THE DEVELOPMENT OF A CRITERION-REFERENCED HEALTH KNOWLEDGE INSTRUMENT FOR GRADES FOUR, FIVE, AND SIX

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Grant me the strength, time and opportunity always to correct what I have acquired, always extend its domain, for knowledge is immense and the spirit of man can extend indefinitely to enrich itself daily with new requirements. Today he can discover his errors of yesterday and tomorrow he may obtain light on what he thinks himself sure today.

--Maimonides

DEDICATION

I would like to dedicate this dissertation to the loving memory of my parents, Harold and Alzada Massey. Their legacy will always be my inspiration.

> And what is it to cease breathing, but to free the breath from its restless tides, that it may rise and expand and seek God unencumbered?
>
> Only when you drink from the river of silence shall you indeed sing.
>
> And when you have reached the mountain top, then you shall begin to climb.
>
> And when the earth shall claim your limbs, then shall you truly dance.
>
> --from The Prophet
>
> by Kahlil Gibran

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CHAPTER I

Introduction

Throughout the history of health education in the United States, the status of children's health has been taken into account. Rubinson and Alles (1984) pointed out that as early as 1842, Horace Mann advocated health instruction for schoolchildren; and in 1910, The First White House Conference on Child Health and Protection was held. However, it was not until 1918 when the American Child Health Association (ACHA) was established that health professionals began to pull away from the rigidity of preaching basic hygiene practices and began to concentrate on stressing the importance of teaching decision-making skills. The ACHA thus emphasized the significant interrelationship between health knowledge and decision making. Although there are people today who still view health education as merely personal hygiene instruction, a major goal of health education is to enable individuals to make sound health decisions in order to enhance the quality of every possible dimension of their lives.

As the decade of the 1990s continues to unfold, influencing children's health decisions is of paramount importance. No longer is there a battle to eradicate

health problems such as poliomyelitis, smallpox, measles, and diphtheria that were prevalent among schoolchildren in the past. Today, some key issues confronting the nation include a wide array of lifestyle and social problems such as alcohol and other drug use, tobacco use, teen pregnancies, AIDS and other sexually transmitted diseases, poor nutrition and eating disorders, lack of exercise, poverty, child abuse and neglect, suicide, dysfunctional families, and environmental pollution. These health challenges have potentially long-term and devastating consequences not only in the lives of children and youth, but for the well-being of the nation as a whole. Moreover, since school-age children are "socially vulnerable," the situation is compounded because they lack the resources and the mental and emotional capacity to deal with such serious problems (Swart, Igoe, & Gephart, 1982).

In 1979, Healthy People, the first report of the Surgeon General of the United States on health promotion and disease prevention, was published. The report identified broad national goals intended to reduce overall death rates and days of disability among Americans of all ages by 1990. Now that a new decade is in progress, new national health goals for the year 2000 have been developed in order to continue the effort to improve

the health of the American people. In developing the new health objectives for the year 2000, over 1,000 health professionals and laypersons from all over the country were involved in sharing their knowledge and expertise regarding health promotion and disease prevention (Stoto, Behrens, & Rosemont, 1990).

A belief consistently advocated by those testifying at national hearings regarding the development of the health objectives was that in order to meet many of the objectives, education should begin in the schools. For instance, the American School Health Association (ASHA) asserted that "the school, as a social structure, provides an educational setting in which the total health of the child during the impressionable years is a priority concern" (cited in Stoto et al., 1990, p. 82). School-based programs that were mentioned most frequently at the hearings included those aimed at improving nutrition, physical fitness, and mental health as well as those aimed at preventing AIDS, teenage pregnancy, smoking, and alcohol and other drug use (Stoto et al., 1990).

In Healthy Youth 2000, the American Medical Association (AMA) (1990) addressed those health objectives from Healthy People 2000 that specifically applied to America's young people. Various health objectives were addressed, including

those dealing with tobacco, alcohol and other drugs, and HIV. Additionally, a special emphasis was placed upon quality school health education as playing a major role in enhancing and maintaining the health of children and youth.

Both preadolescence and adolescence are critical periods for establishing healthful behaviors. Bender and Sorochan (1989) stressed that health-maintenance habits and behaviors developed during preadolescence become habits of life. Furthermore, the National Adolescent Student Health Survey (NASHS), conducted in 1987, revealed that adolescents do not always make positive health decisions and need to become more knowledgeable on a variety of health issues including tobacco, drug, and alcohol use; AIDS and other sexually transmitted diseases; nutrition; consumer education; suicide; violence; and injury prevention (NASHS, 1988).

Since approximately 95% of all children and youth in the United States are in elementary or secondary schools (Iverson & Kolbe, 1983), it is imperative that the schools help meet the health needs of young people. The American Association of School Administrators (AASA) proposed that health education begin as early as kindergarten in order to build positive attitudes toward good health

and assist students in making sound decisions that will affect their health not only today but also in the future (AASA, 1987). Likewise, the state of Oklahoma's 1988 Quadrennial State Health Plan mirrored the AASA report, stating that school health education reaches young people as they are formulating attitudes and behaviors, and consequently, has the potential for impacting their lives to a very positive degree (Oklahoma Health Planning Commission, 1988).

Although school health education is mandated in 35 states (Lovato, Allensworth, & Chan, 1989), it is estimated that fewer than 22% of our America's schools provide comprehensive health instruction programs (Cornacchia, Olsen, & Nickerson, 1988). Likewise, a survey commissioned by the Metropolitan Life Foundation (1986) revealed that approximately 8 million public school students across the country had little or no health education. As of 1991, the state of Oklahoma is among those that do not mandate school health education.

Lohrmann, Gold, and Jubb (1987) claimed that health instruction is the "glue" that binds together the components of school health education because health instruction is the major source of the one element shared by all components--health knowledge. As the state of Oklahoma

struggles to offer quality school health education programs, most of the successful efforts are primarily focused on health instruction. For example, since 1981, numerous Oklahoma schools have received funds from a limited, competitive health and nutrition education grant program from the Oklahoma State Department of Education (Oklahoma Health Planning Commission, 1988; T.D. Hollis, personal communication, September, 1990). Funding for these grants varies according to the size of the school district and the total funds appropriated by the state legislature. With regard to programming, schools are encouraged to use these grants to purchase health education programs and materials that research has shown to be effective (Oklahoma State Department of Education, Comprehensive Health Section, 1990-1991). Then, too, the Drug-Free Schools and Communities Act Amendments of 1989 (Public Law 101-226) requires that local school districts adopt and implement drug education and prevention programs that meet requirements of the law. In doing so, these school districts are legally required to submit the proper certification in order to remain eligible to receive all forms of federal financial assistance after October 1, 1990 (Oklahoma State Department of Education, 1990; U.S. Department of Education, 1990). As of 1991, AIDS

prevention education is the only health instruction program that is mandated in the state of Oklahoma (O.S. Law Sec. 200.2). According to the Oklahoma State Department of Education's Administrators' Handbook for Elementary, Middle, Junior High and High Schools, 1989-90, AIDS prevention education shall be taught a minimum of once at each of the following grade levels: 5-6, 7-9, and 10-12.

According to Dr. Lloyd Kolbe (cited in Lovato, et al., 1989), policies enacted by state legislative, executive, and judicial bodies have a powerful impact on the education and health for all American youth. In order for educators to offer quality health instruction that builds a solid health knowledge foundation in students, a meritorious health curriculum must be supported at all levels, implemented, and then evaluated. Similarly, if the need for a high-caliber school health program must be championed, then evaluation of current health knowledge among students can serve as an impetus. Although most people agree that health knowledge alone will not necessarily promote positive health behavior, correct information, that is, a sound knowledge base, is extremely important and serves as a foundation on which individuals can learn to develop values, attitudes, decision-making

skills, and behaviors conducive to overall health.

Purpose of the Study

The purpose of this study was to develop a quality health knowledge instrument at the elementary level that would enable schools to evaluate the effectiveness of their elementary health instruction programs and/or that would serve as a vehicle in order to champion the promotion of mandated school health programs.

Statement of the Problem

The problem of this study was to design and construct a health knowledge instrument that could be used in elementary grades four, five, and six and to establish its content validity and reliability. The instrument was developed to represent three health content areas, namely, nutrition; tobacco, alcohol and other drug use; and HIV/AIDS.

Extent of the Study

Delimitations. This study was delimited to:

1. A sample of 605 fourth, fifth, and sixth grade subjects enrolled in four elementary schools within the Enid, Oklahoma public school district.

2. A reading level as determined by the Forcast formula that is primarily intended for functional literacy and not school learning, but was the only available measure

that did not include any sentence-length variable (see p. 59).

3. A test-retest reliability measure that involved students in one class at each of the three grade levels.

Limitations. The results of this study may have been limited by the following:

1. A panel of five national experts in health education and test development were used to establish content validity.

2. The health knowledge of the subjects was not controlled.

3. No attempt was made to represent a specific elementary school-age population.

4. The IQ of the subjects was not controlled.

5. The instrument was designed to measure knowledge in only three specific health content areas: nutrition; tobacco, alcohol and other drug use; and HIV/AIDS.

6. The instrument was designed to measure health knowledge at three grade levels--fourth, fifth, and sixth.

Assumptions. The following assumptions were made:

1. Each student was sufficiently motivated to perform at his/her best on the test.

2. Each student answered honestly on the test.

3. Instructions for taking the test were accurately

given by the classroom teachers.

4. The classroom teachers allowed the students adequate time to take the test.

Definitions

AIDS. Acquired Immune Deficiency Syndrome. A fatal illness caused by a virus that damages the body's immune system (Oklahoma State Department of Education, 1988, p. 31).

Alcohol and Other Drug Use/Abuse. Alcohol and other drug (AOD) abuse refers to drug use that is socially disapproved and/or has resulted in problems for the individual with family, school, work, or legal authority. In survey research, "use" means that the AOD has been ingested. This common distinction between use and abuse has some utility in research, but it renders confusion when applied
to prevention because it implies that sometimes illicit and potentially dangerous behavior, i.e., AOD use, may be acceptable and that only abuse is a problem. Therefore, all use of illegal drugs and all use of legal drugs (specifically alcohol) by persons under the legal age is defined as abuse (Office for Substance Abuse Prevention [OSAP], 1990, p. 6).

Comprehensive School Health Instruction. The

development, delivery and evaluation of a planned curriculum, pre-school through 12, with goals, objectives, content sequence, and specific classroom lessons which includes, but is not limited to the following major content areas: Community Health, Consumer Health, Environmental Health, Family Life, Mental and Emotional Health, Injury Prevention and Safety, Nutrition, Personal Health, Prevention and Control of Disease, and Substance Use and Abuse ("Report of the 1990 Joint Committee," 1991, p. 182.

Content Validity. The instrument measures what it purports to measure because there was a rational basis to the selection of the actual content (Fox, 1969, p. 370).

Criterion-referenced Instrument. A test that yields a comparison of each student's level of mastery to that of the total body of knowledge that the test has been designed to cover. Typically, this level of mastery is indicated by the percentage of items answered correctly among all possible items (Isaac & Michael, 1981, p. 108).

FORCAST Formula. A readability formula that can be useful in assessing forms, job materials, tests, or other print that is not in normal sentence form and could not otherwise be assessed by a readability formula.

It uses only one variable, that is the number of one-syllable words in a 150-word passage. The FORCAST formula is: U.S. Grade = 20 - (NOSW/10) where NOSW = the number of one-syllable words in a passage of 150 words (Harrison, 1980, p. 80).

Health. Quality of life that is a function of five interrelated dimensions: physical health, intellectual health, emotional health, social health, and spiritual health (Greenberg, 1989, pp. 3-4).

Health Education. The process of teaching youngsters how to choose the kinds of health behaviors that can enhance the quality of every aspect of their lives, not just for today, but for all the tomorrows they will have (Pollock, 1987, p. 12).

HIV. Human Immunodeficiency Virus. This is the virus that causes AIDS (Oklahoma State Department of Education, 1988, p. 32).

Internal Consistency. The extent to which the items on the test are internally consistent with one another--that is, the extent to which the items are homogeneous (Popham, 1981, p. 142).

Multiple-choice Item. A test item that is composed of a short complete or incomplete question or statement (stem) followed by three to five potential answers

(responses). After reading the stem, the student selects the correct response (Baumgartner & Jackson, 1987, p. 388).

Nutrition. The science of food, the nutrients and other substances therein, their action, interaction, and balance in relation to health and disease, and the processes by which the organism ingests, digest, absorbs, transports, utilizes, and excretes food substances. In addition, nutrition must be concerned with social, economic, cultural, and psychological implications of food and eating (Arkwright, Collins, Sharp, and Yakel, 1974, p. 661).

Reliability. The consistency and dependability of a set of measurements (Green & Lewis, 1986, p. 85).

Self-efficacy. A person's appraisals of his or her capability to accomplish a particular task or behavior (Donatelle, Davis, & Hoover, 1988, p. 15).

Seropositive. Producing a positive reaction to seriological tests (Thomas, 1989, p. 1664).

Stability or Test-Retest Reliability. The stability of the test in terms of its consistency over time. This technique involves administering the same instrument to the same people on two separate occasions. The two sets of data are then correlated, and the correlation

estimates the reliability of the instrument (Fox, 1969, pp. 353-354).

Tobacco Use. The ingestion of the chemical stimulant nicotine through several forms, including cigarettes, cigars, pipes, snuff, and chewing tobacco; snuff and chewing tobacco are also referred to as smokeless tobacco (Donatelle et al., 1988, p. 221).

Validity. The extent to which the instrument actually measures what it purports to measure (Popham, 1981, p. 60).

Wellness. The integration of social, mental, emotional, spiritual, and physical health. The closer we get to our potential of the five components of health, the more "well" we are, the more wellness we have achieved (Greenberg, 1989, p. 7). The term "wellness" implies an all-inclusive umbrella composed of a variety of activities aimed at helping individuals recognize components of lifestyle that are detrimental to their health, and then implement positive programs to change behavior so as to improve health, quality of life, and achieve total well-being (Hoeger, 1991, p. 5).

CHAPTER II

Review of the Literature

Knowledge

Since the beginning of time, humankind has been obsessed with the acquisition of new knowledge. In the early 1990s, the knowledge explosion is expanding at an incredible rate as we step into previously unknown territories rich with innovative ideas and information. In turn, American education is struggling to manage the challenges of a complex, multicultural society that is constantly changing and highly mobile.

Bloom's taxonomy of educational objectives (1956) proposed six levels of behaviors within the cognitive domain: knowledge, comprehension, application, analysis, synthesis, and evaluation. Bloom justified the development of knowledge in several ways. For instance, with an increase in knowledge or information, one develops an acquaintance with "reality" in an educational sense, that is, what is currently known or accepted by the experts in a field. Then, too, knowledge is regarded as basic to all of the other purposes of education. As Bloom explained, "problem solving or thinking cannot be carried on in a vacuum, but must be based upon knowledge of some of the 'realities'" (p. 33). Bloom expanded this idea

when he maintained that intellectual virtues provide stability for the individual who must try to find or create some order in the world. A person's ability to think critically and "independently attack" his/her own problems is a critical sign of maturity and enables one to maintain "integrity as an independent personality." Additionally, there is the concept of "individuals in a democracy as independent decision makers who, in the last analysis, are responsible for the conduct of a democratic political system as well as a democratic way of life" (p. 41).

Health knowledge.

Massey and Vineyard (1961) contended that American schools are committed to the "development of the unique and total resources of each individual" (p. 186) and need to work with each student in accordance with individual needs, interests, and abilities. One critical need of students is health. The Oklahoma State Department of Education (1981) affirmed that "health is one of the cardinal principles of education--a healthy body and a sound mind is [sic] a child's greatest asset" (p. 9). Boyer (1983) further advocated health as a worthwhile educational objective when he stated:

Clearly, no knowledge is more crucial than

> knowledge about health. Without it, no other life goal can be successfully achieved. Therefore, we recommend that all students study health, learning about the human body, how it changes over the life cycle, what nourishes it and diminishes it, and how a healthy body contributes to emotional well-being. (p. 112)

Gold and Kelly (1988) provided additional insight when they proposed that "knowledge is power." They redefined knowledge in a health education context as being a dynamic process that results from "an increased understanding of the interrelationships among pieces of information, and also from the power that results from the capacity to effectively utilize that information" (p. 46).

School Health Education

Iverson and Kolbe (1983) argued that America's schools are a primary vehicle through which school-aged children and youth should be educated about issues that will have important ramifications regarding their health and overall wellness. In fact, the future health of America as a whole is greatly affected by the knowledge, attitudes, and skills one learns as a child in school (Cortese, 1985, p. 3). As the Oklahoma Association for Health, Physical Education, Recreation and Dance (OAHPERD)

Position Statement for School Health Education (1990) declared:

> The health problems and issues confronting today's youth, as well as society at large, require the individual to assume more self-responsibility for solutions. Being health educated is a prerequisite for implementation of prevention measures and intervention techniques with current health problems and for promoting a high quality of life for the individual, his/her family, and society.

It has been said numerous times that children and youth represent America's greatest resource. It is imperative that these young people be provided with the proper care and nurturance that will enable them to mature and develop into responsible, healthy adults who can contribute to the betterment of society. Schools play a vital role in the education of the nation's young people; because many students are from homes where proper nurturance and health education unfortunately do not occur, schools have a responsibility to protect and promote the health and well-being of these children and youth (Cornacchia, et al., 1988). And, as Lovato, Allensworth, and Chan (1989) pointed out, America's schools are a powerful educational influence for young people; estimates indicated

that approximately 48 million students between the ages of 5 and 18 are enrolled in nearly 15,000 school districts across the United States. Furthermore, the School Health Education Evaluation, a three-year study of health education in the United States that was conducted in collaboration with the Centers for Disease Control from 1982 through 1984, revealed that health education works; and it works best when it is implemented in conjunction with teacher training, integrated materials, and continuity across grades. Moreover, health education is more successful where there is a focus toward the building of foundations of basic health knowledge as opposed to addressing categorical health problems in the upper grades (Green et al., 1985).

The School Health Education Study (1967), which was monumental in providing direction in curriculum design for health education, identified three key concepts that are fundamental to health: growing and developing, interacting, and decision making. One of the primary goals of health education is to teach individuals to make sound health decisions that will positively impact their lives now and in the future. For example, Pollock (1987) stressed the importance of fostering the acquisition of problem-solving skills and knowledge of sources of

sound health information. In addition, Greenberg (1978) introduced the concept that the goal of health education is to free people from "enslaving factors" affecting them, such as low self-esteem, loneliness, high levels of alienation, anger, guilt, lack of assertiveness, and difficulty in communicating with others. It was his contention that people will make better health decisions if they are not encumbered by these enslaving factors. Greenberg (1989) further explained his position when he employed the following analogy:

> Someone once said, "Give me a fish and I eat today; teach me to fish and I eat for all time." Giving fish in health education--telling people how to behave--is not freeing people. Teaching them to fish for themselves--instructing them on decision-making and problem-solving skills--is. (p. 24)

Although health knowledge alone will not necessarily promote good health, intellectual abilities and skills like those mentioned above can enable the individual to transfer existing knowledge to new situations. This can be especially useful in everyday dilemmas that students face involving peer pressure and media influences to engage in risky behaviors.

Health Problems of School-age Children

There are numerous statistics available that bear witness to the alarming and widespread health problems confronting the nation's children and youth today. For example, the Children's Defense Fund (1990) cited the following sobering facts:

*Every seven minutes, an American child is arrested for a drug offense (76,986 a year).

*Every 30 minutes, an American child is arrested for drunken driving (17,674 a year).

*Every 30 minutes, an American teenager has a baby (472,623 in 1987).

*Every 53 minutes, an American child dies because of poverty (10,000 a year). (p. 3)

*In 1986, 2.2 million children were reported abused, neglected, or both.

*One-half million children drop out of school in the United States each year.

*Every night, approximately 100,000 children go to sleep homeless. The National Conference of Mayors reports that one in four homeless people in their cities is a child.

*The U.S. teen pregnancy rate is twice as high as that of other industrialized countries.

> Two in every five American girls get pregnant, and one in every five American girls has a baby before age 20. (p. 27)

America pays a tremendous price for these problems in terms of both economic costs and human loss (AASA, 1987). A staggering amount of human potential is being deprived and even vanishes due to these often insurmountable dilemmas. Additionally, the quality of life is greatly diminished for thousands of children. And, according to the U.S. Secretary of Education Lauro Cavazos, the future appears to be grimmer for American youngsters who are poor. Cavazos estimated that by the year 2000, "as many as one-third of our young people will be disadvantaged and at risk" (cited in Reed & Sautter, 1990, p. K3). This situation is especially critical because often these "at risk" children lack not only basic academic skills, but they also suffer from very low self-esteem and don't even believe they can achieve (Reed & Sautter, 1990).

Although there is no single primary cause of these health epidemics affecting school-age children, the Office for Substance Abuse Prevention (1990) reported that these problems reflect several factors, including "the loss of positive bonding to adults and to social institutions

such as religious settings and schools" (p.18). Obviously, the tragic situation will not change overnight. However, policies can be implemented that can effect dramatic transformations in the lives of our children. The Children's Defense Fund (1990) strongly recommended that we "acquire the discipline to invest preventively and systematically in all of our children now in order to reap a better trained work force and more stable families tomorrow" (p. 10).

Nutrition.

Glanz & Damberg (1987) asserted that a relationship has been established between dietary habits and at least five of the ten leading causes of death in this country; therefore, nutrition plays a key role in heart disease, some forms of cancer, stroke, arteriosclerosis, and diabetes. Alarmingly, risk factors for heart disease have been shown to begin in childhood. The U.S. Public Health Service (cited in Health Education, 1987) revealed that 40% of children ages five to eight showed one heart disease risk factor; of these 40%, 60% had one or more of the following risk factors: elevated blood pressure (hypertension), high cholesterol, and physical inactivity. In addition, approximately 20% of elementary school-age children were overweight or obese. This is especially

threatening because not only are children adversely affected psychologically by obesity, they are also at increased risk for developing chronic diseases such as heart disease and diabetes (Bender & Sorochan, 1989). Then, too, the National Adolescent Student Health Survey (1988) indicated that many adolescents ate foods high in fat and sugar. Furthermore, numerous adolescents skipped breakfast, and only 16% of those surveyed understood the relationship between dietary fiber and colon cancer. Regarding weight control, the majority of adolescent females reported having dieted during the previous year, and some adolescents used unsafe weight control methods, such as diet pills, self-starvation, and/or purging.

In another survey, Metropolitan Life Foundation (1988) revealed that sizable majorities of public school students from 3rd through 12th grades did not understand that foods too high in sugar and fat were bad for health. Only one in five indicated that he/she thought about whether food choices were healthful; and, again, almost one in five students reported not eating breakfast.

Therefore, there is a tremendous need to educate children about proper nutrition and related areas. For instance, lifestyle habits of not smoking, eating a diet low in salt and cholesterol, watching one's weight,

and exercising regularly have been touted as important preventive measures of heart disease. These habits are adopted in childhood and thus play a key role in an individual's future health (Burdine, Chen, Gottlieb, Peterson, & Vacalis, 1984). Additionally, the U.S. Department of Health and Human Services (DHHS) and the U.S. Department of Agriculture recently released the following guidelines for healthy Americans over the age of two that emphasize wise food choices in order to attain a nutritionally adequate diet and prevent disease:

*Eat a variety of foods.

*Maintain a healthy weight.

*Choose a diet low in fat, saturated fat, and cholesterol.

*Choose a diet with plenty of vegetables, fruits, and grains.

*Use sugar only in moderation.

*Use salt and sodium only in moderation.

*If you drink alcoholic beverages, do so in moderation. ("Dietary Guidelines," 1991).

Research has shown that school nutrition education programs are successful in promoting healthful eating behaviors, developing knowledgeable consumers, and creating positive attitudes (Weiss & Kien, 1987). Included

in the area of nutrition education are school meal programs. Many health professionals and laypersons strongly support the Nutrition Education and Training Program (NET), established by Congress in 1977. The NET was designed to teach children the value of a nutritionally sound diet through positive daily lunchroom experiences and corresponding classroom reinforcement (Stoto, et al., 1990).

Tobacco, Alcohol and Other Drug Use.

Cigarette smoking has been widely acknowledged to be the primary single preventable cause of death in our society; smoking is considered a major risk factor in cardiovascular disease, chronic pulmonary disease, and cancer (Moller, 1982). In addition, cancer is the second leading cause of death in our nation, and smoking accounts for almost one third of all cancer deaths (NASHS, 1981). According to the National Adolescent Student Health Survey, cigarette smoking was decreasing among adolescent males but increasing among adolescent females. Survey results indicated that one out of every five adolescents had smoked cigarettes during the previous month (NASHS, 1981). Then, too, the survey conducted for Metropolitan Life Foundation (1988) showed that approximately 3.2 million public school students were cigarette smokers. To compound

the problem, the American Academy of Pediatrics reported that more than 30% of high school seniors did not believe that smoking was a great health risk (cited in Stoto, et al., 1990). In addition, Tucker (1987) revealed that many children claimed that they first tried smoking as young as five or six years old. Her review of the literature also indicated that approximately 25-30% of the 10-year-olds had at least experimented with smoking cigarettes.

Cigarette smoking is not the only dangerous form of tobacco, however. There is strong evidence that use of smokeless tobacco can cause not only oral cancer and related oral tissue alterations, but it can also cause nicotine addiction. And, unfortunately, the use of smokeless tobacco has been increasing, especially among male adolescents and young male adults (DHHS, 1986). Even more alarming is that children as young as kindergarten age are trying and using smokeless tobacco or expecting to use the product in the future (Stoto, et al., 1990; Young & Williamson, 1985). Within the state of Oklahoma, Glover and Edwards found that 13% of third-grade males and approximately 22% of fifth-grade males were regular users of smokeless tobacco. These percentages increased to approximately 22% among seventh-grade males, 33% among

ninth-grade males, and 39% among eleventh-grade males (cited in Glover, Schroeder, Henningfield, Severson, & Christen, 1988).

It is quite evident, then, that tobacco education programs need to begin early, that is, before actual habits are ingrained. These programs must be initiated at the elementary grade level, preferably in kindergarten or first grade (Tucker, 1987); plus, they need to involve both families and schools (Stoto, et al., 1990).

Coinciding with the problem of tobacco use is the use of alcohol and other drugs among school-age children. Gallup and Elam's poll (1989) of the American public's attitudes toward the public schools revealed that the public has considered drug use to be the number one problem facing public schools since 1986. And, according to both the National Adolescent Student Health Survey (1988) and the survey conducted for Metropolitan Life Foundation (1988), use of alcohol and other drugs by children and youth in this country has been a serious dilemma. Frightening statistics indicate that an estimated 3.3 million children in the United States are problem drinkers (Bender & Sorochan, 1989; Schlaadt & Shannon, 1990; Towers, 1987). Schladdt and Shannon (1990) also reported that the average age at which people start to drink alcohol

is 12.5 years.

Schladdt and Shannon (1990) asserted that recreational illicit drug use begins during 4th, 5th, and 6th grades. Elementary age children may begin using tobacco, alcohol, marijuana, inhalants, or amphetamines. Also, there is a growing inclination toward polydrug use (the use of several drugs), with the younger students patterning the drug-taking behavior of their peers (Schladdt & Shannon, 1990). Likewise, the Office for Substance Abuse Prevention (1990) affirmed that from the ages of 10 to 16, attitudes and beliefs about alcohol and other drug use are being formed; thus, for many children, this is the time at which they begin using alcohol and other drugs. Moreover, the younger individuals are when they first use alcohol or another drug, the more likely they are to develop alcohol and other drug problems.

In addition, the National Institute on Drug Abuse (1990) revealed that over 5 million (24.7%) young people aged 12-17 have tried an illicit drug at least some time during their lives. Furthermore, 3.4 million (16.8%) have used an illicit drug within the past year; and approximately 1.9 million (9.2%) have used within the past month. The American Medical Association (1990) reported that the use of cigarettes, alcohol, and marijuana

is correlated with other health problems including adolescent suicide, homicide, motor vehicle accidents, sexually transmitted diseases, problem pregnancies, school dropout, and delinquency. Another concern is that "mind-altering and addictive substances have been shown to jeopardize physical, mental, and social development during the formative years and to endanger the successful transition from school to the workplace" (AMA, 1990, p. 10).

A 1987 Weekly Reader survey discovered that television and movies were the major influences in making alcohol and other drugs seem attractive; peers were the second greatest influence (cited in "What Works," 1989). Many other factors, such as low self-esteem, poor perceptions of self-efficacy, family influences, cultural norms, stress, boredom, and curiosity also play significant roles in swaying children and youth to use alcohol and other drugs. Due to this very grave threat to the health and well-being of school-age children, it is critical that preventive educational programs be initiated in the elementary grades.

HIV/AIDS.

Oklahoma ranks 6th in the nation in the number of teen pregnancies (Archer, 1990; Ramirez, 1990). And,

not surprisingly, Oklahoma ranks 50th in the nation in expenditures for prevention programs (Archer, 1990). These figures have far-reaching implications with regard to not only fertility and contraception, but to AIDS and other sexually transmitted diseases as well. The reported AIDS cases in the United States from 1981 through April 1991 reached a cumulative total of 174,893. Of those 174,893 reported cases, 20% (34,880) fell in the 20-29 age category, and 46% (80,336) were in the 30-39 age category (Oklahoma STD/HIV Update, 1991). In addition, according to the June 1991 Oklahoma STD/HIV Update, from July 1988 through May 1991, the number of Oklahoma HIV cases resulting from confidential testing equaled 1,260; an additional 185 HIV seropositives were reported anonymously. Furthermore, the cumulative total of reported AIDS cases in Oklahoma from January 1983 through May 1991 equaled 800; there were also 500 reported Oklahoma deaths from AIDS during this time period. Since the onset of AIDS is sometimes delayed several years, these figures have important ramifications with regard to high-risk sexual behavior among young people.

On the national level, studies showed that American youth entertain several misconceptions about AIDS (Jones, Ellis, Tappe, & Lindsay, 1991; Metropolitan Life Foundation,

1988; NASHS, 1988). Some of the misunderstandings revealed in these studies involve uncertainties about both transmission and prevention of HIV, plus there is confusion regarding the safety of the nation's blood supply, that is, the safety of blood transfusions. Besides the lack of knowledge in the areas mentioned above, Jones et al. (1991) found that there are confused attitudes; although the large majority of the students in their survey believed that HIV seropositive students should be allowed to attend public schools, the respondents were also wary of being in the same classroom with the HIV-infected students.

Compounding the situation is the extent to which young people engage in risky sexual behaviors. The AASA (1987) indicated that about 12 million adolescents over the age of twelve are sexually active; plus, 75% of all sexually transmitted diseases are found in the 15 to 24 age group. In addition, Jones et al. (1983) claimed that the average age of first sexual intercourse appears to be between the ages of 13 and 16. However, approximately 10% of the students in their survey reported first intercourse at age 12 or earlier. Also, according to the survey, 45% of the ninth grade males, 34% of the ninth grade females, 64% of the eleventh grade males, and 59% of the eleventh grade females had sexual intercourse

at least once; and, 34% of the total sample reported that they had multiple partners. Furthermore, 66% of the sexually active sample stated that they used condoms sporadically; approximately 25% indicated that they never used condoms. Since unprotected sexual intercourse and engaging in sexual relations with multiple partners both put people at increased risk of HIV infection, it is imperative that these issues be addressed in school-based HIV/AIDS prevention programs.

Alcohol and other drug use is closely connected with high-risk sexual behavior as well as the transmission of HIV (i.e., sharing drug needles). It is important that we do not overlook the interaction that exists among these problems. For instance, it is widely known that effects from alcohol and other drugs can lead to disinhibition of behavior; therefore, an individual who is under the influence of alcohol and/or other drugs may be likely to engage in high-risk sexual behavior, that is, unprotected sexual intercourse. Similarly, a person under the influence may be likely to engage in other drug use that involves sharing drug needles. Because these risky behaviors are conducive to the spread of HIV, there is even greater need for comprehensive health education programs that address a wide range of

interrelated health issues.

Similarly, in order for AIDS prevention education to be effective, it must be a part of a comprehensive health education program that focuses on the relationship among self-esteem, personal decision making, behavior, and health (Stoto, et al., 1990). Moreover, according to Linda Hawes Clever of the Pacific Presbyterian Medical Center in San Francisco, all AIDS educational programs, regardless of the audience, site, or specific message, should teach "mercy, compassion, and the insidious effects of stigma and prejudice" (cited in Stoto, et al., 1990, p. 154). Detailed information regarding various attitudes, beliefs, and knowledge about AIDS can be located elsewhere ("AIDS," 1991).

In summary, the exceedingly complex issue of AIDS was eloquently expressed by Mann (1991) when he espoused:

> Therefore, the HIV/AIDS pandemic cannot yet be considered an endemic, stable process; it is too new and its interaction with personal and societal life too complex to allow us the mental relief of predictability or complacency.
>
> This is the global epidemic of HIV and AIDS; dynamic, volatile--its major impact yet to come--yet still containing an enormous opportunity for

> prevention. I believe there is sufficient evidence from nearly a decade of experience in HIV prevention to state that we do know how to slow the spread of HIV. Three elements are required: information/education; health and social services; and a supportive social environment. (p. 6)

Evaluation

Baumgartner and Jackson (1987) defined evaluation as "the process of judging performance with reference to an established standard" (p. 155). According to IOX Associates (1983), evaluation is necessary to find out if programs are working and how to make them function better. Specifically, evaluation of health education programs can provide solid data for determining the areas that are having an impact as well as those that are not. Effective components of the health education program can then be retained, and ineffective components can be strengthened or dropped. Whereas summative evaluation refers to judgment of the effectiveness of a completed program, formative evaluation is an ongoing effort to bolster a program's quality as it is being developed, put into action, and maintained (IOX Associates, 1983; Pollock, 1987).

Some of the specific purposes for evaluation of

school health programs include the following:

*to obtain basic data regarding student health knowledge, attitudes, beliefs, and practices

*to identify curriculum strengths and weaknesses

*to provide a basis for necessary curriculum revisions

*to measure changes in student knowledge, problem-solving skills, and behaviors effected by the program (Pollock, 1987)

School Health Instrumentation.

In spite of the fact that educational tests have primarily been used for individual assessment, other prominent applications of educational tests include those for program evaluation and those functioning as catalysts for instructional improvement (Popham, 1981). Health education tests have been developed to evaluate student health knowledge, attitudes, and behaviors; however, there appears to be a paucity of current, high-quality health knowledge instruments that are designed specifically for the elementary grade level. Solleder (1986) included evaluation instruments for elementary grades; however, many of these tests were either outdated, out of print, or covered one particular health content area (e.g., dental health). Additionally, some of the instruments

were designed to measure attitudes and behavior rather than knowledge, while others were indicated for use with preschool or primary grades only. An exception was the Michigan Educational Assessment Program that included health education tests at the fourth, seventh, and tenth grade levels (Michigan State Board of Education, 1985). These tests were comprehensive in nature, but still did not contain questions on the subject of HIV/AIDS.

Similarly, Sweetland and Keyser's reference book (1986) included health science tests, but the instruments were designed for primarily the secondary level. None of the tests were described for use with fourth and fifth grades, and only one included the sixth grade level, that is, it was designed for use with grades 6-8 or what is commonly referred to as the middle school level.

On the other hand, when the School Health Education Evaluation was conducted in collaboration with the Centers for Disease Control from 1982 through 1984, lengthy research was devoted to developing a valid and reliable instrument that could be utilized in the study with grades four through seven. The end result was an objective-referenced test with six forms. Each of the six forms included 10 introductory items (demographic and key health practice information), 30 multiple-choice knowledge items,

20 attitude items, and 20 self-report behavior items. The knowledge portion of the instrument covered 10 content areas: growth and development, mental health, personal health, nutrition, family life, disease prevention, substance use/abuse, safety/first aid, consumer health, and community health; an eleventh content area, human sexuality, was constructed for the seventh grade only. There were no questions regarding HIV/AIDS. Detailed information regarding both the School Health Education Evaluation and the study's instrumentation has been published ("Results," 1985).

In addition, the Center for Health Promotion and Education of the Centers for Disease Control contracted with IOX Associates (1983) to develop seven handbooks on measurement and evaluation in the following areas of health education: smoking; immunization; stress management; nutrition; alcohol and substance abuse; diabetes; and physical fitness programs. Each of the handbooks contained information on basic concepts pertaining to evaluation of health education programs in general. Plus, there were assessment tools for knowledge, attitudes, skills, and behavior; test specifications for each of the instruments; and a collection of existing measures that had been used for evaluation of related health

education programs.

Regarding the instruments, one form was provided for adults and older adolescents. And, where appropriate, a simpler version of the same test was included for elementary grade children. Specifically, the knowledge tests were in true-false format. The instruments were presumed to be of high face validity, and major validation studies were planned. Meanwhile, the handbooks were available for duplication and distribution.

In conjunction with searching the literature for health knowledge instrumentation at the elementary level, the researcher wrote the health consultant of each State Department of Education, including the one representing the District of Columbia (see Appendix A). Each health consultant was asked to respond on a self-addressed, stamped postcard (by checking "Yes" or "No") whether he/she had or knew about specific paper and pencil health knowledge instruments for the elementary level; if the individual did have the information, he/she was asked to add a convenient time for the researcher to call for further information. The responses shown in Table 1 clearly indicated a definite need for quality health knowledge instruments at the elementary level.

Table 1

Summary of Responses from State Departments of Education with Regard to Ownership or Knowledge About Specific Health Knowledge Instruments for the Elementary Level

Yes	No	No Response
Alabama	Colorado	Delaware
Alaska	Connecticut	District
Arizona	Idaho	of Columbia
Arkansas	Iowa	Florida
California	Kansas	Hawaii
Georgia	Kentucky	Massachusetts
Illinois	Louisiana	Minnesota
Indiana	Maine	Mississippi
Maryland	Missouri	Nevada
Michigan	Montana	New Hampshire
Oklahoma	Nebraska	New Mexico
Pennsylvania	New Jersey	New York
Wisconsin	North Dakota	North Carolina
	Ohio	Oregon
	South Carolina	Rhode Island
	South Dakota	Utah

table continues

Yes	No	No Response
	Tennessee	Vermont
	Texas	Washington
	Virginia	Wyoming
	West Virginia	

Additionally, the researcher made numerous phone calls and wrote letters to other viable health education sources, including health education experts employed at universities, national health foundations and organizations, and the Centers for Disease Control. The results verified the scarcity of quality health knowledge instruments at the elementary level. These findings were particularly evident with regard to tests that measure knowledge at the fourth through sixth grade levels in the content areas of nutrition, alcohol and other drug use, and HIV/AIDS; therefore, there clearly was an explicit need for instrument development.

Criterion-referenced Testing.

In comparison to norm-referenced measurement, which attempts to ascertain an examinee's status with respect to other examinees, criterion-referenced mueasurement is used to ascertain an examinee's status with respect to a clearly defined set of behaviors (IOX Associates, 1983; Pollock, 1987; Popham, 1981). Likewise, Ebel (1979) explained that a criterion-referenced test contains a cluster of items, each of which indicates whether a specific instructional objective has or has not been achieved. According to IOX Associates (1983), regardless of the criterion-referenced test's particular form, the descriptive

information associated with it should unambiguously discern what is being measured. Therefore, a criterion-referenced instrument can be a very effective form of evaluating health knowledge in school-age children as well as a useful guide for program designers and evaluators as they strive to improve the quality of health instruction programs.

Test Construction

Green and Lewis (1986) maintained that seven stages were necessary in developing and testing instruments; their recommendations were based upon Lindeman's framework (cited in Green & Lewis, 1986) and were as follows:

Stage 1: Selecting a conceptual framework

Stage 2: Determining the instrument's use--this stage includes determining the type of evaluation (e.g., summative or formative) and determining who will administer and interpret the instrument

Stage 3: Specifying client population

Stage 4: Identifying items or indicators--selecting items from existing measures or generating new test items

Stage 5: Quantifying items--trying to achieve a discriminating level of measurement

Stages 6/7: Testing reliability and validity

In addition, the number of test items and the readability of the instrument are other important considerations in test construction; these issues are discussed in Chapter III ("Procedures").

Multiple-choice tests

Ebel (1979) claimed that the multiple-choice test was the most highly regarded and widely used form of objective test. As with most types of tests, the multiple-choice test possesses both advantages and disadvantages, although the advantages seem to outweigh the disadvantages. Some of the more common advantages of the multiple-choice test item include the following:

*Flexibility/Versatility--a variety of cognitive and affective outcomes can be assessed.

*Greater reliability--since it is objective, scoring is far more simple and consistent. Also, the numerous alternatives make it difficult for examinees to guess the correct answer.

*Discrimination--The respondent is required to make subtle decisions regarding the alternative answers.

*Diagnostic tool--incorrect responses can yield pertinent information regarding instructional methods.

On the other hand, there are also some disadvantages

associated with the multiple-choice test item. Some of these drawbacks include the following:

*Students can sometimes recognize a correct answer that otherwise they could not construct.

*When items at the lower end of Bloom's taxonomy are used, strictly rote memorization of facts may occur without regard to their implications.

*Examinees can not synthesize thoughts and write creatively; therefore, writing skills can not be measured.

*Students can not demonstrate the entire range of their knowledge; they can only respond to particular items that the teacher has constructed. However, this is a criticism that can be directed toward all objective test items.

*The novice test writer may have difficulty in thinking of enough reasonable distractors or wrong answers (Baumgartner & Jackson, 1987; Ebel, 1979; Pollock, 1987; and Popham, 1981).

Although the disadvantages cited above are worth considering, Ebel (1979) defended the multiple-choice test item. It was his opinion that critics of this type of test item tend to exaggerate the problems; plus, they seldom supply evidence to support their charges or offer

better testing alternatives. In comparison to essay tests, he attested that the significant aspects of educational achievement that objective tests measure are primarily the same that essay tests measure.

In the construction of multiple-choice test items, experts have offered numerous guidelines, including the following:

1. Keep both stems and responses (alternatives) as brief and explicit as possible.
2. The stem needs to present a self-contained question or problem.
3. Make all responses approximately the same length.
4. Use plausible answers for all responses.
5. Try to avoid negatively stated stems unless it is important for students to know a particular exception or to be able to detect errors in statements.
6. If a negative is used in the stem, underline or capitalize it in order to bring it to the student's attention.
7. In the stem, include any introductory words that are common to all of the responses.
8. Each alternative should be grammatically consistent with the item's stem.
9. Avoid the use of "none of the above" and "all

of the above" as alternatives.

10. Try to use four or five seemingly acceptable responses for each item to keep the guess factor acceptably low.

11. Do not allow the content of one item to divulge the answer to another item.

12. Do not write an item so that its answer depends upon the answer to another item; if a student answers the first one incorrectly, the second one will most likely be answered incorrectly as well.

13. Attempt to use each letter as the correct answer approximately the same number of times throughout the test.

Another worthwhile point to remember is that it is better to write an item using the best-answer approach rather than the correct-answer approach; it is quite difficult to write a correct-answer alternative so precise that all experts will agree with its correctness (Baumgartner & Jackson, 1987; Ebel, 1979; Pollock, 1987; and Popham, 1981).

Evaluation and Analysis of Tests

Authorities in evaluation and test construction agreed that the ideal instrument is valid, reliable, and relevant. A valid instrument measures what it purports

to measure, that is, it correctly measures the concepts under study (Green & Lewis, 1986; Popham, 1981). Baumgartner and Jackson (1987) added that a valid test must be both relevant and reliable--relevant to the material being tested and reliable as a measurement of that material. If a particular test is based upon instructional objectives, it is assumed that the instrument possesses content validity. Content validity is determined by the extent to which the test accurately describes the behavioral domain being measured (Popham, 1981). Isaac and Michael (1987) further explained that the knowledge, aptitudes, and skills that are necessary for successful test performance must be exactly what is evaluated in terms of test scores. Therefore, evaluating a test's content validity for a particular purpose is the same as subjectively recognizing the adequacy of the definition. Furthermore, Fox (1969) contended that true content validity affirms that the instrument measures what it purports to measure because there was a rational basis to the selection of content. In evaluating the content validity of a particular instrument, Popham (1981) suggested that experts in the subject matter review the test items to judge whether they are congruent with the test's descriptive information.

In spite of the fact that validity is considered to be the most important quality of a sound instrument (Fox, 1969), reliability is essential to validity and thus of similar significance. Reliability refers to the consistency and stability of a test (Isaac & Michael, 1987). The stability of the test or test-retest reliability refers to its consistency over time. According to Fox (1969), the same instrument is administered to the same people on two different occasions. The two sets of data are then correlated, and the correlation estimates the reliability of the instrument. Correlations of +1.00 would indicate perfect reliability, correlations at or close to 0.00 would indicate no reliability, and correlations at intermediate points between 0.00 and +1.00 would indicate intermediate levels of reliability. Obviously, in practice, perfect correlations are seldom achieved. Therefore, in order to evaluate intermediate correlations, a squaring technique, that is, squaring and converting to a percent, can be utilized. For example, an instrument with a reliability of 0.80, which results in 64% by the squaring technique, reveals, on one administration, 64% of what an individual needs to know to predict the data he/she would obtain on the second administration of the same instrument to the same people.

Additionally, Popham (1981) maintained that in comparison with longer tests, criterion-referenced tests will usually yield lower reliability coefficients (well below the 0.80 to 0.90 levels) because criterion-referenced tests sometimes have only 10 to 20 items per measured behavioral domain.

One of the main concerns with the test-retest method seems to revolve around the time interval. It is important to try to time the second administration of the instrument so that the examinees do not remember their responses on the first test, while, at the same time, ensuring that the time interval has not been lengthy enough for change to take place. This is a tricky matter, and there is no single solution. Fox (1969) claimed that the proper length of time between the two test administrations depends upon the research data being collected or analyzed.

The internal-consistency reliability reflects the extent to which the test items are internally consistent with one another, that is, the extent to which they are homogeneous. Internal consistency also has a direct bearing on the content validity of the test since a criterion-referenced test contains homogeneous items that are congruent with a clear description of a behavioral domain (Popham, 1981).

Another crucial quality of an ideal instrument is relevance. Green and Lewis (1986) explained that a relevant instrument is applicable to all of the examinees; this implies that every examinee has the potential to obtain any score, including the highest or the lowest score, when the test is administered.

Nevertheless, the perfect instrument, that is, one that is totally free from error, does not exist (Green & Lewis, 1986). Although measurement does have its limitations, as long as the evaluator is cognizant of a test's strengths and weaknesses, the instrument can be utilized in order to gain very valuable insights into a program's effectiveness.

Summary

Health knowledge is an important asset for school-age children to possess because it can lead to the acquisition of skills that promote positive health attitudes and behaviors. This is especially crucial due to the multitude of health problems confronting children and youth today.

Quality school health education programs can teach young people how to make sound health decisions that affect their lives not only today but in the future as well. The foundation of this process is health knowledge;

intellectual skills and abilities can enable an individual to transfer this health knowledge to daily situations that may involve peer pressure and other strong influences to engage in risky behaviors.

The process of evaluating school health programs can yield important information regarding student health knowledge, attitudes, beliefs, and practices. In addition, evaluation can identify curriculum strengths and weaknesses and thus provide a basis for necessary curriculum revisions. Health education tests can help assess student health knowledge, attitudes, and behaviors. However, in reviewing the literature, in writing the health consultant of each state department of education, and in contacting numerous other experts in health education, the author has determined that there is a definite need for current, high-quality health knowledge instruments that are designed specifically for grades four, five, and six.

Test construction involves several important steps, including the decision of whether to use an existing measure or to develop a new test. The most widely used form of objective test is the multiple-choice test. Although this type of test possesses both advantages and disadvantages, its positive features seem to outweigh the negative elements. There are numerous guidelines

to consider when constructing a quality multiple-choice test; and, authorities in evaluation and test construction concur that the ideal instrument is valid, reliable, and relevant. A valid instrument measures what it purports to measure, and a reliable test possesses both consistency and stability. Additionally, a relevant instrument is applicable to all of the examinees.

The perfect instrument, that is, one that is entirely free from error, does not exist. However, evaluation with a valid, reliable, and relevant instrument can be quite useful as long as the evaluator remains cognizant of the test's strengths and weaknesses. As a result, valuable insights into an educational program's effectiveness can be gained.

CHAPTER III

Procedures

Introduction

To accomplish the objective of measuring health knowledge in fourth, fifth, and sixth grade students in the areas of nutrition, tobacco, alcohol and other drug use, and HIV/AIDS, a criterion-referenced instrument was designed, constructed, and evaluated in terms of its content validity, internal consistency, and stability.

The procedures in this chapter are divided into preliminary and operational procedures. The preliminary procedures include test design and construction, establishment of content validity, obtaining consent, selection of the sample, and securing tests and answer sheets. Operational procedures include the specific steps taken to administer the instrument, collect data, and statistically analyze the data.

Preliminary Procedures

Test Design and Construction.

Before that actual construction of the test occurred, some general concepts were developed for each of the three content areas--nutrition; tobacco, alcohol and other drug use; and HIV/AIDS. The researcher utilized a variety of viable sources to arrive at the particular

concepts, including an assortment of health education assessment programs and elementary health education textbooks (see Appendix B). Once the concepts were developed, they were sent to three university experts in school health education for their review and comments. The experts who evaluated the concepts were Dr. Danny Ballard of Texas A & M University, Dr. Betty Edgley of Oklahoma State University, and Dr. Michael Hamrick of Memphis State University (see Appendix C). After the researcher received the edited concepts from the reviewers, she amended them accordingly (see Appendix D).

Using the concepts and other instructional sources as guides, the author began the process of test construction. Numerous references were consulted, including the following:

*American Health Foundation--KNOW YOUR BODY Health Survey (Grades 4-6)

*American Lung Association--Elementary School Health Test (Grade 5)

*Arizona Department of Education--AIDS--A K-12 Education Program (April 1988) and AIDS--HIV Prevention Education: A Guide for School Districts and Community Health Professionals (July 1989)

*Centers for Disease Control and Office of Assistant

Secretary of Health--Evaluation of School Health Instruction Programs: An Inventory of Health Knowledge, Attitudes, and Practices for Students in Grades 4-6, Forms 1-6 (July 1984)

*HEALTH SKILLS FOR LIFE--Comprehensive K-12 Health Curriculum (Eugene, OR: Dr. Jim Terhune)

*Jefferson Parish Heart Study--"Heart Smart" Knowledge Tests (Grades 4, 5, & 6)

*Michigan State Board of Education--Michigan Educational Assessment Program: Health Education Test, Form B (Grades 4 & 7)

*National Center for Health Education--GROWING HEALTHY--Comprehensive K-7 Health Curriculum

*National Dairy Council--Nutrition Achievement Test 2 (Grade 4) and Test 3 (Grades 5 & 6)

*Oklahoma State Department of Education--<u>AIDS Prevention Education: Curriculum Guide for Teachers</u> (1988)

The test items were devised to go beyond mere recall of specific knowledge and evaluate, whenever possible, decision-making skills and discerning abilities. The multiple-choice format was used; and, as each item was constructed, both the stem and responses (alternatives) were evaluated against the criteria previously established

and cited in Chapter II. Many of the items were rewritten several times before the author felt satisfied with the results.

Popham (1981) suggested a minimum of 10 items per learning objective as a guideline for developing a certain number of test items; therefore, in order to exceed the minimum criteria, 20 items were developed for each of the three major content areas, totaling 60 questions on the entire instrument.

Establishment of Content Validity.

In order to verify the content validity of the instrument, the test items along with their corresponding general concepts were submitted to five national experts who were selected due to their recognized expertise in health education and test construction/instrumentation. Each individual was contacted by letter and asked to participate in the project (see Appendix E). The following health educators were asked to judge the test items for content validity: Dr. David Anspaugh of Memphis State University, Dr. Wanda Jubb of the Centers for Disease Control, Dr. Larry Olsen of The Pennsylvania State University, Dr. Marion Pollock, Professor Emeritus of California State University at Long Beach, and Dr. Jim Terhune of HEALTH SKILLS FOR LIFE, INC. (Eugene, OR).

Later, after each person had accepted, he/she was mailed a cover letter (see Appendix F), the instrument, the general concepts, and a self-addressed stamped envelope in which to return the reviewed instrument. A rating scale was typed beside each test item for the reviewer's convenience. Each expert rated each question on a 1-5 scale (with 5 as the highest score) according to its suitability and its concurrence with the cited concepts. In addition, the author triple spaced each test item in order to provide room for any editorial questions, comments, and/or suggestions. Originally, the researcher had proposed to revise those test items that did not average at least a 3.0 rating. However, after the reviewed instruments were returned and the author read the numerous contributory comments and suggestions that the experts had supplied, she decided to make the necessary changes to the instrument in accordance with not only the item ratings but the editorial comments as well (see Appendix G).

After the essential revisions were made, the readability of the instrument was also evaluated. However, multiple-choice tests are difficult to analyze using a conventional readability formula because they do not allow one to estimate sentence length in the normal manner.

As a result, the FORCAST formula can be used under these circumstances since it is not based upon a sentence-length variable. It is important to note, however, that the FORCAST formula is intended primarily for assessing functional literacy (e.g., application forms and other job-related materials) instead of school-based learning. Thus, it tends to give rather high results on school materials, especially at the lower levels. Furthermore, since the formula is not based upon a sentence-length variable like other conventional readability formulas, it loses some of its predictive validity. Nevertheless, it can be useful in assessing print that is not in normal sentence form and that could not otherwise be assessed by a readability formula (Harrison, 1980).

The FORCAST formula uses only one variable, which is the number of one-syllable words in a 150-word passage (Harrison, 1980). When this formula was applied to three separate passages of the instrument under study, it yielded an average reading level of 10.1 or the equivalent of the tenth grade. The author understood that this was rather high, due to the weaknesses of the FORCAST formula cited above and also partly due to the difficulty of the instrument itself.

Obtaining Consent.

The Enid public school system was asked to participate in the study due to its size (approximately 6,775 students), its location, and its reputation for assisting with other university projects and research endeavors. The author contacted Mr. Ray Woodson, Assistant Superintendent for Elementary Education in the Enid Public Schools, by phone to ask permission to conduct the study in some of the Enid elementary schools. At that time, the author was verbally given permission, but asked to forward a copy of the dissertation proposal for the local school board to review and approve. The researcher complied with the request (see Appendix H) and asked that a letter of approval be mailed to her so that she could submit it to her doctoral committee as well as to the Institutional Review Board at Oklahoma State University. Approval for the study was granted by the Enid Public Schools shortly thereafter; the researcher received two letters of approval--one from Mr. Woodson and the other from Roxanna Hollrah, RN, SNP, Director of Health Services (see Appendix I). Later, formal permission to proceed with the study was granted by the Oklahoma State University Institutional Review Board for Human Subjects Research (see Appendix J).

Selection of the Sample.

Because the testing would obviously upset normal school schedules, the particular elementary schools and classrooms that would participate in the study were chosen based upon convenience and the willing cooperation of the principals and teachers. From a pool of 12 elementary schools, four schools were elected by Mr. Woodson and Ms. Hollrah: Adams, Coolidge, Glenwood, and Harrison. The students who comprised the sample taking the test included fourth, fifth, and sixth graders from those specific schools. The breakdown for each grade level was as follows: 11 fourth grade classes; 1 split fourth/fifth grade class; 7 fifth grade classes; 1 split fifth/sixth grade class; and 9 sixth grade classes.

Securing Tests and Answer Sheets.

Tests and answer sheets were secured in advance by the researcher. A Stillwater enterprise made copies of the instrument. Although the researcher planned to have approximately 625 of the tests administered, she had only 325 copies made because of the cost involved. It seemed reasonable to share the test booklets among the participating schools since separate answer sheets were utilized.

Additionally, the researcher purchased 650 computer

scan answer sheets from the Oklahoma State University Testing and Evaluation Service (see Appendix K).

Operational Procedures

Test Administration.

After setting up a time to meet with Mr. Woodson and Ms. Hollrah at the Enid Public Schools' Administration Building in late April, the researcher took the test booklets and answer sheets to the meeting. (Prior to this time, Mr. Woodson and Ms. Hoorah had each been sent copies of the instrument to preview.) The researcher and Ms. Hollrah discussed the administration procedures since Ms. Hollrah was the individual designated to be in charge of the field work. An important factor mentioned at the meeting was that the researcher could not participate in the actual test administration; the Institutional Review Board had made that stipulation as contingent upon their approval of the project. Otherwise, the researcher would have to secure a parental consent form for each student involved in the testing.

The principal of each elementary school that was participating in the project was contacted personally by Ms. Hollrah; at that time, each principal was given a memo for the school's participating classroom teachers that briefly explained the purpose of the study and outlined

some specific directions (see Appendix L). It was then each principal's responsibility to contact each classroom teacher who was administering the test.

Due to the fact that the test booklets were shared among 29 different classrooms within four different schools, the instrument was administered on six separate days in May. The test was given in the individual classrooms by the regular classroom teachers (with the exception of one substitute teacher) whenever it was the most convenient time for working it into the daily schedule. The testing times ranged from 8:40 a.m. to 3:00 p.m., and the time students spent taking the test ranged from 30 minutes to 90 minutes. In at least one of the fourth grade classrooms, the teacher read the questions aloud to the students. In the rest of the fourth, fifth, and sixth grade classrooms, the students read the questions themselves. The teachers were allowed to pronounce unfamiliar words for the students; however, they could not define the words or give any other form of assistance.

In addition, in order to establish the stability of the instrument, a test-retest measure was conducted with three separate classes, one at each grade level. The second test was administered approximately one week after the first administration. The entire testing process,

including the second test administrations with the three specific classes, lasted from May 8th to May 23rd.

Data Collection.

The researcher made two different trips to Enid to pick up the completed answer sheets and test booklets from Ms. Hollrah's office. In order to ensure each student's confidentiality, no names were on the answer sheets; identification numbers were used only with those particular students involved with the retesting. In addition, each grade level was coded on the corresponding answer sheets. Before the answer sheets could be scanned by the computer, however, the researcher had to check each answer sheet to ensure each one was properly coded and marked and that erasures were clean. One set of 25 answer sheets were not coded for grade level; and because the class was split (fifth and sixth), the researcher had no way to identify which answer sheets belonged to the fifth grade and which of them belonged to the sixth grade. Therefore, these 25 answer sheets could not be used for data analysis. After all of the 605 usable answer sheets were in clear form, they were taken to the Oklahoma State University Testing and Evaluation Service to be scanned by the computer.

Statistical Analysis

An analysis was conducted on both the total test and on each individual test question. Selected portions of the analytical data were derived from the Oklahoma State University Testing and Evaluation Service.

To analyze the total test, the overall difficulty of the test was determined by calculating the mean performance of the grade level, dividing the mean by the total number of questions, and then multiplying by 100; a higher mean denoted an easier test. In addition to the overall difficulty of the test, the variability in test scores was determined by calculating the standard deviation. The larger the standard deviation, the more the test discriminated among the respondents.

The reliability of the test was also measured. First, internal consistency measurements were calculated; then, in order to determine the stability of the test, test-retest measurements were used.

Next, item analysis was conducted. Item difficulty was calculated in order to determine the percentage of students who chose the correct answer. This percentage, or item difficulty, ranged from 0 to 100%. When the test item was easy, the percentage tended to be large; and when the test item was difficult, the percentage

tended to be small. For example, if the difficulty value for the correct response on an item was 80.0, this meant that 80% of the students answered the question correctly. For the purpose of this study, the following indexes were used for each item's difficulty: 75% = easy; 50% = average; and 25% = difficult.

In addition to item difficulty, item discrimination was also employed as part of the analysis. Item discrimination indicated how well a test item discriminated between those who performed well on the test overall and those who did poorly overall. If, as was desired, an item was answered correctly by more of the better students than the poorer students, it discriminated positively; if more of the poorer students answered the item correctly than did the better students, the item was a poor one and discriminated negatively. For the purpose of this study, a test item was reviewed for revision if the discrimination index was negative or if it was between 0.00 and 0.20 (Ebel, 1979).

Likewise, response quality was considered within the item analysis. Each response needed to be functioning in that at least some of the students should have selected each response of a multiple-choice item. If a test item contained a response that was not chosen by any students,

then that item was revised.

Finally, after monitoring response quality and calculating the difficulty of and discrimination index for each item, the overall quality of the test and of each item was determined; and the test was revised as necessary (Baumgartner & Jackson, 1987).

CHAPTER IV

Results and Discussion

Introduction

The purpose of this study was to develop a quality health knowledge instrument at the elementary level that would enable schools to evaluate the effectiveness of their elementary health instruction programs and/or that would serve as a vehicle in order to champion the promotion of mandated school health programs.

The resulting criterion-referenced instrument for grades four, five, and six covered three health content areas--nutrition; tobacco, alcohol and other drug use; and HIV/AIDS. There were a total of 60 multiple-choice items on the test, 20 for each of the three content areas. The instrument was administered to 630 fourth, fifth, and sixth graders within the Enid Public School District; 605 usable answer sheets were subsequently submitted for data analysis. An analysis was conducted on both the total test and on each individual test question. Selected portions of the analysis were completed by the Oklahoma State University Testing and Evaluation Service.

Results

Statistical Analysis.

Statistical data derived from the analysis of the

test is found in Table 2. In order to analyze the total test, the overall difficulty of the test was determined by calculating the mean performance of the grade level, dividing the mean by the total number of questions, and then multiplying by 100; a higher mean denoted an easier test. In addition to the overall difficulty of the test, the variability in test scores was determined by calculating the standard deviation. The more the scores clustered around the mean, the smaller the standard deviation. Therefore, the larger the standard deviation, the more the test discriminated among the respondents.

The reliability of the test was also measured. In order to establish internal-consistency reliability, that is, the consistent rate of scoring by the respondents throughout the test, the KR-8 formula was used. Additionally, test-retest measurements utilizing the Pearson correlation coefficient r determined stability reliability, which is the stability of the test over time.

Next, the standard error of measurement was calculated. The standard error of measurement reflected the degree one might expect a score to vary due to measurement error. The standard error was based upon the reliability of the test and the standard deviation.

Another measurement used in the data analysis was mean difficulty. Difficulty is an index that indicates the percent of some specified group who answers a test item correctly. The higher this percentage was, the easier the item. Difficulty indicated whether an item was easy or difficult, not that an item was good or bad.

Then, too, a mean discrimination score was obtained from the data. Discrimination is an index that indicates the discriminating power of a test item. The most commonly used index is the proportion of the highest 27% (on total score) correctly answering an item, minus the proportion passing of the lowest 27% of the group. Values can range from -1.00 to 1.00. For example, a discrimination index of 0.70 would result if 85% and 15% of the students in the upper and lower groups, respectively, responded correctly to a given item.

As was previously mentioned, Table 2 reflects a summary of the test statistics discussed above. After examining the means and standard deviations, it can be seen that the fourth, fifth, and sixth graders performed basically about the same on the test.

Table 2

Summary of Test Statistics

Statistic	Grade 4	5	6	Total
MEAN	33.25	36.90	37.99	35.78
STANDARD DEVIATION	9.47	8.85	9.80	9.65
RELIABILITY				
Internal Consistency	0.88	0.87	0.89	0.89
Stability or Test-Retest	0.76	0.65	0.84	0.83
STANDARD ERROR	3.31	3.19	3.18	3.26
MEAN DIFFICULTY	55.42	61.51	63.32	59.63
MEAN DISCRIMINATION	0.34	0.33	0.36	0.35

Item Analysis.

As part of the item analysis, response quality was considered. Ideally, at least some of the respondents should select each response of a multiple-choice item. As can be seen in Table 3, each response on the test was chosen by someone; thus, each item is considered to be functioning. It should be noted that within the table, total responses for each item do not equal the total number of respondents (605) due to occasional errors on part of the respondents.

Table 3

Summary of Responses for Each Test Item

	Grade			
Item	4	5	6	Total
1				
A	44	16	18	78
B	1	2	3	6
C*	191	143	168	502
D	8	4	6	18
2				
A	29	23	23	75
B*	79	92	107	278
C	56	18	32	106
D	79	32	32	143
3				
A	45	24	28	97
B	67	36	46	149
C	31	19	26	76
D*	100	86	95	281

table continues

Item	4	5	6	Total
4				
A	9	3	3	15
B*	179	133	180	492
C	10	8	7	25
D	43	22	5	70
5				
A*	149	109	130	388
B	27	18	21	66
C	24	15	10	49
D	43	24	32	99
6				
A	47	19	25	91
B	12	9	9	30
C*	119	97	116	332
D	63	40	44	147
7				
A	15	5	4	24
B*	171	134	162	467
C	28	15	12	55
D	29	12	16	57

table continues

Item	4	5	6	Total
8				
A	58	36	34	128
B	14	10	4	28
C	10	11	16	37
D*	161	109	140	410
9				
A	28	14	19	61
B	17	6	7	30
C*	191	141	163	495
D	7	5	5	17
10				
A*	63	53	56	172
B	139	88	113	340
C	13	6	9	28
D	28	18	16	62
11				
A	22	5	5	32
B*	197	142	182	521
C	15	13	6	34
D	10	5	1	16

Table Continues

Item	4	5	6	Total
12				
A	33	27	37	97
B	5	5	4	14
C*	200	131	148	479
D	6	3	6	15
13				
A	41	20	26	87
B	38	26	36	100
C	26	16	14	56
D*	139	104	118	361
14				
A	48	35	62	145
B*	51	33	45	129
C	63	63	55	181
D	79	35	32	146
15				
A	8	2	3	13
B	54	26	29	109
C	6	6	5	17
D*	175	132	156	463

Table Continues

Item	4	5	6	Total
16				
A*	99	53	94	246
B	17	4	13	34
C	21	20	16	57
D	106	89	72	267
17				
A	32	14	22	68
B*	178	137	140	455
C	15	11	13	39
D	19	4	19	42
18				
A	129	93	92	314
B	33	18	17	68
C*	66	41	68	175
D	15	14	15	44
19				
A*	146	111	133	390
B	32	14	26	72
C	35	27	27	89
D	31	13	9	53

Table Continues

Item	4	5	6	Total
20				
A	8	5	12	25
B	114	67	95	276
C	14	10	4	28
D*	108	84	81	273
21				
A	70	48	50	168
B*	148	104	129	381
C	14	7	10	31
D	12	6	6	24
22				
A*	91	83	101	275
B	45	30	29	104
C	44	28	35	107
D	64	25	29	118
23				
A*	142	137	149	428
B	35	9	18	62
C	37	15	18	70
D	26	4	9	39

Table Continues

Item	4	5	6	Total
24				
A	18	13	18	49
B	36	10	20	66
C*	144	105	127	376
D	45	38	30	113
25				
A	27	7	12	46
B	59	44	25	128
C	13	4	5	22
D*	141	110	150	401
26				
A	36	30	24	90
B*	155	120	158	433
C	37	8	9	54
D	15	8	3	26
27				
A	12	9	7	28
B	11	2	13	26
C	17	5	26	48
D*	203	149	143	495

Table Continues

Item	4	5	6	Total
28				
A	39	30	30	99
B	83	47	52	182
C*	72	57	69	198
D	49	32	44	125
29				
A*	177	137	153	467
B	20	6	17	43
C	8	5	6	19
D	36	17	18	71
30				
A	27	16	18	61
B	67	42	59	168
C	106	75	85	266
D*	40	32	32	104
31				
A	47	28	30	105
B*	156	121	146	423
C	18	12	13	43
D	21	5	4	30

Table Continues

Item	4	5	6	Total
32				
A	17	13	6	36
B	9	9	9	27
C*	134	91	121	346
D	83	53	59	195
33				
A	52	28	27	107
B*	135	106	126	367
C	16	10	11	37
D	40	21	29	90
34				
A*	68	58	78	204
B	43	22	34	99
C	61	38	37	136
D	70	48	45	163
35				
A	20	8	20	48
B	32	15	7	54
C	16	7	11	34
D*	174	136	153	463

table continues

Item	4	5	6	Total
36				
A	31	20	13	64
B	24	10	22	56
C*	115	92	122	329
D	71	43	36	150
37				
A	12	10	10	32
B*	201	143	165	509
C	19	9	11	39
D	11	3	6	20
38				
A*	128	101	153	382
B	63	35	20	118
C	15	10	5	30
D	34	19	15	68
39				
A	57	34	40	131
B*	144	109	125	378
C	16	11	15	42
D	24	11	13	48

table continues

Item	4	5	6	Total
40				
A	17	10	11	38
B	24	7	10	41
C	17	14	18	49
D*	183	133	153	469
41				
A	23	7	8	38
B	20	10	14	44
C*	158	127	155	440
D	41	20	18	79
42				
A	12	7	13	32
B	39	18	33	90
C*	155	127	128	410
D	35	13	20	68
43				
A*	185	126	138	449
B	24	10	23	57
C	12	10	14	36
D	20	19	19	58

table continues

Item	4	5	6	Total
44				
A	11	6	15	32
B*	123	114	133	370
C	50	16	24	90
D	54	29	21	104
45				
A	13	6	10	29
B	34	27	26	87
C	14	13	15	42
D*	177	120	141	438
46				
A	8	6	9	23
B	44	14	15	73
C*	170	139	164	473
D	18	7	7	32
47				
A	45	25	19	89
B	27	24	18	69
C	25	11	21	57
D*	142	105	134	381

table continues

Item	4	5	6	Total
48				
A	12	5	8	25
B	43	19	31	93
C*	175	138	135	448
D	11	4	19	34
49				
A*	127	97	109	333
B	50	22	37	109
C	25	19	20	64
D	37	28	26	91
50				
A*	172	121	122	415
B	47	35	46	128
C	8	6	15	29
D	13	3	7	23
51				
A*	114	86	107	307
B	29	13	16	58
C	51	36	34	121
D	44	29	34	107

table continues

Item	4	5	6	Total
52				
A	100	70	76	246
B	45	50	37	132
C	28	17	25	70
D*	65	28	51	144
53				
A	47	40	34	121
B	36	24	21	81
C	60	40	25	125
D*	94	61	111	266
54				
A	34	12	33	79
B*	80	53	105	238
C	36	37	20	93
D	88	62	31	181
55				
A*	75	63	94	232
B	34	11	19	64
C	64	33	38	135
D	65	58	40	163

table continues

Item	4	5	6	Total
56				
A	33	16	24	73
B	35	21	26	82
C	61	44	34	139
D*	106	83	104	293
57				
A	31	14	16	61
B	27	16	31	74
C*	142	112	121	375
D	38	23	20	81
58				
A	24	3	12	39
B*	140	106	127	373
C	36	28	29	93
D	39	25	21	85
59				
A	36	31	30	97
B	62	44	41	147
C	22	17	25	64
D*	119	73	93	285

table continues

Item	4	5	6	Total
60				
A*	81	58	101	240
B	32	17	22	71
C	25	23	27	75
D	98	66	37	201

Note. * = correct response. n4 = 244; n5 = 166; n6 = 195; N = 605.

Another element included within item analysis was item difficulty, which was calculated in order to determine the percentage of students who chose the correct answer for each item. Table 4 reflects a summary of each test item's difficulty value. Regarding the instrument under study, this percentage ranged from 17.19% to 86.12%. When the test item was easy, the percentage tended to be large; and when the test item was difficult, the percentage tended to be small. For example, if the difficulty value for the correct response on an item was 82.98%, this meant that approximately 83% of the students answered the question correctly. For the purpose of this study, the following indexes were used for each item's difficulty: 75% = easy; 50% = average; 25% = difficult. Ideally, the difficulty index of the test items should be as close to 50% as possible--a difficult task for a test writer to accomplish (Baumgartner & Jackson, 1982). Regarding the instrument under study, the difficulty of the test items can be roughly estimated as follows: 22 items were easy, 13 items were moderately easy, 16 items were of average difficulty, 2 items were difficult, and 7 items were very difficult.

In addition to item difficulty, item discrimination was also employed as part of the item analysis. Item

discrimination indicated how well a test item discriminated between those who performed well on the test overall and those who did poorly overall. Table 4 reflects a summary of each test item's discrimination index. If an item was answered correctly by more of the better students than the poorer students, the item was a good one and discriminated positively; if more of the poorer students answered the item correctly than did the better students, the item was a poor one and discriminated negatively. For the purpose of this study, a test item was reviewed for revision if the discrimination index was negative or if it was between 0.00 and 0.20 (Ebel, 1979). See Table 4 for a summary of each test item's difficulty value and discrimination index.

Table 4

Summary of Item Difficulty (DIF) and Item Discrimination (DIS)

	Grade			
Item	4	5	6	Total
1				
DIF	78.28%	86.14%	86.15%	82.98%
DIS	0.29	0.10	0.14	0.21
2				
DIF	32.38%	55.42%	54.87%	45.95%
DIS	0.48	0.53	0.45	0.51
3				
DIF	40.98%	51.81%	48.72%	46.45%
DIS	0.25	0.41	0.41	0.35
4				
DIF	73.36%	80.12%	92.31%	81.32%
DIS	0.38	0.25	0.28	0.34
5				
DIF	61.07%	65.66%	66.67%	64.13%
DIS	0.40	0.52	0.38	0.42

table continues

Item	4	5	6	Total
6				
DIF	48.77%	58.43%	59.49%	54.88%
DIS	0.26	0.21	0.25	0.26
7				
DIF	70.08%	80.72%	83.08%	77.19%
DIS	0.53	0.45	0.37	0.47
8				
DIF	65.98%	65.66%	71.79%	67.77%
DIS	0.25	0.16	0.19	0.21
9				
DIF	78.28%	84.94%	83.59%	81.82%
DIS	0.43	0.35	0.36	0.39
10				
DIF	25.82%	31.93%	28.72%	28.43%
DIS	-0.05	0.24	0.18	0.11
11				
DIF	80.74%	85.54%	93.33%	86.12%
DIS	0.37	0.37	0.22	0.34
12				
DIF	81.97%	78.92%	75.90%	79.17%
DIS	-0.01	0.01	-0.10	-0.05

table continues

Item		4	5	6	Total
13					
	DIF	56.97%	62.65%	60.51%	59.67%
	DIS	0.23	0.38	0.18	0.25
14					
	DIF	20.90%	19.88%	23.08%	21.32%
	DIS	0.00	0.00	0.17	0.06
15					
	DIF	71.72%	79.52%	80.00%	76.53%
	DIS	0.46	0.55	0.42	0.47
16					
	DIF	40.57%	31.93%	48.21%	40.66%
	DIS	0.20	0.17	0.27	0.22
17					
	DIF	72.95%	82.53%	71.79%	75.21%
	DIS	0.40	0.39	0.31	0.36
18					
	DIF	27.05%	24.70%	34.87%	28.93%
	DIS	-0.02	0.15	0.15	0.09
19					
	DIF	59.84%	66.87%	68.21%	64.46%
	DIS	0.40	0.24	0.33	0.34

table continues

Item	4	5	6	Total
20				
DIF	44.26%	50.60%	41.54%	45.12%
DIS	0.05	0.28	0.19	0.15
21				
DIF	60.66%	62.65%	66.15%	62.98%
DIS	0.29	0.27	0.31	0.29
22				
DIF	37.30%	50.00%	51.79%	45.45%
DIS	0.38	0.49	0.54	0.48
23				
DIF	58.20%	82.53%	76.41%	70.74%
DIS	0.51	0.34	0.39	0.46
24				
DIF	59.02%	63.25%	65.13%	62.15%
DIS	0.51	0.47	0.48	0.49
25				
DIF	57.79%	66.27%	76.92%	66.28%
DIS	0.36	0.35	0.39	0.38
26				
DIF	63.52%	72.29%	81.03%	71.57%
DIS	0.40	0.22	0.40	0.38

table continues

Item	4	5	6	Total
27				
DIF	83.20%	89.76%	73.33%	81.82%
DIS	0.35	0.23	0.44	0.33
28				
DIF	29.51%	34.34%	35.38%	32.73%
DIS	0.22	0.27	0.29	0.26
29				
DIF	72.54%	82.53%	78.46%	77.19%
DIS	0.30	0.26	0.40	0.33
30				
DIF	16.39%	19.28%	16.41%	17.19%
DIS	0.10	0.09	0.17	0.12
31				
DIF	63.93%	72.89%	74.87%	69.92%
DIS	0.35	0.35	0.50	0.41
32				
DIF	54.92%	54.82%	62.05%	57.19%
DIS	0.35	0.43	0.36	0.37
33				
DIF	55.33%	63.86%	64.62%	60.66%
DIS	0.30	0.24	0.25	0.28

table continues

Item	4	5	6	Total
34				
DIF	27.87%	34.94%	40.00%	33.72%
DIS	0.31	0.36	0.34	0.35
35				
DIF	71.31%	81.93%	78.46%	76.53%
DIS	0.52	0.53	0.46	0.51
36				
DIF	47.13%	55.42%	62.56%	54.38%
DIS	0.41	0.29	0.37	0.38
37				
DIF	82.38%	86.14%	84.62%	84.13%
DIS	0.42	0.39	0.46	0.42
38				
DIF	52.46%	60.84%	78.46%	63.14%
DIS	0.40	0.36	0.50	0.44
39				
DIF	59.02%	65.66%	64.10%	62.48%
DIS	0.33	0.34	0.34	0.34
40				
DIF	75.00%	80.12%	78.46%	77.52%
DIS	0.54	0.49	0.50	0.51

table continues

Item	4	5	6	Total
41				
DIF	64.75%	76.51%	79.49%	72.73%
DIS	0.53	0.48	0.54	0.53
42				
DIF	63.52%	76.51%	65.64%	67.77%
DIS	0.34	0.37	0.53	0.41
43				
DIF	75.82%	75.90%	70.77%	74.21%
DIS	0.45	0.43	0.43	0.42
44				
DIF	50.41%	68.67%	68.21%	61.16%
DIS	0.33	0.32	0.44	0.38
45				
DIF	72.54%	72.29%	72.31%	72.40%
DIS	0.43	0.46	0.55	0.46
46				
DIF	69.67%	83.73%	84.10%	78.18%
DIS	0.49	0.41	0.44	0.47
47				
DIF	58.20%	63.25%	68.72%	62.98%
DIS	0.31	0.32	0.42	0.35

table continues

Item	4	5	6	Total
48				
DIF	71.72%	83.13%	69.23%	74.05%
DIS	0.45	0.39	0.41	0.41
49				
DIF	52.05%	58.43%	55.90%	55.04%
DIS	0.54	0.63	0.48	0.54
50				
DIF	70.49%	72.89%	62.56%	68.60%
DIS	0.48	0.33	0.45	0.41
51				
DIF	46.72%	51.81%	54.87%	50.74%
DIS	0.36	0.20	0.21	0.27
52				
DIF	26.64%	16.87%	26.15%	23.80%
DIS	0.14	0.18	0.14	0.14
53				
DIF	38.52%	36.75%	56.92%	43.97%
DIS	0.28	0.18	0.46	0.33
54				
DIF	32.79%	31.93%	53.85%	39.34%
DIS	0.27	0.17	0.36	0.30

table continues

Item	4	5	6	Total
55				
DIF	30.74%	37.95%	48.21%	38.35%
DIS	0.28	0.37	0.42	0.37
56				
DIF	43.44%	50.00%	53.33%	48.43%
DIS	0.33	0.42	0.46	0.40
57				
DIF	58.20%	67.47%	62.05%	61.98%
DIS	0.56	0.55	0.60	0.57
58				
DIF	57.38%	63.86%	65.13%	61.65%
DIS	0.43	0.41	0.50	0.45
59				
DIF	48.77%	43.98%	47.69%	47.11%
DIS	0.28	0.44	0.37	0.33
60				
DIF	33.20%	34.94%	51.79%	39.67%
DIS	0.32	0.27	0.52	0.39

Revision of the Instrument

Based upon the item discrimination data in Table 4 and the item responses summarized in Table 3, the researcher considered 13 test items for revision. Each of these items contained a discrimination index that was below 0.20 at either a particular grade level or for the total of all three grades.

Item 1 had two responses, B and D, that were not functioning very effectively. Both responses were entirely changed in order to make them more attractive as plausible answers.

Item 8 also had two responses, B and C, that were not functioning as well as the other two responses. Although there did not seem to be any obvious method of alteration, the researcher decided to retain cheese as a response since it does contain protein. In addition, cereal was dropped, and rice was added in its place because of rice's similarity to potatoes, which was a functioning response.

On Item 10, the B response was chosen more than the correct response of A. Plus, two responses, namely, C and D, were not nearly as attractive to the students as A and B. Therefore, the author altered each response and also tried to make the correct response more attractive

than it appeared on the first test.

On Item 12, the A response seemed to be too attractive, probably due to advertising techniques that promote granola bars as healthful snacks. The author thus decided to change Response A to homemade brownies.

Item 13 had only one discrimination index that was below 0.20, and that was at the sixth grade level. Since there did not appear to be any obvious revision, the author decided to leave the item as written and to watch the item closely on subsequent administrations of the instrument.

Item 14 was interesting because it appeared that no single answer was apparently the best one; all four responses seemed to be equivocal. Therefore, the author slightly altered the A, C, and D responses and totally changed Response B, which is the correct answer.

On Item 16, Response D drew too many of the students, probably because iced tea is commonly drunk by children and adults, even with meals. Thus, the author decided to change Response D to hot coffee in order to retain the concept of caffeine as a drug.

On Item 18, there seemed to be confusion as to which drug is a depressant. Cocaine was the most popular choice for the best answer; this may have been due to the fact

that cocaine is widely discussed these days, and it was the first response listed. In order to focus on cocaine as the best answer, the author reworded the stem and changed two of the responses; the order that the alternative answers appeared was altered as well.

On Item 20, B was chosen as a response slightly more than the correct answer of D. Both alternatives contained the word vitamins; therefore, the author decided to include vitamins with the stem, which was also slightly reworded, so that the responses would be read and be understood more clearly.

Item 30 seemed to be too difficult in that the respondents did not know the quickest form of energy for the body. Thus, the author thought that it would improve the item to focus on a source of energy for the body rather than the quickest form of energy. As a result, the stem was rewritten, and two of the responses were changed.

On Item 52, vegetable soup drew most of the responses; this may have been due to the fact that many vegetable soups also contain protein sources, such as meat, fish, and beans with rice. Therefore, the author decided to change that particular response to broccoli soup. In addition, the word salad was omitted from Response D

because an egg sandwich may be more familiar to the respondents than an egg salad sandwich. And, as a result, all of the alternatives are consistent as two-word answers.

On Item 53, there was only one grade level, the fifth grade, that had a discrimination index less than 0.20. Due to the fact that there did not appear to be any obvious method for revision, the author left the item as written.

Likewise, Item 54 contained only one discrimination index below 0.20, and that was at the fifth grade level as well. Because there was not any apparent revision that was necessary, the author left the item as written. Nevertheless, both Item 53 and Item 54 will be closely monitored on subsequent administrations of the instrument.

In addition to the revisions cited above, the author made some other minor changes on the instrument. For instance, most of the boldfaced words were changed to underlined words so that their emphasis would be more apparent, especially on photocopies. Furthermore, the author underlined two words that needed to be stressed but were in plain type on the first instrument: 1) the word <u>best</u> within the set of directions on the third page (i.e., the first page of actual test items); and 2) the word <u>not</u> on Item 55, Response C.

Finally, four other test items were slightly altered. On Item 6, a period was added to the end of each response because complete sentences are formed from the combination of the stem with each response. On Item 27, the word four was added to designate the four basic food groups because there are some books that discuss five and even seven food groups. Next, on Item 40, the word newborn was added to more accurately describe the word baby. Then, on Item 55, quotation marks were removed from HIV because they are unnecessary. See Appendix M for a copy of the revised instrument.

Discussion of the Results

Statistical Analysis.

As can be seen from the results of the statistical analysis, the instrument under study proved to possess strong reliability. The internal-consistency reliability indexes for each of the three grade levels plus the one for the total of the three grades were all in the high 80s. And, with regard to stability or test-retest reliability, the correlation coefficient for the grade levels overall was 0.83. Additionally, when comparing the three grade levels, the figures for the mean, standard deviation, and standard error of measurement all indicated that the instrument possessed a great deal of sameness.

Although the statistical results were not identical for each grade, there was clearly enough similarity to attest to the fact that the instrument was an effective evaluation tool for all three grade levels.

While the primary emphasis was to establish the content validity and reliability of the health knowledge instrument under study, the students' scores were also of interest. From a total of 60 possible points, the scores for all three grades ranged from 57 (95% correct) to 9 (15% correct). In addition, an analysis of the students who scored 70% or above on the test revealed the following percentages: 32% of the total group, 20% of the fourth grade, 35% of the fifth grade, and 43% of the sixth grade. Furthermore, 11% of the total group, 6% of the fourth grade, 11% of the fifth grade, and 17% of the sixth grade scored 80% or above on the test.

Factors for Consideration.

Although the health knowledge of the students taking the test was not controlled, it should be mentioned that Enid Public Schools have health curricula at the fourth, fifth, and sixth grade levels that include instruction about nutrition, tobacco, alcohol and other drugs, and HIV/AIDS. Regarding the HIV/AIDS education programs, discussion of subject matter related to sexual intercourse

is avoided due to its controversial nature. That is why the author did not include test items that addressed the relationship between protected sexual intercourse (i.e., safe sex) and HIV prevention.

Another important factor to keep in mind was the difference in socioeconomic status of the students at the four participating elementary schools. Three of the four schools consisted primarily of students from low-income families. One of those three schools also included children whose parents were employed by Phillips University (a local four-year university). On the other hand, the fourth school was comprised primarily of students from high-income families; only a small number of its students were from low-income families. No attempt was made to control the socioeconomic status nor the race of the students taking the test.

In addition, the IQ of the students was not controlled. There may have been a few students inadvertently included in the data that were slow learners because they were new to the school system and had not yet been placed in specific special education classes. However, since the testing occurred at the end of the school year, it is unlikely that this had any significant effect on the results.

Furthermore, students were tested on different days at various times of the day. Due to the fact that the time of day that the test was administered was not controlled, those students who took the test in the morning may have been more motivated and alert than those students who took the test in the afternoon.

Then, too, the total amount of time spent on the administration of the instrument was not controlled. The testing times ranged from 30 minutes to 90 minutes. Thus, those classes that only spent 30 minutes on the test may not have performed as well as those who worked longer.

Because the administration of the instrument occurred at the end of the school year when schedules were hectic, the morale of the individuals involved may have been affected. If the teachers administering the test displayed annoyance or other signs of stress, the students may have performed under duress.

Some of the teachers who administered the test, especially the fourth grade teachers, later commented that they thought the test was too difficult for the students in terms of both readability and length. As a result, at least one teacher thought that her students may have guessed during the test. In addition, at least

one of the teachers read the test items aloud to students. This may have affected the responses of those particular students as opposed to their reading the questions themselves. If some of the students did indeed have difficulty in reading and interpreting the instrument, test results may have been affected. However, in perusing the results of the statistical analysis discussed earlier, it appears that the intellectual abilities of the students, especially the fourth graders, may have been greatly underestimated by the teachers.

CHAPTER V

Summary, Findings, Conclusions, and Recommendations

This chapter includes a brief summary of the research with a listing of findings, conclusions, and recommendations for further study.

Summary

Our children and youth represent this nation's most valuable resource. With the wide array of health problems confronting youngsters today, it is imperative that we offer quality health education programs in the schools so that young people can learn to make sound health decisions affecting their lives not only today but in all of the tomorrows to come.

A major outcome of strong health education programs is health knowledge that can be transferred and applied to everyday situations. Evaluation of health knowledge is an integral component of any health instruction program. However, there seems to be a paucity of quality health knowledge instruments specifically designed for the elementary level. Therefore, the purpose of this study was to develop a quality health knowledge instrument at the elementary level that would enable schools to evaluate the effectiveness of their elementary health instruction programs and/or that would serve as an impetus

for promotion of mandated school health programs.

A criterion-referenced health knowledge instrument for grades four, five, and six was subsequently designed and constructed; three health content areas were represented on the test: nutrition; tobacco, alcohol and other drugs; and HIV/AIDS. A panel of five national experts in health education and instrumentation/test construction verified the content validity of the instrument.

Internal-consistency reliability of the instrument was determined from a statistical analysis of data derived from actual administrations of the health knowledge instrument. Four elementary schools within the Enid (Oklahoma) Public School System participated in the study; a total of 630 students took the test, resulting in 605 answer sheets that were usable data. The test administrations occurred in individual classrooms during May of 1991.

In addition, to evaluate the stability reliability of the instrument, a test-retest measure was conducted with three separate classes, one at each grade level. The second test was administered approximately one week after the first administration.

An analysis was then conducted on both the total test and on each individual test question. Selected

portions of the statistical data were derived from the Oklahoma State University Testing and Evaluation Service. In order to analyze the total test, overall difficulty of the test was determined by calculating the mean performance of the grade level, dividing the mean by the total number of questions, and then multiplying by 100; a higher mean denoted an easier test. Additionally, the variability in test scores was determined by calculating the standard deviation. The larger the standard deviation, the more the test discriminated among the respondents.

The reliability of the instrument was measured as well. Both internal consistency and stability measurements were utilized.

Furthermore, item analysis was conducted, yielding an index for each item's difficulty and another index for each item's discrimination. For each item's difficulty, the following indexes were used: 75% = easy; 50% = average; and 25% = difficult. Regarding item discrimination, the ability of a test item to discriminate between those who performed well on the test overall and those who did poorly overall, an item was reviewed for revision if its discrimination index was below 0.20.

Response quality was also considered within the item analysis. Each response needed to be functioning

in that at least someone should have selected each response of a multiple-choice item.

After monitoring response quality and evaluating the difficulty of and discrimination index for each item, the overall quality of the test and of each test item was determined; the test was then revised as necessary.

Summary of the Findings

1. According to data collected from the panel of expert judges, the instrument had high content validity.
2. According to test statistics, the instrument possessed high internal-consistency reliability at each of the three grade levels.
3. According to test statistics, the instrument also possessed fairly high stability reliability for the three grade levels overall.
4. According to test statistics, there was a great deal of similarity among the three grade levels with regard to the means, standard deviations, and internal-consistency measures.
5. The difficulty of the test items was distributed approximately in the following manner: 22 items were easy, 13 items were moderately easy, 16 items were of average

difficulty, 2 items were difficult, and 7 items were very difficult.

6. Thirteen test items contained discrimination indexes below 0.20 and, thus, were reviewed for revision. As a result, 10 of these items were actually revised.
7. Each test item had functioning responses in that at least someone chose each response as the best answer.

Conclusions

Based upon the findings and limitations of this study, the following conclusions are appropriate:

1. The health knowledge instrument is valid, reliable, and relevant.
2. The health knowledge instrument is a suitable evaluation tool for fourth, fifth, and sixth grade students.
3. The readability of the instrument may have been somewhat difficult for the fourth grade level; this opinion is derived from contemplating the results of the FORCAST formula, the opinion of one of the national experts who evaluated the instrument for its content validity, and the comments from some of the fourth grade teachers

who administered the test. Therefore, it is feasible to consider using the instrument for grades five and six and then developing another test for the fourth grade level that is less difficult. However, an important point worth mentioning is that many terms used in health education can not be reduced to simpler terms, such as the words carbohydrates and vitamins.

4. The generalizability of the instrument is another important factor to consider. There is a need to determine whether the instrument is valid and reliable in measuring health knowledgeable students in grades four, five, and six across the United States as opposed to administering the test only in Oklahoma.
5. With regard to students' scores on the instrument, there should be a noticeable difference among the scores of those students who have experienced comprehensive school health instruction as opposed to the scores of students who have received very little or no school health instruction at all.

Recommendations for Future Research

Relative to this study, the following recommendations are made for future study:

1. Conduct a similar study with a larger sample; control the race and socioeconomic status of the subjects so that relevant comparisons can be made.
2. Utilizing the assistance of health education experts located in different areas of the United States, conduct a study to determine the validity and reliability of the instrument across the nation.
3. There is a need for a health knowledge instrument to be designed and constructed for the upper elementary and middle school grades that contains items regarding the relationship between protected sexual intercourse and HIV prevention.
4. There may need to be a separate instrument with a lower readability level developed for fourth graders.
5. Conduct future test administrations in early fall or right after Christmas when school schedules are less hectic.
6. Maintain tighter controls with future test administrations. For instance, the researcher needs to talk individually with each school principal and classroom teacher involved

with the study so that everyone clearly understands how to correctly administer the test. In addition, the time of day the test is administered and the total amount of time for the testing process both need to be controlled.

7. There is a need for studies to produce additional health tests for students in the elementary grades; these instruments need to measure health knowledge, attitudes, and behaviors.
8. There is also a need to study the relationship of self-efficacy, health knowledge, and health behavior among children and youth.
9. Conduct similar studies with students considered to be especially at risk (e.g., disadvantaged youth living in the inner cities).

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Appendix A

Letter to Health Consultants at State Departments of Education

1002 E. Virginia #3
Stillwater, OK 74075
September 5, 1990

Ms. Joyce Moore
Health Consultant
Alabama State Department of Education
50 North Ripley Street
Montgomery, AL 36130-3901

Dear Ms. Moore:

I am a doctoral student at Oklahoma State University and am currently doing research for my dissertation. I am working on developing a **paper and pencil health knowledge instrument** for Oklahoma school-age children, particularly for the grade levels 4-6. The content areas that I hope to include are **substance use/abuse, risk factors of cardiovascular disease, nutrition, and HIV infection/AIDS.**

I am contacting you to see if you have (or know about) specific paper and pencil health knowledge assessments at the elementary level that may assist me in this research. A self-addressed, stamped postcard is enclosed for your reply, and I will appreciate it very much if you will please respond at your earliest convenience.

Thank you for your time and assistance in this proposed study. If you have any questions, feel free to call me at (405)372-4613 (H) or (405)744-5507 (OSU).

Cordially yours,

Marilyn S. Massey

enclosure

Appendix B

Sources for the Development of General Concepts

Sources Used for the Development of General Concepts

*Anspaugh, D. J., & G. O. Ezell. (1990). Teaching today's health (3rd. ed.). Columbus, OH: Merrill.

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Appendix C

Letter to Health Education Experts for Review of General Concepts

1002 E. Virginia #3
Stillwater, OK 74075
January 31, 1991

Dr. Danny Ballard
Department of Health and Physical Education
Texas A & M University
College Station, TX 77843-4243

Dear Dr. Ballard:

I am a doctoral student at Oklahoma State University; and I am currently working on my dissertation, which concerns the development of a criterion-referenced health knowledge instrument for grades four, five, and six. The health content areas I intend to cover are nutrition, substance use/abuse, and HIV/AIDS.

To aid in the first draft of the instrument, I have selected **general** concepts for each content area. Due to your expertise in health education as well as Dr. Betty Edgley's personal recommendation of you, I will be very pleased to receive your professional opinion regarding the appropriateness of the concepts.

I have enclosed a copy of the concepts along with a self-addressed, stamped envelope. I appreciate any feedback you may have and hope to hear from you at your earliest convenience.

Thank you for your valuable time and assistance.

Cordially yours,

Marilyn S. Massey

enclosures

Appendix D

General Concepts

NUTRITION

GENERAL CONCEPTS FOR GRADES 4-6

1. Each of the major nutrients performs important functions for the body.

2. Carbohydrates, fats, and proteins are nutrients that supply the body with energy.

3. Vitamins, minerals, and water are nutrients that do not supply the body with energy, but they can help by performing other important functions.

4. There are primary food sources for each major nutrient.

5. Foods differ in nutritive value; no one food supplies all the nutrients that a person needs.

6. Eating a variety of foods from the four basic food groups is the best way to ensure that the body receives the proper amounts of nutrients it needs.

7. Individuals require the same nutrients but in varying amounts throughout life.

8. Lack of nutritious food may be detrimental to the health of individuals.

9. Different factors, such as cultural and social influences, help determine the types and amounts of food people choose to consume.

10. Eating nutritious meals and snacks is important for learning, growing, and providing energy to accomplish tasks.

11. Caloric intake should be balanced with energy needs.

12. Food labels can provide useful nutritional information.

13. There are school and community resources that provide reliable information about nutrition.

14. Being overweight can lead to various health problems, such as high blood pressure, high cholesterol levels, diabetes, heart disease, and stroke.

15. Fiber plays an important role in promoting good health.

16. Poor nutrition is a risk factor in the development of chronic, degenerative diseases, such as heart disease, cancer, and stroke.

TOBACCO, ALCOHOL AND OTHER DRUG USE

GENERAL CONCEPTS FOR GRADES 4-6

1. There are different kinds of drugs, and they have multiple uses with a variety of effects on people.

2. Alcohol, tobacco, caffeine, over-the-counter drugs, and prescription drugs are legal drugs. However, alcohol and tobacco are illegal for individuals under a certain age.

3. Illicit or illegal drugs include marijuana, cocaine, speed, PCP, and heroin.

4. Common household products such as glue, spray paint and other spray products, paint thinner, and gasoline are used as inhalants; the fumes from inhalants cut off oxygen to the brain and lungs.

5. Alcohol, barbituates (downers), tranquilizers, and sleeping pills are depressants that slow down the body's nervous system.

6. Nicotine, caffeine, amphetamines (uppers), cocaine, and speed are common stimulants that speed up the body's nervous system.

7. Narcotics, such as opium, morphine, heroin, and codeine, slow down breathing and heart rate, cause sleepiness, and make it difficult to see, walk, talk, and think.

8. Hallucinogens, such as LSD and PCP, are mind-altering drugs that interfere with normal sensations and emotions.

9. Drugs can be beneficial or harmful; the individual is responsible for deciding how to correctly use or totally avoid certain drugs.

10. Improper use of drugs may result in both short-term and long-term health problems.

11. People use drugs for various physical, emotional, and social reasons.

12. There are healthy, recreational alternatives to

tobacco, alcohol and other drug use, such as sports, music, hobbies, and other positive leisure activities; the decision not to use drugs is up to each individual.

13. Strong decision-making and problem-solving skills are important to possess in order to effectively resist peer pressure to use drugs.

14. School and community resources are available to assist individuals with tobacco, alcohol and other drug problems.

15. Advertising can influence tobacco, alcohol and other drug use.

16. It is important to develop self-esteem in order to avoid tobacco, alcohol, and other drug use.

HIV/AIDS

GENERAL CONCEPTS FOR GRADES 4-6

1. The body's immune system is a defense mechanism that helps fight disease.

2. AIDS is a fatal illness caused by a virus that destroys the body's immune system.

3. HIV is the virus that causes AIDS by attacking the immune system, making infected people vulnerable to fatal infections and diseases.

4. AIDS is unlike other communicable diseases such as the cold, flu, or measles because it cannot be transmitted through saliva or casual social contact.

5. Mosquitoes and other kinds of insects do not transmit AIDS.

6. The three major ways HIV can be transmitted are by sexual contact with an infected person, by sharing IV drug needles and syringes with an infected person, and from an infected mother to the fetus or newborn baby.

7. HIV can be present in certain body fluids, such as blood and semen. The exchange of body fluids, especially blood to blood, can transmit HIV from one person to another.

8. Blood for transfusions is now screened for HIV, so blood transfusions are considered safe.

9. You cannot tell by looking at someone whether he/she is infected with HIV.

10. There is presently no cure for AIDS, and there is presently no vaccine to prevent AIDS.

11. It can take several years after becoming infected with HIV before symptoms of AIDS appear. However, HIV is still transmissible during this time.

12. AIDS is a worldwide problem among all races; many different people have AIDS, including male and female, rich and poor, and those living in small and large

communities.

13. People who engage in risky behaviors (i.e., unprotected sexual intercourse, needle sharing, and alcohol and other drug use) are placing themselves in danger of getting AIDS.

14. There are blood tests available that can detect whether a person has been infected with HIV.

15. Good personal health habits help a person to fight infections.

16. Individuals must assume responsibility for their own health.

17. Strong decision-making and problem-solving skills are important to possess in order to effectively resist peer pressure to engage in risky behaviors.

18. It is important to develop self-esteem in order to avoid engaging in risky behaviors.

19. There are resources within the school and the community where people can get information about AIDS.

20. A person with AIDS needs comfort, support, and understanding from family, friends, and society.

Appendix E

Letter to National Experts in Health Education and Test Construction/Instrumentation to Request Adjudication of Instrument

1002 E. Virginia #3
Stillwater, OK 74075
December 18, 1990

Dr. David Anspaugh
Health Education
Memphis State University
Memphis, TN 38101

Dear Dr. Anspaugh:

I am a doctoral student at Oklahoma State University, and I am currently working on my dissertation. The focus of my study is to develop a criterion-referenced health knowledge instrument for grades four, five, and six. The content areas I intend to cover are nutrition, substance use/abuse, and HIV/AIDS.

In order to verify the content validity of the instrument, I need a panel of five experts in the areas of health education and test construction/instrumentation to judge the suitability of the test. Due to your recognized expertise, I will consider it an honor if you will serve as one of the five judges. I have enclosed a self-addressed, stamped postcard for you to respond at your earliest convenience. If you decide that you will review the instrument, I will send you the necessary materials around January or February of 1991.

Thank you for your valued assistance.

Cordially yours,

Marilyn S. Massey

enclosure

Appendix F

Letter to Panel of National Experts for Evaluation of the Instrument's Content Validity

1002 E. Virginia #3
Stillwater, OK 74075
March 8, 1991

Dr. Wanda H. Jubb
2867 Greystone Lane
Chamblee, GA 30341

Dear Dr. Jubb:

I am the doctoral student at Oklahoma State University who previously contacted you to inquire if you would be willing to serve as a panel of nationally recognized experts to review the health knowledge instrument I have developed for grades 4-6; the content areas include nutrition, substance use/abuse, and HIV/AIDS.

At your consent, I am mailing you a copy of the instrument along with a copy of the **general** concepts for each content area. As you will note, I have omitted any reference to sexual intercourse in the HIV/AIDS questions due to the conservatism of Oklahoma and especially of the community in which I plan to administer the revised instrument.

The instrument consists of sixty questions, twenty in each content area; these questions have been randomly ordered. For your convenience, there is a rating scale for each question located in the left-hand margin of each page. Please rate each question according to the provided scale; circle the appropriate number, with 5 as the highest ranking and 1 as the lowest ranking. I intend to revise all questions that do not average at least a 3.0 rating from the review panel. Furthermore, I have allowed extra space for you to add pertinent editorial comments, particularly for items you believe need revision.

The readability of the instrument has not yet been determined; thus, you may see and comment upon words you believe are too difficult for this grade level. Please note that the instrument will be evaluated for its readability prior to administering the revised instrument to actual schoolchildren.

After you have reviewed the instrument, please mail it back to me in the enclosed, self-addressed envelope. Due to a strict dissertation schedule, I must receive your evaluation no later than **April 1, 1991.**

If you have any questions, please feel free to call me at (405) 372-4613. Thank you for your valuable time and assistance.

Cordially yours,

Marilyn S. Massey

enclosures

Appendix G

Health Knowledge Instrument

FORM A

THE MASSEY HEALTH KNOWLEDGE TEST

FOR GRADES 4-6

DIRECTIONS

In this test, you are being asked to answer some questions about health.

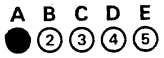
Be sure you understand the directions before you begin. You will have as much time as you need to finish the test. If you are not sure about the answer to a question, do your best to select the correct answer.

You will mark your answers on the answer sheet. Mark only **one** answer for each item. If you change an answer, be sure to erase the first mark completely; then select a new answer. Look at the sample item below:

SAMPLE: Vegetable oil and butter are among the main sources of:

A. fats.
B. minerals.
C. proteins.
D. vitamins.

Since vegetable oil and butter are among the main sources of fats, you would fill in space "A" on the answer sheet like this:



Remember, only **one** answer should be marked for each question. Use a pencil to mark the space; do **not** use a pen. If you change your answer, erase your first answer completely.

If you have any questions, ask the person in charge of the test.

When you are ready to begin, go on to the next page and **read the directions.**

DIRECTIONS: Do **not** write your name on this test booklet, and do **not** write your name on the answer sheet. Read each question, and mark the best answer for each question on your answer sheet.

1. Why are alcohol and tobacco products advertised?

   A. Alcohol and tobacco are popular products.
   B. Alcohol and tobacco are good for everyone.
   C. The companies that sell them want to make money.
   D. Most people can not afford to buy these products.

2. Which one of the following is the **least likely** to help you avoid using alcohol and other drugs?

   A. learning skills to help you deal with peer pressure
   B. allowing others to influence your decisions
   C. learning about the risks and dangers of each drug
   D. choosing friends who do **not** use these drugs

3. Which one of the following is the **least likely** to be associated with being overweight?

   A. high blood pressure
   B. high blood cholesterol
   C. heart disease
   D. lung cancer

4. Which one of these statements is **true**?

   A. People with AIDS do **not** deserve the support of family and friends.
   B. You can **not** tell by looking at a person whether he/she has the AIDS virus.
   C. AIDS is a problem **only** in large cities within the United States.
   D. You can get AIDS **just** by being in the same room with someone who has AIDS.

GO ON TO THE NEXT PAGE.

5. Which one of the following statements is **false**?

   A. Fried foods contain low amounts of fat and calories.
   B. Proteins help build and repair body cells.
   C. Items in a food are listed on the food label.
   D. Fast foods often contain large amounts of salt.

6. One of the best sources of dietary calcium is:

   A. grape juice
   B. a pork chop
   C. low-fat milk
   D. wheat bread

7. Which one of the following should we limit in our diets?

   A. green beans
   B. fried foods
   C. citrus fruits
   D. whole grains

8. Which one of the following foods belongs to the meat group?

   A. potatoes
   B. cereal
   C. cheese
   D. beans

9. Which one of the following statements is **false**?

   A. Cigarette advertisements influence you to think that smoking makes you more attractive.
   B. Young people often use alcohol and other drugs because their friends do.
   C. Using alcohol and other drugs can help you deal better with personal problems.
   D. Cigarettes and smokeless tobacco both contain a drug called nicotine.

GO ON TO THE NEXT PAGE.

10. The **main** reason why people are overweight is because they:

    A. take in more calories than they need for energy.
    B. eat meals and snacks that are not nutritious.
    C. skip breakfast and lunch too often.
    D. consume too many carbohydrates.

11. One way to prevent AIDS is to avoid:

    A. hugging a person who has AIDS.
    B. sharing drug needles with people.
    C. swimming in a public pool.
    D. sitting by someone who has AIDS.

12. Which one of the following snacks is the **most** healthful?

    A. granola bar
    B. potato chips
    C. low-fat yogurt
    D. buttered popcorn

13. Which one of the following is the **least** important to consider when deciding whether to say "No" to a certain behavior?

    A. Will it go against my values?
    B. Will it be harmful to myself or others?
    C. Will it follow the rules set by my family?
    D. Will my friends make fun of me if I say "No"?

14. Which statement is **false**?

    A. Narcotics slow down the heart rate.
    B. Cocaine slows down the nervous system.
    C. Hallucinogens affect a person's senses.
    D. Inhalants can cause brain damage.

GO ON TO THE NEXT PAGE.

15. The individuals **least** likely to have good information about AIDS are:

    A. nurses.
    B. doctors.
    C. teachers.
    D. classmates.

16. An example of a drink that does **not** contain a drug is:

    A. fruit punch.
    B. wine cooler.
    C. diet cola.
    D. iced tea.

17. The **best** example of a low-fat dairy product is:

    A. whole milk.
    B. skim milk.
    C. ice cream.
    D. cheddar cheese.

18. Which one of the following drugs slows down body functions?

    A. cocaine
    B. nicotine
    C. alcohol
    D. caffeine

19. Too much animal fat in a person's diet can lead to:

    A. heart disease.
    B. lung disease.
    C. bone disease.
    D. gum disease.

GO ON TO THE NEXT PAGE.

20. The fruit and vegetable group is a good source of:

A. carbohydrates and fats.
B. vitamins and proteins.
C. fats and proteins.
D. vitamins and minerals.

21. Which one of the following foods contains cholesterol?

A. spinach
B. cheese
C. apple
D. carrot

22. Which one of the following is the **least** likely to cause a person to take health risks?

A. strong values
B. peer pressure
C. poor self-concept
D. problems at home

23. Which one of the following statements is **true**?

A. Poor self-concept can lead to drug use.
B. People do **not** abuse drugs to escape problems.
C. Alcoholism is a disease that can **not** be treated.
D. It is considered safe to combine different drugs.

24. Which one of the following is the **least** likely to help fight infections?

A. getting enough rest
B. eating balanced meals
C. watching television
D. washing your hands

GO ON TO THE NEXT PAGE.

25. Which one of the following substances is **not** a drug?

A. aspirin
B. caffeine
C. nicotine
D. dentine

26. To keep from getting AIDS, it is wise to:

A. get the AIDS vaccine yearly.
B. avoid sharing drug needles.
C. **not** touch someone with AIDS.
D. avoid using public restrooms.

27. Which one of the following lunches provides a serving from each of the basic food groups?

A. ham sandwich, chocolate pudding, milk
B. hamburger, french fries, cola
C. tuna salad, crackers, iced tea
D. chicken sandwich, apple, milk

28. Which one of the following behaviors is the **least** likely to prevent you from getting AIDS?

A. learning ways to resist peer pressure
b. avoiding the sharing of drug needles
C. ignoring AIDS prevention information
D. seeking help for personal problems

29. Which one of the following foods is the **best** source of vitamin C?

A. orange
B. eggs
C. meat
D. milk

GO ON TO THE NEXT PAGE.

30. The body's quickest energy source is:

A. minerals.
B. proteins.
C. vitamins.
D. carbohydrates.

31. A family member abuses drugs. The rest of the family should:

A. avoid the subject of drug abuse.
B. seek help for themselves from a counselor.
C. ignore the person with the drug problem.
D. act like nothing is wrong within the family.

32. A good source of dietary fiber is:

A. fried chicken.
B. potato chips.
C. bran cereal.
D. apple juice.

33. Which one of the following is the most well-balanced breakfast?

A. fried eggs, sausage, gravy, milk
B. ham, toast, orange juice, milk
C. bacon, muffin, doughnut, milk
D. cereal, toast, milk, coffee

34. Which one of the following factors is the **least** likely to affect a person's eating habits?

A. height
B. emotions
C. activity level
D. family customs

GO ON TO THE NEXT PAGE.

35. Which one of the following behaviors is **not** considered safe use of drugs?

A. drinking colas and other beverages that have caffeine
B. taking prescribed medicine as the doctor ordered
C. taking an aspirin to relieve a headache or toothache
D. using alcohol/other drugs to escape life's pressures

36. Which one of the following statements is **false**?

A. We should limit animal fats in our diets.
B. Skipping meals can cause you to have less energy.
C. All persons need the same amounts of nutrients.
D. Boiling vegetables can cause a loss of vitamins.

37. You have just found out that your classmate's brother has AIDS. The **best** way to treat that classmate is to:

A. talk about him/her.
B. be a caring friend.
C. avoid contact with him/her.
D. transfer to another school.

38. Which one of the following statements is **true**?

A. There is no known cure for AIDS.
B. AIDS is caused by a fungus.
C. AIDS affects only males.
D. Only drug abusers have AIDS.

39. Which one of the following can **not** be caused by smoking?

A. emphysema
B. obesity
C. lung cancer
D. heart disease

GO ON TO THE NEXT PAGE.

40. Which one of the following statements is **false**?

A. You can get the AIDS virus if you are sharing drug needles.
B. One goal of AIDS education is to prevent future cases of AIDS.
C. If a woman who has the AIDS virus is pregnant, her baby will be infected.
D. Shaking hands with someone who has AIDS can cause you to get AIDS.

41. The **best** source for good information about nutrition is a:

A. magazine advertisement.
B. television commercial.
C. registered dietician.
D. grocery store clerk.

42. Which one of the following statements is **false**?

A. Smoking damages the functions of the heart and lungs.
B. Marijuana increases both heart rate and blood pressure.
C. Smokeless tobacco is a safe substitute for cigarette smoking.
D. Tobacco smoke is harmful for both smokers and nonsmokers to breathe.

43. If you are faced with peer pressure to do something that may put you at risk for becoming infected with the AIDS virus, what is the **best** action you can take?

A. Talk to a trusted adult about your problem.
B. Avoid your friends and think about it.
C. Ignore the risk and do it anyway.
D. Try to forget about the problem.

GO ON TO THE NEXT PAGE.

44. Many alcohol-related deaths are due to:

A. hunting accidents.
B. car accidents.
C. liver disease.
D. heart disease.

45. Which one of the following statements is **true**?

A. It is safe to take another person's prescribed medicine.
B. Using over-the-counter drugs, like aspirin, is **totally** safe.
C. Medicine works better if you take more than the directions say.
D. Drugs have a variety of uses and affect people differently.

46. It is hard for people to stop smoking because they:

A. don't have enough free time.
B. are too lazy and don't try.
C. are addicted to nicotine.
D. don't know smoking is harmful.

47. The AIDS virus is transmitted by:

A. sharing food.
B. toilet seats.
C. insect bites.
D. body fluids.

48. Jay is upset because he had an argument with his sister. A friend tells Jay to drink some beer so he can relax and forget about the fight. What is the **best** action Jay can take in this situation?

A. Follow his friend's advice and drink beer.
B. Go home and ignore his sister for awhile.
C. Try to discuss the problem with his sister.
D. Stay at his friend's house for awhile.

GO ON TO THE NEXT PAGE.

49. Which one of the following is the **least** likely to influence a person to use alcohol and other drugs?

A. musical ability
B. peer pressure
C. curiosity
D. boredom

50. Drinking alcohol can:

A. prevent you from thinking clearly.
B. speed up your nervous system.
C. help you use good judgment.
D. help you solve problems.

51. Using smokeless tobacco can cause:

A. oral cancer.
B. hair loss.
C. bronchitis.
D. diabetes.

52. Kim is on a vegetarian diet. Which of the following foods can provide the protein for one of her meals?

A. vegetable soup
B. spinach salad
C. tomato sandwich
D. egg salad sandwich

53. Which body system does the AIDS virus destroy?

A. circulatory
B. digestive
C. muscular
D. immune

GO ON TO THE NEXT PAGE.

54. Drugs that speed up body functions are called:

A. depressants.
B. stimulants.
C. carcinogens.
D. narcotics.

55. Which one of the following statements is **true**?

A. The virus that causes AIDS is called "HIV."
B. AIDS is a problem **only** among certain races.
C. It is not considered safe to give blood.
D. There is a vaccine to prevent AIDS.

56. Which one of the following is the **least** likely to help improve your self-concept?

A. caring friends
B. family closeness
C. finishing a project
D. negative thoughts

57. Which one of the following is the **least** risky behavior?

A. forgetting to wear your seat belt
B. using alcohol and other drugs
C. swimming in a public pool
D. sharing drug needles

58. The AIDS virus can **not** be transmitted by:

A. sharing drug needles.
B. casual social contact.
C. an exchange of body fluids.
D. an infected mother to her baby.

GO ON TO THE NEXT PAGE.

59. Which one of the following statements is **false**?

A. Community resources are available to help people with AIDS.
B. It can take several years before the symptoms of AIDS appear.
C. People who share drug needles are in danger of getting AIDS.
D. Many people have been infected with the AIDS virus through casual contact.

60. Which one of the following statements is **false**?

A. If you discover you have the AIDS virus early, you can be cured.
B. Blood for transfusions is now screened for the AIDS virus.
C. Community resources can give you good information about AIDS.
D. There are no known cases of the AIDS virus being transmitted by kissing.

STOP.

Appendix H

Letter to Enid Public Schools

1002 E. Virginia #3
Stillwater, OK 74075
December 20, 1990

Mr. Ray Woodson
Assistant Superintendent
for Elementary Education
Enid Public Schools
500 S. Independence
Enid, OK 73701-5693

Dear Mr. Woodson:

I am a doctoral student at Oklahoma State University. As you may recall, I contacted you earlier by phone regarding the use of at least two elementary schools within the Enid Public School System to assist in my dissertation research. The focus of my study is to develop a criterion-referenced health knowledge instrument for grades four, five, and six. The content areas I intend to cover are nutrition, substance use/abuse, and HIV/AIDS.

Enclosed, you will find a copy of the dissertation proposal. After you have reviewed it, I need you to write me a letter of approval **at your earliest convenience** so I can submit a copy of the letter to my doctoral committee as well as to the Institutional Review Board of Oklahoma State University.

If the proposal meets your approval, I will contact you around February of 1991 to discuss pertinent details of the test administrations. In the meantime, if you have any questions, please don't hesitate to call me at 372-4613 (H) or 744-5507 (OSU).

Thank you for your valued assistance.

Cordially yours,

Marilyn S. Massey

Steven W. Edwards, Ph.D.

enclosure

Appendix I

Enid Public Schools Permission

ENID PUBLIC SCHOOLS

ADMINISTRATION BUILDING
500 SOUTH INDEPENDENCE
ENID, OKLAHOMA 73701

January 16, 1991

Marilyn Massey
1002 E. Virginia #3
Stillwater, OK 74075

Dear Marilyn:

I have been in touch with our school nurse, Roxanna Hollrah. She has reviewed your proposal and feels it is good. You have my permission to use our schools to develop and evaluate health education programs in your dissertation research.

I will look forward to hearing from your about the first of February.

Sincerely,

Ray Woodson

Ray Woodson
Assistant Superintendent for
Elementary Education

RW:gk

Enid Public Schools 500 S. Independence
Enid, Oklahoma 73701 405/234-5270

January 15, 1991

Marilyn Massey
1002 E. Virginia #3
Stillwater, OK 74075

Dear Marilyn,

Ray Woodson asked me to review your dissertation proposal and offer any assistance that I could in helping you implement your program in the Enid Public Schools.

Your proposal is excellent and will provide valuable information to schools in developing and evaluating health education programs. Please feel free to call me any time. I look forward to working with you.

Sincerely yours,

Roxanna

Roxanna Hollrah, RN, SNP
Director of Health Services

237-7822 Home
234-5270 Work

Appendix J

Oklahoma State University

Institutional Review Board Permission

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
FOR HUMAN SUBJECTS RESEARCH

Proposal Title: The Development of a Criterion-Referenced Health Knowledge Instrument for Grades Four, Five, and Six

Principal Investigator: Steven W. Edwards/Marilyn S. Massey

Date: April 18, 1991 IRB # ED-91-033

This application has been reviewed by the IRB and

Processed as: Exempt [X] Expedite [ ] Full Board Review [ ]

Renewal or Continuation [ ]

Approval Status Recommended by Reviewer(s):

Approved [X] Deferred for Revision [ ]

Approved with Provision [ ] Disapproved [ ]

Approval status subject to review by full Institutional Review Board at next meeting, 2nd and 4th Thursday of each month.

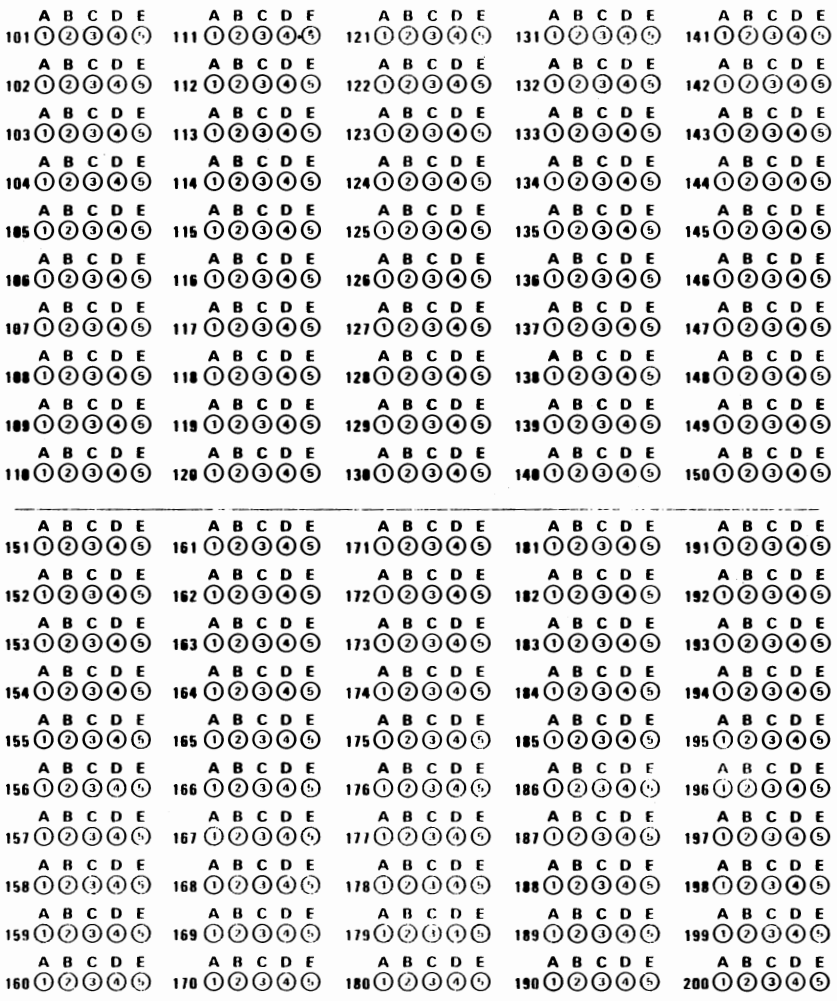
Comments, Modifications/Conditions for Approval or Reason for Deferral or Disapproval:

Signature: Steven W. Edwards Date: April 19, 1991
Chair of Institutional Review Board

Appendix K

Computer Scan Answer Sheet

169



GENERAL PURPOSE

NCS®

ANSWER SHEET

FOR PROCESSING BY OKLAHOMA STATE UNIVERSITY

TESTING AND EVALUATION SERVICE

EXAMPLES	IMPORTANT DIRECTIONS FOR MARKING ANSWERS
WRONG 1 ① ⊗ ③ ④ ⑤ WRONG 2 ① ② Ø ④ ⑤ WRONG 3 ① ② ③ ◕ ⑤ RIGHT 4 ① ② ③ ● ⑤	• Use #2 pencil only. • Do NOT use ink or ballpoint pens. • Make heavy black marks that fill the circle completely. • Erase cleanly any answer you wish to change. • Make no stray marks on the answer sheet.

DO NOT

WRITE

IN THIS

SPACE

Appendix L

Memo to Classroom Teachers

MEMO TO 4th, 5th,6th Grade Teachers
FROM: Ray Woodson RW
RE: Health Knowledge Survey
DATE: May 1991

Marilyn Massey is a graduate student at OSU completing her doctoral studies.. She has requested that we administer her Massey Health Knowledge Test to 650 students in the EPS. The survey will give us useful information about the effectiveness of our health curriculum. Please administer the test in your classroom on May , 1991. Four schools will be taking the test.

1. Review the directions on the first page of the booklet with the students.

2. Remind them **not to write in the booklets**...only on the answer sheet. We only received 325 booklets so they must be reused. Remind the students to erase any mistakes on the answer sheet well.

3. Students should use only a #2 pencil to mark their answers. They will be scored by computer at OSU.

4. **Do not have the students put their names on the answer sheet.** This must be an anonymous survey. Have them put their grade level (4 , 5 , or 6) in the first "Course Number" box and then blacken in the corresponding circled number below.

5. Teachers may pronounce a word for a child but should not define the word or explain the questions.

6. Each teacher should answer the following questions and return this sheet with the test booklets and answer sheets to Roxanna Hollrah. She will pick them up at each school.

Date test administered:

Time test started: Time test ended:

School: Grade:

Who administered the test:

Number of children taking the test:

Place test administered (classroom, auditorium, gym):

How do you feel about the readability of this test for the level of your students?

Did you or your students find any concerns or problems with the test?

Any additional comments?

Appendix M

Revised Health Knowledge Instrument

FORM A--REVISED

THE MASSEY HEALTH KNOWLEDGE TEST

FOR GRADES 4-6

DIRECTIONS

In this test, you are being asked to answer some questions about health.

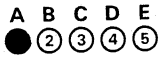
Be sure you understand the directions before you begin. You will have as much time as you need to finish the test. If you are not sure about the answer to a question, do your best to select the correct answer.

You will mark your answers on the answer sheet. Mark only one answer for each item. If you change an answer, be sure to erase the first mark completely; then select a new answer. Look at the sample item below:

SAMPLE: Vegetable oil and butter are among the main sources of:

A. fats.
B. minerals.
C. proteins.
D. vitamins.

Since vegetable oil and butter are among the main sources of fats, you would fill in space "A" on the answer sheet like this:



Remember, only one answer should be marked for each question. Use a pencil to mark the space; do not use a pen. If you change your answer, erase your first answer completely.

If you have any questions, ask the person in charge of the test.

When you are ready to begin, go on to the next page and read the directions.

DIRECTIONS: Do not write your name on this test booklet, and do not write your name on the answer sheet. Read each question, and mark the best answer for each question on your answer sheet.

1. Why are alcohol and tobacco products advertised?

   A. Alcohol and tobacco are popular products.
   B. People enjoy viewing the advertisements.
   C. The companies that sell them want to make money.
   D. People have extra money that they need to spend.

2. Which one of the following is the least likely to help you avoid using alcohol and other drugs?

   A. learning skills to help you deal with peer pressure
   B. allowing others to influence your decisions
   C. learning about the risks and dangers of each drug
   D. choosing friends who do not use these drugs

3. Which one of the following is the least likely to be associated with being overweight?

   A. high blood pressure
   B. high blood cholesterol
   C. heart disease
   D. lung cancer

4. Which one of these statements is true?

   A. People with AIDS do not deserve the support of family and friends.
   B. You can not tell by looking at a person whether he/she has the AIDS virus.
   C. AIDS is a problem only in large cities within the United States.
   D. You can get AIDS just by being in the same room with someone who has AIDS.

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5. Which one of the following statements is false?

   A. Fried foods contain low amounts of fat and calories.
   B. Proteins help build and repair body cells.
   C. Items in a food are listed on the food label.
   D. Fast foods often contain large amounts of salt.

6. One of the best sources of dietary calcium is:

   A. grape juice.
   B. a pork chop.
   C. low-fat milk.
   D. wheat bread.

7. Which one of the following should we limit in our diets?

   A. green beans
   B. fried foods
   C. citrus fruits
   D. whole grains

8. Which one of the following foods belongs to the meat group?

   A. potatoes
   B. cheese
   C. rice
   D. beans

9. Which one of the following statements is false?

   A. Cigarette advertisements influence you to think that smoking makes you more attractive.
   B. Young people often use alcohol and other drugs because their friends do.
   C. Using alcohol and other drugs can help you deal better with personal problems.
   D. Cigarettes and smokeless tobacco both contain a drug called nicotine.

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10. The main reason why people are overweight is because they:

    A. eat far more calories than they actually need for energy.
    B. sometimes eat meals and snacks that are not nutritious.
    C. usually eat three meals every day and drink too much water.
    D. forget to read food labels and consume too many carbohydrates.

11. One way to prevent AIDS is to avoid:

    A. hugging a person who has AIDS.
    B. sharing drug needles with people.
    C. swimming in a public pool.
    D. sitting by someone who has AIDS.

12. Which one of the following snacks is the most healthful?

    A. homemade brownies
    B. potato chips
    C. low-fat yogurt
    D. buttered popcorn

13. Which one of the following is the least important to consider when deciding whether to say "No" to a certain behavior?

    A. Will it go against my values?
    B. Will it be harmful to myself or others?
    C. Will it follow the rules set by my family?
    D. Will my friends make fun of me if I say "No"?

14. Which statement is false?

    A. Using narcotics can cause sleepiness.
    B. People who use crack rarely become addicted.
    C. Hallucinogens affect a person's senses.
    D. Using inhalants can cause brain damage.

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15. The individuals least likely to have good information about AIDS are:

A. nurses.
B. doctors.
C. teachers.
D. classmates.

16. An example of a drink that does not contain a drug is:

A. fruit punch.
B. wine cooler.
D. diet cola.
E. hot coffee.

17. The best example of a low-fat dairy product is:

A. whole milk.
B. skim milk.
C. ice cream.
D. cheddar cheese.

18. Which one of the following drugs speeds up body functions and can cause sudden heart failure?

A. heroine
B. morphine
C. cocaine
D. alcohol

19. Too much animal fat in a person's diet can lead to:

A. heart disease.
B. lung disease.
C. bone disease.
D. gum disease.

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20. Fruits and vegetables are good sources of vitamins and:

    A. fats.
    B. oils.
    C. proteins.
    D. minerals.

21. Which one of the following foods contains cholesterol?

    A. spinach
    B. cheese
    C. apple
    D. carrot

22. Which one of the following is the least likely to cause a person to take health risks?

    A. strong values
    B. peer pressure
    C. poor self-concept
    D. problems at home

23. Which one of the following statements is true?

    A. Poor self-concept can lead to drug use.
    B. People do not abuse drugs to escape problems.
    C. Alcoholism is a disease that can not be treated.
    D. It is considered safe to combine different drugs.

24. Which one of the following is the least likely to help fight infections?

    A. getting enough rest
    B. eating balanced meals
    C. watching television
    D. washing your hands

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25. Which one of the following substances is not a drug?

A. aspirin
B. caffeine
C. nicotine
D. dentine

26. To keep from getting AIDS, it is wise to:

A. get the AIDS vaccine yearly.
B. avoid sharing drug needles.
C. not touch someone with AIDS.
D. avoid using public restrooms.

27. Which one of the following lunches provides a serving from each of the basic four food groups?

A. ham sandwich, chocolate pudding, milk
B. hamburger, french fries, cola
C. tuna salad, crackers, iced tea
D. chicken sandwich, apple, milk

28. Which one of the following behaviors is the least likely to prevent you from getting AIDS?

A. learning ways to resist peer pressure
B. avoiding the sharing of drug needles
C. ignoring AIDS prevention information
D. seeking help for personal problems

29. Which one of the following foods is the best source of vitamin C?

A. orange
B. eggs
C. meat
D. milk

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30. Which one of the following provides the body with energy?

A. minerals
B. water
C. fiber
D. carbohydrates

31. A family member abuses drugs. The rest of the family should:

A. avoid the subject of drug abuse.
B. seek help for themselves from a counselor.
C. ignore the person with the drug problem.
D. act like nothing is wrong within the family.

32. A good source of dietary fiber is:

A. fried chicken.
B. potato chips.
C. bran cereal.
D. apple juice.

33. Which one of the following is the most well-balanced breakfast?

A. fried eggs, sausage, gravy, milk
B. ham, toast, orange juice, milk
C. bacon, muffin, doughnut, milk
D. cereal, toast, milk, coffee

34. Which one of the following factors is the <u>least</u> likely to affect a person's eating habits?

A. height
B. emotions
C. activity level
D. family customs

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35. Which one of the following behaviors is not considered safe use of drugs?

A. drinking colas and other beverages that have caffeine
B. taking prescribed medicine as the doctor ordered
C. taking an aspirin to relieve a headache or toothache
D. using alcohol/other drugs to escape life's pressures

36. Which one of the following statements is false?

A. We should limit animal fats in our diets.
B. Skipping meals can cause you to have less energy.
C. All persons need the same amounts of nutrients.
D. Boiling vegetables can cause a loss of vitamins.

37. You have just found out that your classmate's brother has AIDS. The best way to treat that classmate is to:

A. talk about him/her.
B. be a caring friend.
C. avoid contact with him/her.
D. transfer to another school.

38. Which one of the following statements is true?

A. There is no known cure for AIDS.
B. AIDS is caused by a fungus.
C. AIDS affects only males.
D. Only drug abusers have AIDS.

39. Which one of the following can not be caused by smoking?

A. emphysema
B. obesity
C. lung cancer
D. heart disease

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40. Which one of the following statements is false?

A. You can get the AIDS virus if you are sharing drug needles.
B. One goal of AIDS education is to prevent future cases of AIDS.
C. If a woman who has the AIDS virus is pregnant, her newborn baby will be infected.
D. Shaking hands with someone who has AIDS can cause you to get AIDS.

41. The best source for good information about nutrition is a:

A. magazine advertisement.
B. television commercial.
C. registered dietician.
D. grocery store clerk.

42. Which one of the following statements is false?

A. Smoking damages the functions of the heart and lungs.
B. Marijuana increases both heart rate and blood pressure.
C. Smokeless tobacco is a safe substitute for cigarette smoking.
D. Tobacco smoke is harmful for both smokers and nonsmokers to breathe.

43. If you are faced with peer pressure to do something that may put you at risk for becoming infected with the AIDS virus, what is the best action you can take?

A. Talk to a trusted adult about your problem.
B. Avoid your friends and think about it.
C. Ignore the risk and do it anyway.
D. Try to forget about the problem.

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44. Many alcohol-related deaths are due to:

A. hunting accidents.
B. car accidents.
C. liver disease.
D. heart disease.

45. Which one of the following statements is <u>true</u>?

A. It is safe to take another person's prescribed medicine.
B. Using over-the-counter drugs, like aspirin, is <u>totally</u> safe.
C. Medicine works better if you take more than the directions say.
D. Drugs have a variety of uses and affect people differently.

46. It is hard for people to stop smoking because they:

A. don't have enough free time.
B. are too lazy and don't try.
C. are addicted to nicotine.
D. don't know smoking is harmful.

47. The AIDS virus is transmitted by:

A. sharing food.
B. toilet seats.
C. insect bites.
D. body fluids.

48. Jay is upset because he had an argument with his sister. A friend tells Jay to drink some beer so he can relax and forget about the fight. What is the <u>best</u> action Jay can take in this situation?

A. Follow his friend's advice and drink beer.
B. Go home and ignore his sister for awhile.
C. Try to discuss the problem with his sister.
D. Stay at his friend's house for awhile.

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49. Which one of the following is the least likely to influence a person to use alcohol and other drugs?

A. musical ability
B. peer pressure
C. curiosity
D. boredom

50. Drinking alcohol can:

A. prevent you from thinking clearly.
B. speed up your nervous system.
C. help you use good judgment.
D. help you solve problems.

51. Using smokeless tobacco can cause:

A. oral cancer.
B. hair loss.
C. bronchitis.
D. diabetes.

52. Kim is on a vegetarian diet. Which one of the following foods is the best source of protein for one of her meals?

A. broccoli soup
B. spinach salad
C. tomato sandwich
D. egg sandwich

53. Which body system does the AIDS virus destroy?

A. circulatory
B. digestive
C. muscular
D. immune

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54. Drugs that speed up body functions are called:

A. depressants.
B. stimulants.
C. carcinogens.
D. narcotics.

55. Which one of the following statements is true?

A. The virus that causes AIDS is called HIV.
B. AIDS is a problem only among certain races.
C. It is not considered safe to give blood.
D. There is a vaccine to prevent AIDS.

56. Which one of the following is the least likely to help improve your self-concept?

A. caring friends
B. family closeness
C. finishing a project
D. negative thoughts

57. Which one of the following is the least risky behavior?

A. forgetting to wear your seat belt
B. using alcohol and other drugs
C. swimming in a public pool
D. sharing drug needles

58. The AIDS virus can not be transmitted by:

A. sharing drug needles.
B. casual social contact.
C. an exchange of body fluids.
D. an infected mother to her baby.

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59. Which one of the following statements is false?

A. Community resources are available to help people with AIDS.
B. It can take several years before the symptoms of AIDS appear.
C. People who share drug needles are in danger of getting AIDS.
D. Many people have been infected with the AIDS virus through casual contact.

60. Which one of the following statements is false?

A. If you discover you have the AIDS virus early, you can be cured.
B. Blood for transfusions is now screened for the AIDS virus.
C. Community resources can give you good information about AIDS.
D. There are no known cases of the AIDS virus being transmitted by kissing.

STOP

VITA

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