine)

This test is similar to the WRAT test and correlates quite well with WRAT in terms of reading scores.[10,11] However, in the REALM, the patient reads from a list of 66 health/medical–related words. The REALM test words are arranged in three columns beginning with short easy words like *fat, flu,* and *pill,* proceeding to more difficult words like *medication* and *osteoporosis.* (See Figure 3-3 for word list.)

To administer the test, patients are asked to read the words in the three word lists aloud, starting at the top of List 1. The tester uses a corresponding word list to check the words pronounced correctly. When patients can read no further, they are asked to look down the lists and to pronounce any other words that they can. The raw score is the total number of words pronounced correctly. Table 3-1 can be used to convert the raw score into reading grade range.

REALM has several advantages over WRAT and other graded word tests. A principal advantage is that it is more likely to be accepted by patients in a health care setting because it uses medical and health-related words. Administration of REALM takes less time than WRAT. A third advantage is that the scoring is simpler. The fact that REALM offers less precision (scores are given as a *range* of grade levels rather than a specific grade level as in WRAT) is of little consequence for most health care purposes.

The REALM test, scoring guide, and a summary of validation results are given in Appendix B. Although REALM is a copyrighted test, there is no charge or cost to use or copy the test, provided that acknowledgment is given. A plastic enclosed REALM word list is available for a small fee from the REALM authors.

Should the reading skill of every patient be routinely tested by hospitals and clinics? Some hospitals already do this and enter patients' reading scores on their medical records. One reason in favor of testing every patient is to respond (partially) to the JCAHO patient education requirements. Another reason is to provide the hospital staff with information to help them select the materials and teaching methods most appropriate for each patient. Three reasons against testing the literacy skills of every patient are:

FIGURE 3-3

REALM test word list. (*Source:* © Davis, Crouch, Wills, Louisiana State University)

Patient Name/Subject # _____ Date of Birth _____		Reading Level _____ Grade Completed _____

Date _____ Clinic _____ Examiner _____

List 1		List 2		List 3	
fat	____	fatigue	____	allergic	____
flu	____	pelvic	____	menstrual	____
pill	____	jaundice	____	testicle	____
dose	____	infection	____	colitis	____
eye	____	exercise	____	emergency	____
stress	____	behavior	____	medication	____
smear	____	prescription	____	occupation	____
nerves	____	notify	____	sexually	____
germs	____	gallbladder	____	alcoholism	____
meals	____	calories	____	irritation	____
disease	____	depression	____	constipation	____
cancer	____	miscarriage	____	gonorrhea	____
caffeine	____	pregnancy	____	inflammatory	____
attack	____	arthritis	____	diabetes	____
kidney	____	nutrition	____	hepatitis	____
hormones	____	menopause	____	antibiotics	____
herpes	____	appendix	____	diagnosis	____
seizure	____	abnormal	____	potassium	____
bowel	____	syphilis	____	anemia	____
asthma	____	hemorrhoids	____	obesity	____
rectal	____	nausea	____	osteoporosis	____
incest	____	directed	____	impetigo	____

SCORE

List 1 _____
List 2 _____
List 3 _____
Raw Score _____

TABLE 3-1

REALM scoring chart

RAW SCORE	GRADE RANGE
0–18	3rd grade and below
19–44	4th to 6th grades
45–60	7th to 8th grades
61–66	9th grade and above

1. Unless the hospital staff is trained to apply appropriate teaching methods for each reading level, it cannot make effective use of the patients' literacy record.
2. Patients may initiate litigation if they believe that the hospital has made an unauthorized release of their literacy test results. Also, some low literacy patients may elect to seek medical services elsewhere upon learning of the literacy test and that it would be a permanent part of their medical record.
3. It adds to the overhead costs of the hospital.

Other reading tests

A number of other oral reading tests are in use in school systems. Among these are the Slosson Oral Reading Test (SORT) and the Peabody Individual Achievement Test–Revised (PIAT–R).[12,13] The SORT uses a series of word lists, each one scaled for a different grade level. The PIAT is an individually administered test to diagnose reading problems. Both of these tests may be used with patients, but the tests involve more procedural steps and they are likely to be more time consuming than the WRAT or REALM.

Neither the WRAT nor the REALM is available in other languages, but a Spanish version of WRAT is currently in the validation phase and may be available during 1995. Other languages employ different rules for pronunciation compared to English. Thus, a test in another language is not simply a matter of translating existing word lists into that language.

Using test results to select teaching methods

The results of word recognition tests of individuals or patient populations are useful criteria for selecting teaching methods. Box 3-2 presents a set of such teaching criteria. Additional criteria and teaching tips are found in Chapter 9.

The criteria in Box 3-2 offer only general guidelines for teaching methods, but are indicative of the benefits of applying these tests with your patient population.

Part 2: Reading Comprehension Testing Methods

Comprehension tests differ in design from reading tests (WRAT and REALM) in that the test instrument is based on a specific text passage that you may select rather than standard word lists. For that reason, comprehension tests

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BOX 3-2

Teaching methods based on WRAT scores

BELOW 5TH-GRADE SCORES

— Use participative methods such as demonstration or discussion (see Chapter 9, Tips on Teaching).
— Use short audiotapes, videotapes, single-concept flip charts.
— Consider "end-use" teaching materials. For example, teach nutrition via shopping lists or restaurant menus rather than the food groups.

BETWEEN 5TH AND 9TH GRADES

— Use above methods plus pamphlets, booklets with low reading levels.
— Use record-keeping diaries.

9TH GRADE AND ABOVE

— Use all of the above plus simple charts and diagrams that include directions for use.

indicate the patient's reading skills *for the specific material used.* Thus, comprehension tests don't directly indicate patients' reading skills in terms of grade level—the test only indicates whether or not they can understand the specific pamphlet or booklet used in the test. This is an important distinction.

In comparison, reading tests such as WRAT and REALM do not require that patients understand the words—only that they are able to pronounce them. Subject matter is an important variable in reading comprehension. For example, an auto mechanic can read and understand material on carburetors with much greater ease than can a musician; in turn, a musician will find that the terms used in music make perfect sense whereas the auto mechanic may only shake his head.

For most people in the United States, health care subjects are not among their most familiar topics. Health instructions that appear to be straightforward to health care providers may not be understood by patients. A reading comprehension test is one way to measure how much is understood.

The Cloze Test

The Cloze test may be used for patients who have a WRAT/REALM score at the 6th grade or higher. Below the 6th grade the listening test should be used. Since the Cloze is a paper and pencil test, it is possible to administer it to a group of patients, but in practice it is usually administered to patients individually.

The Cloze test determines, directly, the fit between reader and material. The material may or may not be familiar to the reader. The test brings the reader and the material together with the task of filling in a series of blanks.Developed by Taylor (1953), the test is designed so that every fifth word is deleted from a passage, and the reader's task is to fill in the blanks with the exact replacements.[14] The ability of readers to fill in missing words correctly is a valid indicator of how well they understand the passage.

The Cloze test measures comprehension in two ways: (1) it tests how much knowledge was obtained from the information surrounding the blanks, and (2) it determines how well this information was used to obtain additional information.[15]

To use the Cloze, make up your own Cloze test from one or more of your frequently used health care materials. Detailed directions for making up a Cloze test are given in the following pages. Ideally, your Cloze test should have about 50 blanks for the patient to fill in.

For example, if you are a nurse working with patients who have chronic obstructive pulmonary disease (COPD), you might want to test your patients' ability to understand one of the instructions they are given. You might make up a Cloze test from one of your materials, such as the example shown in Figure 3-4. The example shows only a partial passage as it contains only 17 blanks, about one-third of the 50 blanks recommended.

The exact replacement words in Figure 3-4 are: *cough, those, prescription, your, make, you, sputum, this, from, easily, lung, even, bought, be, taking, prescribed, sure.*

Partial sample of a Cloze test

CONTROL OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

Medications

The pharmacist will explain the correct way to take the medication your doctor has prescribed for you.

Do not take any _____ or cold remedies, including _____ you buy without a _____, without first checking with _____ doctor. These medications can _____ it more difficult for _____ to cough up the _____ from your lungs. If _____ sputum is not removed _____ your lungs, you can _____ get a respiratory or _____ infection.

Remember, mixing medications _____ those that can be_____ without a prescription, can _____ dangerous. If you are _____ medications that have been _____ for other reasons, be _____ to inform your doctor.

Constructing and administering a Cloze test

To construct a Cloze test for your patients, select a manual, booklet, or other written instruction of some length (300 words or more) with contents of fairly even difficulty. Choose a passage that consists of prose that does not include lists, charts, or illustrations.

1. Leave the first sentence intact. Beginning with the second sentence, delete every fifth word until you have about 50 words deleted. Replace each word with a blank line; make all lines of equal length. Do not delete proper nouns (names); instead delete the word that follows the proper noun.

2. After introducing the test to the patient, explain the Cloze test by saying,

   Here is an instruction that has some words left out. From the words that are there, see if you can fill in the missing word. If you get stuck, go on and come back later if you wish. Perhaps more than one word will make sense, but choose the word that seems best to you. Don't worry if you can't get them all. Hardly anyone does.

3. After the patient has filled in the words, compare the result with a copy of the original. Count as correct the words that are *exactly* like the original. Do not count any word other than the original, even if the substituted word makes sense. (The scoring allows for up to 40 percent of such substitutions without indicating a deficiency in reading skill.) Errors in word endings such as *s, ed,* and *ing* are counted as incorrect.

4. *Scoring the Cloze:* Determine the percentage correct by dividing the number of exact word replacements by the total number of blanks. For example:

39 correct replacements in 50 blanks
39 divided by 50 = .78 or 78% correct.

Interpreting the score:

Score (% exact replacements)	Interpretation
60–100%	*The passage is understood. It should be easy for the patient.*
40–59%	*The material can be used but may require supplemental teaching.*
below 40%	*Not understood; not suitable.*

Using Cloze results

We do not suggest that Cloze be administered to every patient in a hospital or clinic, but rather to a representative sample of patients. It might be administered to an individual patient who seems to be having difficulty understanding one of your health instruction materials. The authors have found that it takes about an hour or two to construct a Cloze test, and 10 to 20 minutes to test each patient. This is time well spent because the Cloze can verify that a patient understands—a key requirement of the new JCAHO directives mentioned early in this chapter.

If a significant number of your patients score below 40 percent on the Cloze test, the material used in the test is not appropriate for them. These patients need to be taught using a different method (see Chapter 9, Tips on Teaching), or the material used in the Cloze test must be revised. A clue as to what needs to be revised can be obtained by examining the completed Cloze tests to see which portions of the test caused the greatest number of errors.

A further clue as to how to revise the wording of the material to make it more understandable may be given in the *choice* of "wrong" words (not exact replacement words) that some patients wrote in the blanks. Those "wrong" words may be the more common expressions that are understood by your patient population, and if not incorrect in terms of the context of the material, they should be used in its revision. Additional characteristics of the material that may be the causes of difficulty may be uncovered by analyzing the material using the SAM instrument described in Chapter 4.

Listening tests for comprehension

The Cloze test is likely to prove too difficult for patients with reading skills below the 6th-grade level (approximately competency level 1 on NALS scale). Patients at this reading skill level lack fluency and read with hesitancy so the meanings of sentences and the context around the missing words (blanks) are likely to be elusive. A listening test may be required to test their comprehen-

sion skills. That is, you read a passage; the patient listens; you ask questions verbally and record the answers.

To construct the listening test, select the key points of the text—especially points dealing with desired behaviors—and write short questions on these (not more than 10). The selected text should not take longer than about 3 minutes to read. If it is longer than that, break it into segments with a reading and short question session for each segment.

The same scoring percentages used for Cloze have been used to score levels of comprehension from a listening test.[16] You may use any of your patient education materials that have readability levels below the 5th-grade level for a listening test. An illustrative listening test prepared from materials available to patients at the Norfolk, Virginia, Public Health Hospital is given in Box 3-3.

Administration of a short listening comprehension test takes less than 10 minutes. An additional advantage of the listening test is that besides its comprehension measurement, it opens the door for dialogue with patients and further questions they may have.

BOX 3-3

Sample passage for a listening comprehension test

Getting Flu Shots: Most people see a doctor when they are sick. When you are sick, it's easy to forget about the shots that could keep you from getting sick. Please listen to this, and if you need any shots or have any questions, see your doctor.

The Flu: For a lot of people the flu isn't a very bad illness, but some people get very sick with it and may even die from it. If you are one of these people who can get very sick from it, you should get a flu shot every year.

If you have not had a flu shot, talk to your doctor. You should have a flu shot if:
1. You are 65 years old or older.
2. You have diabetes, or lung, heart, kidney, or liver trouble, or if you've had another disease for a long time.

SAMPLE QUESTIONS FOR LISTENING TEST

Q-1. *According to what I've just read to you, why don't some people get their flu shots?*
A-1. Because they only see the doctor when they are already sick.

Q-2. *What should a person do if he thinks he needs a flu shot, or any other shot?*
A-2. See his doctor.

Q-3. *How long does a flu shot protect you?*
A-3. About a year (or, You need one every Fall).

Q-4. *What diseases make you more likely to need a flu shot?*
A-4. Diabetes, or lung, heart, kidney, liver, or any disease you've had a long time. (Any three count as a correct answer.)

Q-5. *At what age should older people have a flu shot?*
A-5. 65.

Summary

National literacy surveys provide extensive statistics on reading ability of the U.S. population as a whole, by ethnic group, and by age. Although these are useful data, they may or may not be representative of your patient population. Information on the reading level for your population can be quickly obtained by testing a sample of that population using word recognition tests such as WRAT or REALM.

Results of the reading tests can be used to help you select appropriate teaching methods for your patient population, and as threshold criteria for other surveys or tests such as the Cloze test. A few hospitals and some substance abuse programs test all incoming patients using a word recognition test and the test scores are entered on the patients' records.

Reading comprehension testing is a step beyond reading word recognition testing and may be done using the Cloze or a listening test. Results from these tests apply only to the individuals tested and the material used in the test. That is, the Cloze assesses the "literacy fit" of a specific material to a specific patient. Furthermore, the test can provide verification that your health care organization meets the patient comprehension requirements set forth by JCAHO for accreditation.

Applying this chapter in your practice: the next 90 days

Here are some ways you can apply the information learned in this chapter during the next 90 days that will make a difference in the way that you teach your patients. Even a very busy health professional has time to take one or two of the following actions.

With a colleague, take 20 minutes to practice administering the WRAT or REALM so you feel comfortable doing it. In your practice sessions, include giving the brief introduction and explanation of the test to the "patient."

- Administer the WRAT or REALM to 10 patients. Share the results with your colleagues.
- Based on the WRAT or REALM scores, decide on one new or different approach you will use to improve patient comprehension of your instructions.
- Construct a Cloze test from one of your most frequently used written health instructions. Use the Cloze to test three to ten patients. (First, use WRAT or REALM to screen for patients that are reading at least at the 6th-grade level.)
- From the test results, decide what changes are needed in the instruction you used for the Cloze test.

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4

Assessing Suitability of Materials

How suitable are your patient education materials? Are your patients likely to understand them? To accept them? This chapter describes practical ways to analyze the suitability of materials so you can continue to use them with confidence, or have evidence of the need for revision. Another method for evaluation—using patients to assess suitability of materials—is given in Chapter 10, under Learner Verification and Revision of Materials.

An Overview of Testing Methods

The need to assess the suitability of materials has been with us for a long time. Text readability formulas made their appearance during the 1920s and received much elaboration over the next seven decades.[1] Flesch (1946) offered a mathematical "yardstick" for written materials based on the number of words, sentences, affixes, and personal references.[2] Jonassen (1982) suggests a 20-step evaluation process for books and booklets that relies on elaboration theory.[3] The U.S. Department of Agriculture, WIC nutrition program (1991), presents a 23-item evaluation list for text, and a 21-item list for audiovisual materials.[4] Wileman (1993) addresses visual design evaluation via a 13-point checklist.[5]

Recent reports from the National Adult Literacy Surveys (NALS) briefly explain the criteria to rate the difficulty of written materials used in the literacy testing of the US population.[6] Unfortunately, the NALS reports offer no easy-to-use "formula" suitable to rate health care pamphlets or booklets to score them on the 0 to 500 scale.

Computer-aided instruction (CAI), multimedia, hypertext, hypermedia: these instructional formats may be helpful in teaching patients with low literacy skills. How can patient education materials in these media be assessed? At this point the reader may be thinking, "Why bother? I don't even know what these all mean, and I don't use them to teach patients." We would respond that, perhaps not today, but with the forces of technology and cost containment advancing so rapidly, you can expect to be using at least some of these media within the next few years. These media are evolving so rapidly they present a difficult moving target for any one evaluation method. Although Skinner (1993) offers guidelines for selecting CAI programs, and Thompson (1992) presents a list of factors to consider in learning displays, a widely agreed upon assessment method is yet to be developed.[7,8]

For this chapter, the authors have selected the most practical current assessment methods. The following three easy-to-learn methods can be used to assess the difficulty and suitability of patient education materials:

1. A checklist of attributes
2. Analysis via readability formulas
3. Analysis using SAM (Suitability Assessment of Materials), a new instrument

The three methods progress from an informal checklist of attributes of print materials to a more rigorous and quantified evaluation of materials in any medium using SAM. Before using any new patient instruction, health educators should consider assessing it using at least one of these methods.

An assessment using the checklist takes less than 15 minutes. Readability formulas can be learned and applied in 10 to 15 minutes and provide a grade-level measure of the reading difficulty of a material. The SAM instrument can be used immediately after reading the directions and takes 30 to 45 minutes to apply to a material. By acquiring the skills presented in this chapter you will be able to answer, with confidence, the following kinds of questions:

- What is the reading difficulty of this written health material? Is the reading level too difficult for my patients?
- Due to budget cuts, I can afford to order quantities of only one new pamphlet. I must select one that is suitable for nearly all my patients. Among the many offered, which one should I buy?
- How can I assess materials for a wide range of suitability factors, including cultural factors?
- How can I decide on the suitability of video- and audiotaped instructions?

An Assessment Checklist

The 17-item checklist (Figure 4-1) is one of the easiest and quickest ways to assess appropriateness of a material for patients. If you have to make a selection among a number of health care instructions, the list offers a quick way to screen to sort out the good from the not so good.

FIGURE 4-1

Checklist for print materials. (*Source:* Area Health Education Center, Biddeford, Maine)

Title of material:_____

Directions: Place a check next to each item that meets the described attribute.

ORGANIZATION

☐ 1. The cover is attractive. It indicates the core content and intended audience.
☐ 2. Desired behavior changes are stressed. "Need to know" information is stressed.
☐ 3. Not more than three or four main points are presented.
☐ 4. Headers and summaries are used to show organization and provide message repetition.
☐ 5. A summary that stresses what to do is included.

WRITING STYLE

☐ 6. The writing is in conversational style, active voice.
☐ 7. There is little or no technical jargon.
☐ 8. Text is vivid and interesting. Tone is friendly.

APPEARANCE:

☐ 9. Pages or sections appear uncluttered. Ample white spaces.
☐ 10. Lowercase letters used (capitals used only where grammatically needed).
☐ 11. There is a high degree of contrast between the print and the paper.
☐ 12. Print size is at least 12 point, serif type, and no stylized letters.
☐ 13. Illustrations are simple—preferably line drawings.
☐ 14. Illustrations serve to amplify the text.

APPEAL

☐ 15. The material is culturally, gender, and age appropriate.
☐ 16. The material closely matches the logic, language, and experience of the intended audience.
☐ 17. Interaction is invited via questions, responses, suggested action, etc.

As you read the material to be assessed, check off each of the attributes in Figure 4-1 found in the material. Any that are missing will indicate a potential deficiency in suitability. If the material is in the draft phase it can be revised. If the material has already been published and cannot easily be revised, the deficiencies point to where supplemental teaching may be required.

When using the checklist in Figure 4-1, you may find that some parts of the material possess an attribute, while other parts do not. For example, when considering item 13 on the checklist, one illustration might be simple and easy to understand, but another might be a copy from a medical textbook and far too complex. Resolve the dilemma on the basis of how important the illustrations are. If the complex illustration is *not* essential to understanding the key points of the material, then it does less harm and this favorable attribute on illustrations can be checked.

Readability Formulas

Readability formulas offer the health care provider an easy-to-use method to assess the reading difficulty of most print materials. In this section you will learn to use a readability formula.

What do they measure?

Readability formulas can be applied to prose—that is, running text—but not to tables, charts, or word lists. At least 40 different readability formulas are reported in the literature. Most of the 40 formulas are based on just two factors: word difficulty and sentence length. These formulas say that: "The greater the number of multi-syllable words, the greater the reading difficulty. Also, the longer the sentences, the greater the reading difficulty." Differences among the many formulas are mostly in the sample size and in the mathematical coefficients applied to the two factors.

Application of these two factors in a readability formula provides a grade-level rating. You can then compare the readability level of the material(s) with the reading skills of your patient population to determine suitability. (See Chapter 1 for data on literacy; Chapter 3 for methods to measure the reading skills of your patients.)

Knowing how to determine the readability level of your materials is critical to you and to your patients. You cannot afford to "fly blind." As noted in Chapter 1, the authors have found that health materials at college levels are often given to all patients—including those who have low and marginal reading skills. (See also Figure 6-1 in Chapter 6.) Is it any wonder that patients do not understand? That they do not follow directions for taking medications? That they miss their appointments?

Assessing readability using the Fry formula

Nearly all the 40+ readability formulas provide a reasonably accurate grade level (typically plus or minus one grade level with a 68-percent confidence factor). Among these formulas, the authors recommend the Fry formula. The Fry is widely accepted in the reading literature and among reading professionals and is not copyrighted. This formula applies from grade 1 through grade 17, and compared to some formulas, the Fry does not require as extensive a test sample.

It is not necessary to test the readability of every word and sentence. This would be especially tedious in a long booklet. Instead, test three samples from different parts of the instruction. For a very long text, such as a book of 50 pages or more, double the number to six samples.

Select a piece of material that you customarily use with your patients/clients and follow the five steps given below to determine its reading level using the Fry formula.[9]

Detailed directions

1. **Select three 100-word passages from the material you wish to test.** Count out exactly 100 words for each passage, starting with the first word of a sentence. (Omit headings.) If you are testing a very short pamphlet that may have only a few hundred words, select a single 100-word sample to test.

   Readability levels may vary considerably from one part of your material to another. Therefore, select the three samples from different content topics, if possible. For example, if a pamphlet includes such topics as the disease process, treatment options, and actions the patient should take, select one sample from each of these topics.

   ### Additional information:

   - Count proper nouns. Hyphenated words count as one word.
   - A word is defined as a group of symbols with a space on either side; thus "IRA," "1994," and "&" are each one word.

2. **Count the number of *sentences* in each 100 words, estimating the fractional length of the last sentence to the nearest 1/10.** For example, if the 100th word occurs 5 words into a 15-word sentence, the fraction of the sentence is 5/15 or 1/3 or 0.3.

3. **Count the total number of *syllables* in each 100-word passage.** You can count by making a small check mark over each syllable. For initializations (e.g., IRA) and numerals (e.g., 1994), count 1 syllable for each symbol. So "IRA" = 3 syllables and "1994" = 4 syllables.

   There is a short cut to counting the syllables. Since each 100-word sample must have at least 100 syllables, skip the first syllable in each word. Don't count it; just add 100 after you finish the count. Count only the remaining syllables (that are greater than one) in the 100-word sample. Thus, you don't put check marks over any of the one-syllable words; you put only one check over each two-syllable word, two checks over three-syllable words, and so forth.

   Occasionally you may be in doubt as to the number of syllables in a word. Resolve the doubt by placing a finger under your chin, say the word aloud, and count the number of times your chin drops. Each chin drop counts as a syllable.

4. **Calculate the average number of sentences and the average number of syllables from the three passages.** This is done by dividing the totals obtained from the three samples by 3 as shown in the example below.

Example:

	NUMBER OF SENTENCES	NUMBER OF SYLLABLES
1st 100 words	5.9	124
2nd 100 words	4.8	141
3rd 100 words	6.1	158
Totals	*16.8*	*423*
Divide Totals by 3:	5.6 Average	141 Average

5. **Refer to the Fry graph.** On the horizontal axis, find the line for the *average number of syllables* (141 for above example). On the vertical axis find the line for the *average number of sentences* (5.6 for the example). The readability grade level of the material is found at the point where the two lines intersect.

   In the example above, the Fry chart shows the readability level at the 8th grade (see dot at the intersection in Figure 4-2). The curved line through the center of the Fry graph shows the locus of greatest accuracy. With a little practice, the five-step process will become much easier. You will soon be able to determine a readability level in less than 10 minutes.
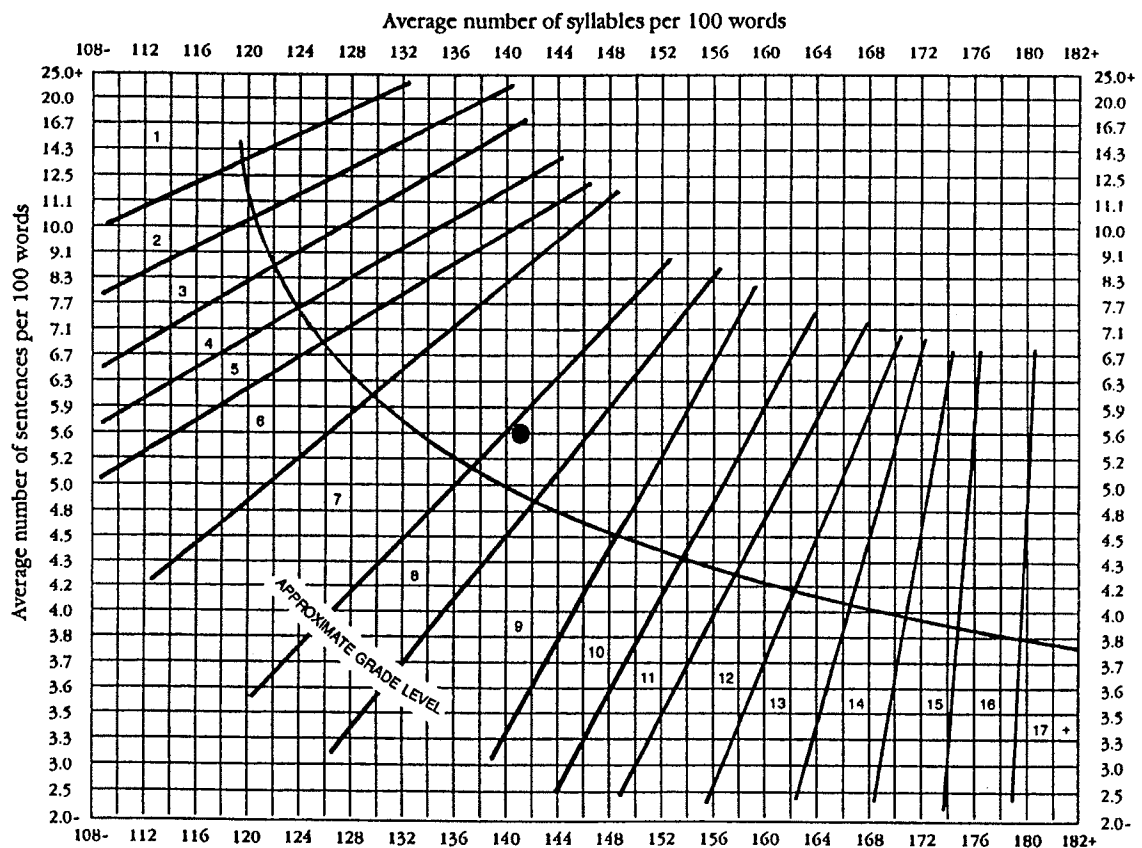

FIGURE 4-2

Fry graph for estimating readability—extended

Readability formulas: an important predictor

Fry and other readability authorities point out that the formulas predict the level of reading difficulty, but not all of the causes. The two factors assessed by the formulas, long sentences and difficult vocabulary, are recognized as only two among many. Nonetheless, the formulas are widely used and are an important predictor of overall suitability of patient instructions.

The authors have found a strong correlation between the readability level and the SAM instrument described later in this chapter. Although readability level is only one of the 22 SAM factors, it is pivotal. If readability is high (difficult), the overall SAM score is usually low (less suitable). The converse is also true.

Readability assessment by computer programs

At this writing, at least a dozen computer programs are on the market to assess readability.[10,11] The cost of these programs is less than US$100 each. If you have one of these computer programs, you can obtain a readability measure at the stroke of a key for any text material stored in the computer. The programs provide a range of other useful information as well. They may indicate violations of grammar rules such as a noun-verb mismatch, style rules such as active/passive voice, usage rules such as legalese, lists of "uncommon" words, and punctuation rules such as unnecessary or missing commas. They may suggest alternative words for you to consider and most of them offer corrected spelling.

For materials not already stored in your computer, it may be quicker to use the Fry formula as described above rather than to type the text into your computer.

Readability formulas for other languages

Readability formulas for text are currently available in at least 12 languages other than English. The languages include Chinese, Danish, Dutch, French, German, Hebrew, Hindi, Korean, Russian, Spanish, Swedish, and Vietnamese. For many of these languages, especially Spanish and German, you have a choice among several formulas.

The two variables used in formulas for English-language text, the number of syllables and length of the sentences, are used in most formulas for other languages as well. Some of these employ additional variables such as the number of words that separate the subject from the verb. Zakaluk and Samuels (1988) provide guidance on the selection and use of these formulas.[12]

A readability goal for your instructions

You may ask, "What is a reasonable readability goal? How low does it have to be?" The answer is to make it as low as practical without sacrificing important content or writing style. It is better to use conversational writing style

even though you might squeeze your text a little lower on the readability scale using short, choppy sentences. Write for the patient, not for the formula.

The 6th-grade level is a reasonable goal for most health care instructions. About 75 percent of adult Americans will be able to read at this level without difficulty. If you want to make the instruction easily readable by 90 percent of adult Americans, it must be written at about the 3rd-grade level. Methods and examples of writing at low readability levels are presented in Chapter 6.

A frequently asked question is, "But won't good readers feel talked down to by instructions that have a low reading level?" Frederickson (1994) and others have shown that adults at all reading skill levels prefer and learn better with easy-to-read instructions.[13]

Factors beyond the readability formulas

At this point it is well to mention some attributes of print materials that are not included in the formulas but affect reading difficulty. (These are included in the checklist presented in Figure 4-1 and in the SAM instrument shown in the following pages.) The attributes include:

- **The print size and type style.** Print size on some health care materials may be so small that it is readable only by those with good eyesight. (See Chapter 6, Writing the Message, for type styles that are easiest to read.)
- **Color contrast between the ink and the paper.** Some materials have hues of artistic appeal (brown ink on tan paper), but these provide poor contrast which makes reading difficult.
- **The self-efficacy factor.** Does it look hard to read? A page of solid text may, by its appearance alone, discourage any reader.
- **The concept density.** Are many concepts and facts jammed into each paragraph—even in paragraphs with low readability scores?
- **Unfamiliar context.** Medical and scientific contexts are not familiar milieus for millions of patients. The meaning of common words may not be understood when used in an unfamiliar context. This is illustrated in the example that follows—from outside the health care field.

Consider these common words:

squares	combined	within
variance	divided	estimate
degrees	interaction	cells
freedom	sums	circumstances

Taken separately, a good reader will probably know the meaning for each of these words. However, if these words appear in a text about statistics (like the one below), many good readers suddenly feel illiterate—at least on this subject.

Under certain circumstances the within-cells and the interaction sums of squares may be added together and divided by the combined degrees of freedom to obtain an estimate of the variance based on a larger number of degrees of freedom.

The sentence presents these words in an unfamiliar context for most of us, and includes a large number of concepts and facts as well. A parallel can be drawn from this statistical example to health instructions. In health messages, it is not only the medical or technical words that may cause trouble, but also the more common words when used in unfamiliar contexts.

Suitability Assessment of Materials (SAM)

A dilemma facing many health care providers is how to systematically assess the suitability of a health care instruction for a given patient population, and do it in the short time available. The authors recognize that an ideal way is to evaluate the instruction with a sample of the intended audience, but often there is neither time nor resources for that. The assessment must be made analytically "at your desk."

Our response to this dilemma was to develop and validate SAM: a suitability assessment of materials instrument.[14] Validation was conducted with 172 health care providers from several cultures.[15] The cultures included Southeast Asians, Native Americans, and African Americans as well as students and faculty from the University of North Carolina School of Public Health and Johns Hopkins School of Medicine.

SAM was originally designed for use with print material and illustrations, but it has also been applied successfully to video- and audiotaped instructions. For each material, SAM provides a numerical score (in percent) that may fall in one of three categories: superior, adequate, or not suitable.

There is a continuing need for more comprehensive evaluation instruments. For instance, one can expect that in the near future a computer program will be developed that will evaluate instructions in text, visuals, audio/verbal, interactive television, multimedia, and combinations of these. Until such a program is developed, SAM is a logical step toward meeting that need.

The application of SAM can pinpoint specific deficiencies in an instruction that reduce its suitability. If the material is still in its developmental stage, these deficiencies can be corrected. If the material is already in use, the deficiencies indicate what supplemental instructions (perhaps verbal explanations) are needed.

Using SAM to evaluate a health care instruction

To use SAM for the first time, follow the six steps below:

1. Read through the SAM factor list and the evaluation criteria.
2. Read the material (or view the video) you wish to evaluate and write brief statements as to its purpose(s) and key points.
3. For short instructions, evaluate the entire piece. For long instructions, select samples to evaluate.
4. Evaluate and score each of the 22 SAM factors.
5. Calculate total suitability score.
6. Decide on the impact of deficiencies and what action to take.

The entire process to evaluate your instructional material should take 30 to 45 minutes the first time through. For subsequent applications of SAM, you may skip the first step because the SAM factors and criteria will be already familiar to you.

For a first-time use of SAM, we suggest you test a simple, short material that has only a few illustrations.

1. **Read the SAM instrument and the evaluation criteria.**

2. **Read the material to be assessed.** Read (or view) the material you plan to evaluate. It will help if you write brief statements as to its purpose(s) and its key points. Refer to these as you evaluate each SAM factor. Use a note pad to jot down comments and observations as you read the material, view the video, or listen to the audiotape.

3. **The sampling process for SAM is somewhat similar to that described earlier for selecting samples to apply a readability formula.** If you are applying SAM to a short material such as a single-page instruction or a typical pamphlet (twofold or threefold), assess the entire instruction. Similarly, for audio- and videotaped instructions of less than 10 minutes, evaluate the entire instruction.

   To apply SAM to a longer text, such as a booklet, select three pages that deal with topics central to the purpose of the booklet. For booklets of more than 50 pages, increase the sample size to six pages. For video- or audiotaped instructions exceeding 10 minutes, select topics in 2-minute blocks from the beginning, middle, and end sections of the video or audio presentation.

4. **Evaluate material vs. criteria for each factor, decide on its rating, and record it on the score sheet.** As you seek to evaluate your material against each factor, you are likely to find wide variation among different parts of your material. For any one factor, some parts may rate high (superior) while other parts of the same material rate low (unsuitable). For example, some illustrations may include captions while others do not. Resolve this dilemma by giving most weight to the part of your material that includes the key points that you previously identified in step 2 above.

   Materials that meet the superior criteria for a factor are scored 2 points for that factor; adequate receives 1 point; not suitable receives a zero. For factors that do not apply, write N/A. Use the SAM scoring sheet shown in Figure 4-3 to record your score for each of the 22 factors and to guide you in calculating the overall rating in percent.

5. **Calculate the total suitability score.** When you have evaluated all the factors, and written a score for each one on the score sheet, add up the scores to obtain a total score. Spaces to do this are provided on the score sheet. The maximum possible total score is 44 points (100 percent)—a perfect rating, which almost never happens. A more typical example: if the total score for your material is 34, your percent score is 34/44 or 77 percent.

   For some instructional materials, one or more of the 22 SAM factors may not apply. For example, for an audiotape or a videotape, the text readability

FIGURE 4-3

SAM scoring sheet

2 points for superior rating
1 point for adequate rating
0 points for not suitable rating
N/A if the factor does not apply to this material

FACTOR TO BE RATED	SCORE	COMMENTS

1. CONTENT

(a) Purpose is evident _____ _____
(b) Content about behaviors _____ _____
(c) Scope is limited _____ _____
(d) Summary or review included _____ _____

2. LITERACY DEMAND

(a) Reading grade level _____ _____
(b) Writing style, active voice _____ _____
(c) Vocabulary uses common words _____ _____
(d) Context is given first _____ _____
(e) Learning aids via "road signs" _____ _____

3. GRAPHICS

(a) Cover graphic shows purpose _____ _____
(b) Type of graphics _____ _____
(c) Relevance of illustrations _____ _____
(d) List, tables, etc. explained _____ _____
(e) Captions used for graphics _____ _____

4. LAYOUT AND TYPOGRAPHY

(a) Layout factors _____ _____
(b) Typography _____ _____
(c) Subheads ("chunking") used _____ _____

5. LEARNING STIMULATION, MOTIVATION

(a) Interaction used _____ _____
(b) Behaviors are modeled and _____ _____
    specific
(c) Motivation—self-efficacy _____ _____

6. CULTURAL APPROPRIATENESS

(a) Match in logic, language, _____ _____
    experience
(b) Cultural image and examples _____ _____

Total SAM score:_____

Total possible score:_____, Percent score:_____%

level (factor 2a) does not apply. To account for SAM factors that occasionally may not apply to a particular material, subtract 2 points for each N/A from the 44 total. Let's do that using the example from the paragraph above. If you arrived at a total score of 34 as noted above, but had one N/A factor, subtract 2 points from 44 to a revised maximum score of 42. Thus, the percent rating would become 34/42, for a rating of 81 percent.

Interpretation of SAM percentage ratings:

70–100 percent   superior material
40–69 percent   adequate material
0–39 percent   not suitable material

6. **Evaluate the impact of deficiencies; decide on revisions.** A deficiency, especially an "unsuitable" rating, in any of the 22 factors is significant. Many of these can be readily overcome by revising a draft material or by adding a supplemental instruction to a material already published. However, factors in two of the groups, the readability level and cultural appropriateness, must be considered as potential go–no/go signals for suitability regardless of the overall rating.

For example, except in the rare cases where an instruction contains a set of illustrations that replicate the entire message given in the text, a written instruction with a very high readability level will not be understood and is unsuitable. Similarly, a material that portrays an ethnic group in an inappropriate way is almost surely unsuitable because it is likely to be rejected by members of that ethnic group.

SAM evaluation criteria

1. Content

A. PURPOSE

Explanation: It is important that readers/clients readily understand the intended purpose of the instruction for them. If they don't clearly perceive the purpose, they may not pay attention or may miss the main point.

Superior	Purpose is explicitly stated in title, or cover illustration, or introduction.
Adequate	Purpose is not explicit. It is implied, or multiple purposes are stated.
Not suitable	No purpose is stated in the title, cover illustration, or introduction.

B. CONTENT TOPICS

Explanation: Since adult patients usually want to solve their immediate health problem rather than learn a series of medical facts (that may only *imply* a solution), the content of greatest interest and use to clients is likely to be behavior information to help solve their problem.

Superior	Thrust of the material is application of knowledge/skills aimed at desirable reader behavior rather than nonbehavior facts.
Adequate	At least 40 percent of content topics focus on desirable behaviors or actions.
Not suitable	Nearly all topics are focused on nonbehavior facts.

C. SCOPE

Explanation: Scope is limited to purpose or objective(s). Scope is also limited to what the patient can reasonably learn in the time allowed.

Superior	Scope is limited to essential information directly related to the purpose. Experience shows it can be learned in time allowed.
Adequate	Scope is expanded beyond the purpose; no more than 40 percent is nonessential information. Key points can be learned in time allowed.
Not suitable	Scope is far out of proportion to the purpose and time allowed.

D. SUMMARY AND REVIEW

Explanation: A review offers the readers/viewers a chance to see or hear the key points of the instruction in other words, examples, or visuals. Reviews are important; readers often miss the key points upon first exposure.

Superior	A summary is included and retells the key messages in different words and examples.
Adequate	Some key ideas are reviewed.
Not suitable	No summary or review is included.

2. Literacy demand

A. READING GRADE LEVEL (FRY FORMULA)

Explanation: Unless the instruction presents the topics completely without text (via visual, demonstrations, and/or audio), the text reading level may be a critical factor in patient comprehension. Reading formulas can provide a reasonably accurate measure of reading difficulty.

Superior	5th-grade level or lower (5 years of schooling level).
Adequate	6th-, 7th-, or 8th-grade level (6–8 years of schooling level).
Not suitable	9th-grade level and above (9 years or more of schooling level).

B. WRITING STYLE

Explanation: Conversational style and active voice lead to easy-to-understand text. Example: "Take your medicine every day." Passive voice is less effective. Example: "Patients should be advised to take their medicine every day." Embedded information, the long or multiple phrases included in a sentence, slows down the reading process and generally makes comprehension more difficult.

Superior	Both factors: (1) Mostly conversational style and active voice. (2) Simple sentences are used extensively; few sentences contain embedded information.
Adequate	(1) About 50 percent of the text uses conversational style and active voice. (2)Less than half the sentences have embedded information.
Not suitable	(1) Passive voice throughout. (2)Over half the sentences have extensive embedded information.

c. VOCABULARY

Explanation: Common, explicit words are used (for example, doctor vs. physician). The instruction uses few or no words that express general terms such as categories (for example, legumes vs. beans), concepts (for example, normal range vs. 15 to 70), and value judgments (for example, excessive pain vs. pain lasts more than 5 minutes). Imagery words are used because these are words people can "see" (for example, whole wheat bread vs. dietary fiber; a runny nose vs. excess mucus).

Superior	All three factors: (1) Common words are used nearly all of the time. (2) Technical, concept, category, value judgment (CCVJ) words are explained by examples. (3) Imagery words are used as appropriate for content.
Adequate	(1) Common words are frequently used. (2) Technical and CCVJ words are sometimes explained by examples. (3) Some jargon or math symbols are included.
Not suitable	Two or more factors: (1) Uncommon words are frequently used in lieu of common words. (2) No examples are given for technical and CCVJ words. (3) Extensive jargon.

d. IN SENTENCE CONSTRUCTION, THE CONTEXT IS GIVEN BEFORE NEW INFORMATION

Explanation: We learn new facts/behaviors more quickly when told the context first. Good example: "To find out what's wrong with you (the context first), the doctor will take a sample of your blood for lab tests" (new information).

Superior	Consistently provides context before presenting new information.
Adequate	Provides context before new information about 50 percent of the time.
Not suitable	Context is provided last or no context is provided.

e. LEARNING ENHANCEMENT BY ADVANCE ORGANIZERS (ROAD SIGNS)

Explanation: Headers or topic captions should be used to tell very briefly what's coming up next. These "road signs" make the text look less formidable, and also prepare the reader's thought process to expect the announced topic.

Superior	Nearly all topics are preceded by an advance organizer (a statement that tells what is coming next).
Adequate	About 50 percent of the topics are preceded by advance organizers.
Not suitable	Few or no advance organizers are used.

3. Graphics (illustrations, lists, tables, charts, graphs)

A. COVER GRAPHIC

Explanation: People *do* judge a booklet by its cover. The cover image often is the deciding factor in a patient's attitude toward, and interest in, the instruction.

Superior	The cover graphic is (1) friendly, (2) attracts attention, (3) clearly portrays the purpose of the material to the intended audience.
Adequate	The cover graphic has one or two of the superior criteria.
Not suitable	The cover graphic has none of the superior criteria.

B. TYPE OF ILLUSTRATIONS

Explanation: Simple line drawings can promote realism without including distracting details. (Photographs often include unwanted details.) Visuals are accepted and remembered better when they portray what is familiar and easily recognized. Viewers may not recognize the meaning of medical textbook drawings or abstract art/symbols.

Superior	Both factors: (1) Simple, adult-appropriate, line drawings/sketches are used. (2) Illustrations are likely to be familiar to the viewers.
Adequate	One of the superior factors is missing.
Not suitable	None of the superior factors are present.

C. RELEVANCE OF ILLUSTRATIONS

Explanation: Nonessential details such as room background, elaborate borders, unneeded color can distract the viewer. The viewer's eyes may be "captured" by these details. The illustrations should tell the key points visually.

Superior	Illustrations present key messages visually so the reader/viewer can grasp the key ideas from the illustrations alone. No distractions.
Adequate	(1) Illustrations include some distractions. (2) Insufficient use of illustrations.
Not suitable	One factor: (1) Confusing or technical illustrations (nonbehavior related). (2) No illustrations, or an overload of illustrations.

D. GRAPHICS: LISTS, TABLES, GRAPHS, CHARTS, GEOMETRIC FORMS

Explanation: Many readers do not understand the author's purpose for the lists, charts, and graphs. Explanations and directions are essential.

Superior	Step-by-step directions, with an example, are provided that will build comprehension and self-efficacy.
Adequate	"How-to" directions are too brief for reader to understand and use the graphic without additional counseling.
Not suitable	Graphics are presented without explanation.

E. CAPTIONS ARE USED TO "ANNOUNCE"/EXPLAIN GRAPHICS

Explanation: Captions can quickly tell the reader what the graphic is all about, where to focus within the graphic. A graphic without a caption is usually an inferior instruction and represents a missed learning opportunity.

Superior	Explanatory captions with all or nearly all illustrations and graphics.
Adequate	Brief captions used for some illustrations and graphics.
Not suitable	Captions are not used.

4. Layout and typography

A. LAYOUT

Explanation: Layout has a substantial influence on the suitability of materials.

Superior	At least five of the following eight factors are present:

1. Illustrations are on the same page adjacent to the related text.
2. Layout and sequence of information are consistent, making it easy for the patient to predict the flow of information.
3. Visual cuing devices (shading, boxes, arrows) are used to direct attention to specific points or key content.
4. Adequate white space is used to reduce appearance of clutter.
5. Use of color supports and is not distracting to the message. Viewers need not learn color codes to understand and use the message.
6. Line length is 30–50 characters and spaces.
7. There is high contrast between type and paper.
8. Paper has nongloss or low-gloss surface.

Adequate	At least three of the superior factors are present.
Not suitable	(1) Two (or less) of the superior factors are present. (2) Looks uninviting or discouragingly hard to read.

B. TYPOGRAPHY

Explanation: Type size and fonts can make text easy or difficult for readers at all skill levels. For example, type in ALL CAPS slows everybody's reading comprehension. Also, when too many (six or more) type fonts and sizes are used on a page, the appearance becomes confusing and the focus uncertain.

Superior   The following four factors are present:

1. Text type is in uppercase and lowercase serif (best) or sans-serif.
2. Type size is at least 12 point.
3. Typographic cues (bold, size, color) emphasize key points.
4. No ALL CAPS for long headers or running text.

Adequate   Two of the superior factors are present.
Not suitable One or none of the superior factors are present. Or, six or more type styles and sizes are used on a page.

C. SUBHEADINGS OR "CHUNKING"

Explanation: Few people can remembering more than seven independent items. For adults with low literacy skills the limit may be three- to five-item lists. Longer lists need to be partitioned into smaller "chunks."

Superior   (1) Lists are grouped under descriptive subheadings or "chunks."
               (2) No more than five items are presented without a subheading.
Adequate   No more than seven items are presented without a subheading.
Not suitable More than seven items are presented without a subheading.

5. Learning stimulation and motivation

A. INTERACTION INCLUDED IN TEXT AND/OR GRAPHIC

Explanation: When the patient responds to the instruction—that is, does something to reply to a problem or question—chemical changes take place in the brain that enhance retention in long-term memory. Readers/viewers should be asked to solve problems, to make choices, to demonstrate, etc.

Superior   Problems or questions presented for reader responses.
Adequate   Question-and-answer format used to discuss problems and solutions (passive interaction).
Not suitable No interactive learning stimulation provided.

B. DESIRED BEHAVIOR PATTERNS ARE MODELED, SHOWN IN SPECIFIC TERMS

Explanation: People often learn more readily by observation and by doing it themselves rather than by reading or being told. They also learn more readily when specific, familiar instances are used rather than the abstract or general.

Superior   Instruction models specific behaviors or skills. (For example, for nutrition instruction, emphasis is given to changes in eating patterns or shopping or food preparation/cooking tips; tips to read labels.)

Adequate	Information is a mix of technical and common language that the reader may not easily interpret in terms of daily living (for example: *Technical:* Starches—80 calories per serving; High Fiber—1–4 grams of fiber in a serving).
Not suitable	Information is presented in nonspecific or category terms such as the food groups.

C. MOTIVATION

Explanation: People are more motivated to learn when they believe the tasks/behaviors are doable by them.

Superior	Complex topics are subdivided into small parts so that readers may experience small successes in understanding or problem solving, leading to self-efficacy.
Adequate	Some topics are subdivided to improve the readers' self-efficacy.
Not suitable	No partitioning is provided to create opportunities for small successes.

6. Cultural appropriateness

A. CULTURAL MATCH: LOGIC, LANGUAGE, EXPERIENCE (LLE)

Explanation: A valid measure of cultural appropriateness of an instruction is how well its logic, language, and experience (inherent in the instruction) match the LLE of the intended audience. For example, a nutrition instruction is a poor cultural match if it tells readers to eat asparagus and romaine lettuce if these vegetables are rarely eaten by people in that culture and are not sold in the readers' neighborhood markets.

Superior	Central concepts/ideas of the material appear to be culturally similar to the LLE of the target culture.
Adequate	Significant match in LLE for 50 percent of the central concepts.
Not suitable	Clearly a cultural mismatch in LLE.

B. CULTURAL IMAGE AND EXAMPLES

Explanation: To be accepted, an instruction must present cultural images and examples in realistic and positive ways.

Superior	Images and examples present the culture in positive ways.
Adequate	Neutral presentation of cultural images or foods.
Not suitable	Negative image such as exaggerated or caricatured cultural characteristics, actions, or examples.

In summary, the SAM offers a systematic method to assess suitability of materials. In about 30 minutes you can obtain a numerical suitability score that you can use to decide whether or not a material is suitable for your patient population.

When making an evaluation using SAM, or using the checklist presented earlier in this chapter, you may have uncovered one or more specific deficiencies. If so, decide on how critical the deficiencies are to patient comprehension and acceptance of the key messages of your material. Guidance for making this decision may be found in Chapters 2 and 5. To overcome the deficiencies, you will find specific details related to each instructional media in the following chapters: Chapter 6 for written materials, Chapter 7 for visuals and graphics, and Chapter 8 for videotapes, audiotapes, and multimedia.

Summary

The health care "culture" relies heavily on written instructions. These may be assessed by using a checklist of attributes that define easy-to-read materials. Another assessment worth making is to test the material using a readability formula. If you assess the readability and suitability of your health care instructions, you are more likely to provide instructions your patients will understand.

Materials that have readability levels of 9th grade or higher need to be rewritten to make them understandable by most Americans. If the materials are not rewritten, supplemental instruction will be needed by most patients when the material is used.

The suitability of a written material depends on many factors. Although readability formulas measure only a few of these characteristics, the reading level is usually a "go–no/go" criterion to predict patient comprehension of the material.

Consider using the SAM instrument to obtain a numerical rating that covers the many other suitability factors not included in readability formulas. SAM addresses suitability in terms of content, literacy demand, graphics, layout, learning stimulation/motivation, and culture of the intended audience.

It is important to note that the assessment methods presented in this chapter use analytical methods exclusively. Another method of assessment—using patients to test the suitability of the material—is presented in Chapter 10, Learner Verification and Revision (LVR) of Materials.

Actions you can take during the next 90 days

- Use the checklist to screen three of your frequently used health care instructions.
- Test the readability of 10 of your written health care materials and record the grade level on the back of each piece. Share this with your colleagues.
- Compare the readability levels of the 10 materials with the reading levels of the adult population of the United States by referring to literacy data in Figure 1-1. Determine how many of the 10 instructions are "over the heads" of at least half the U.S. adult population in terms of reading skills.
- Use the SAM instrument to evaluate the suitability of one of your frequently used health care instructions.

- Use the information from the actions above to fashion a response to the new JCAHO requirement directives for patient understanding.
- Form a small committee at your health care organization to evaluate all new health care instructions.

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