

ADOPTION BY STATES OF FEDERAL
SCHOOL HEALTH POLICY GUIDELINES FOR
HEALTHY EATING, PHYSICAL ACTIVITY AND TOBACCO

by

DIANE O. DUNËT

(Under the Direction of Laurence J. O'Toole, Jr.)

ABSTRACT

New forms of non-legislative government action have proliferated over the last 50 years, expanding the array of bureaucratic "tools of government." Guidelines issued by federal agencies are a tool used to recommend, rather than mandate, state and local government action. The intergovernmental nature of guidelines, lack of penalty for non-compliance, and reliance on bureaucratic or scientific expertise to develop content makes guidelines unique. This study examined guidelines from the federal Centers for Disease Control and Prevention in the 1990s recommending state adoption of school health policies for nutrition, physical activity, and tobacco. With cross-sectional data from the School Health Policies and Programs Study 2000, an index was created to assess the number of guidelines that were adopted as state-level policies. Correlation and multiple regression analyses of the 50 States and District of Columbia were used to compare adoption of CDC guidelines with adoption of legislation reported in the literature. Using the framework of diffusion of innovations theory, analyses identified the District of Columbia and the state of Alabama as consistent national leaders in the number of CDC

guidelines adopted. Analyses by geographic region also indicated consistent leaders and laggards within regions across the three substantive policy areas, with western states showing overall lower levels of policy adoption. An internal determinants model showed that characteristics such as state size, per capita income, and state liberalness were unrelated to guideline adoption levels. Overall, results suggest that guidelines adoption follows markedly different patterns from legislation. Study findings further suggest that analyses which combine policies to seek across-the-board determinants may obscure key determinants that are policy- or issue-specific. The strength of scientific evidence underlying a policy is suggested as a new variable for inclusion in future studies.

INDEX WORDS: Diffusion of innovations; Internal determinants; Guidelines; School health policy; Tools of government; Policy adoption

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DEDICATION

This dissertation is dedicated to my colleagues at the Centers for Disease Control and Prevention who are committed to scientific excellence and public service. Alongside of them, I am especially proud to be a "government bureaucrat."

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CHAPTER 1

INTRODUCTION AND BACKGROUND

Purpose of the Study

Adoption and implementation of guidelines issued by agency bureaucrats rely on the good faith of the intended audience. Guidelines implore, rather than mandate action or impose penalties for non-compliance. For this reason, federal policies such as guidelines have been categorized as “prayers” (Gormley, 1989). This dissertation examines federal guidelines for school health on nutrition, physical activity, and tobacco. The target audience for these guidelines is broad and intergovernmental: state departments of health and education, school districts, schools, school staff, parents, and community members. Using the diffusion of innovations theory as a framework, this study examines factors related to the diffusion and adoption of the federal school health guidelines at the state level. At the forefront of this examination is the question of whether certain states are “policy adoption leaders” and the extent to which factors such as economic and social conditions influence a state’s adoption of federal guidelines across different substantive areas. In the context of this study, because the federal government’s issuance of guidelines for school health is based on supplication rather than regulation, new and ironic meaning can be assigned to the term “prayer in schools.”

Tools of Government Action

Citizen attention is often drawn to the actions of law-making bodies. Efforts by advocacy groups and politicians to keep particular pending legislation in the news lead many people to perceive that the work of government is largely done in the Congress by the enactment of laws.

Perhaps inadvertently, the professional literature reinforces this notion if judged only by the volume of scholarly literature reporting empirical studies of policy adoption related to legislation. (See for example Canon & Baum, 1981; Clark, 1985; Daniels & Darcy, 1985; Downs, Jr. & Mohr, 1976; Elkin, 1983; Glick, 1992; Gottlieb, Lloyd, & Bounds, 1987; Gray, 1973; Kearns, 1992; Kolbe & Iverson, 1981; Mohr, 1969; Savage, 1985; Smith & Taebel, 1985; Walker, 1969; Weimer, 1980; Welch & Thompson, 1980.)

Upon closer examination, however, it is apparent that legislation is only one of many types of government action used to address public problems and to accomplish public goals. What is more, while legislation often sets a direction, conventional wisdom is that career civil servants provide the expertise to implement a law (Rourke, 1984). Bureaucratic action that may employ not only traditional policy tools such as purchase-of-service contracts and grants-in-aid, but may also draw upon policy innovations such as tradable permits, vouchers, loan guarantees, corrective taxes, and agency-made laws in the form of regulations that impose social or economic controls. Even further removed from legislative controls are federal guidelines which recommend rather than mandate action and which typically carry no penalty for non-compliance.

Over the last 50 years, the means or *tools of government* action used to accomplish public goals in the United States have expanded enormously, amounting to what Salamon (2002) calls a “revolution” and a “fundamental transformation” in the basic forms of government action. Since non-legislative policy tools are designed and implemented by bureaucrats, the study of policy tools is particularly relevant to the study of public administration both from a theory-building perspective of bureaucratic action as well as from the standpoint of understanding and improving administrative practice through systematic inquiry.

Guidelines as Policy Tools

Since 1983, several taxonomies of policy tools have been developed, each using a slightly different tool dimension as the basis for a classification scheme. (See Chapter 2 for a discussion of classification schemes of policy tools.) While some of the taxonomies allude to information-based policy tools, none of the classification schemes explicitly includes guidelines despite their wide use as a policy tool. Guidelines are formal statements issued by organizations such as federal agencies which urge a course of bureaucratic or citizen action based on professional judgment, scientific consensus, or both. Guidelines are hortatory and non-coercive in nature, carrying neither the force of law nor formal sanctions for non-compliance.

In his taxonomy of policy tools, Gormley (1989) includes policy controls he calls “jawboning” as being somewhere in the middle between policy tools that are coercive (“coercive control”) and policy tools which stimulate some kind of government action without specifying what the response should be (“catalytic controls”). Although Gormley does not mention guidelines *per se*, they might be classified as “jawboning” since guidelines encourage specific, prescribed action while still allowing flexibility and self-determination. Typically, issuers of guidelines rely on the professionalism and good faith of the target audience as a key to adoption and implementation rather than penalties for non-compliance. Gormley (1989) notes however that although hortatory policy may carry no formal sanctions, the risks of non-compliance with guidelines’ recommendations may include public embarrassment or political backlash. For example, a state may gain a reputation as being “backward” on a particular issue for failure to adopt certain federal guidelines.

Despite apparently being overlooked in policy tool taxonomies, guidelines are used in a variety of contexts within the government bureaucracy for different purposes and with varying degrees of intended effect. Some guidelines are aimed at business, for example:

- “Guide for Livestock Exporters” (U. S. Department of Agriculture, 2002);
- “Antitrust Guidelines for Collaborations Among Competitors” (Federal Trade Commission, 1999); and
- “Guidance on Payments of Iraqi-Origin Petroleum Pursuant to Licensed Purchasers” issued by the Treasury Department (Office of Foreign Assets Control, 2002).

Other guidelines are technical or scientific in nature such as the following:

- “Intramural Guidelines for the Euthanasia of Mouse and Rat Fetuses and Neonates” (National Institutes of Health, 2002);
- “Guidelines for Accessible Public Rights-of-Way” issued by the U.S. Department of Transportation (U. S. Access Board, 2002); and
- “Federal Guidelines for Searching and Seizing Computers” (U. S. Department of Justice, 2002).

Organized sets of guidelines may also relate to specific issues such as medical care, for example:

- As of August, 2002, 854 sets of clinical medicine guidelines were available on the World Wide Web at a site entitled “National Guideline Clearinghouse,” developed and maintained by the Agency for Healthcare Research and Quality, in partnership with the American Medical Association and the American Association of Health Plans Foundation (National Guidelines Clearinghouse, 2002).

Still other guidelines may be more administrative in nature, including the following:

- “Guidelines for Settlement of Federal Personnel Actions Involving Civil Service Retirement Benefits” (U. S. Office of Personnel Management, 2002);
- “Federal Poverty Guidelines” (U. S. Department of Health and Human Services, 2002); and
- “Employee Plans Examination Guidelines” (Internal Revenue Service, 2001).

Although guidelines may ultimately impact citizens, the effect of guidelines is often transmitted through organizations. For example, guidelines for childhood immunizations affect children and parents, but public health departments, health care organizations, and schools play an important role in enacting the guidelines by delivering vaccinations and monitoring compliance. Similarly, guidelines for tax deductions issued by the Internal Revenue Service may ultimately affect citizen tax reporting, but the impact of guidelines may be more directly felt by accounting associations and tax preparers. In fact, an organization may intentionally seek the publication of formal guidelines on an issue either for technical help or for the purpose of developing its own policies.

Guidelines may also be put to unexpected uses. For example, in his review of empirical studies on physician practice guidelines, Lomas (1991) concludes that although clinical medical guidelines frequently did not change the practices of physicians, the guidelines often served as the basis for insurance reimbursement policies and treatment algorithms used by health maintenance organizations.

Guidelines are often employed within an intergovernmental network of policy actors. Thus, the primary target audience for guidelines issued by one set of bureaucrats may be other

bureaucrats. For example, guidelines issued by the U. S. Centers for Disease Control and Prevention (CDC) on school health recommend adoption of particular policies and practices by state departments of health, state departments of education, school districts and schools (CDC, 1994; CDC, 1996b; CDC, 1997).

Another important feature of guidelines is the frequent reliance upon professional and bureaucratic expertise to develop and support recommendations. Panels or committees may conduct formal reviews of the scientific literature as part of the guidelines development process. For example, CDC's "Guidelines for School Health Programs to Promote Lifelong Healthy Eating" are supported by 229 citations from the scientific literature reviewed by the guidelines committee (CDC, 1996b).

While experts bring their personal knowledge to bear on guidelines development, equally important is experts' representation of key stakeholder organizations. Even when guidelines are not intended to reflect a consensus of opinion, federal agencies often intentionally seek the counsel and support of others. Rourke (1984) calls the practice of involving outsiders in internal deliberations of executive agencies "a tradition in American bureaucracy" (p. 141). As one example of this, 39 federal, national, and voluntary organizations participated in developing CDC's "Guidelines for School and Community Programs to Promote Lifelong Physical Activity Among Young People" (CDC, 1997).

In examining the role of public administrators in the arena of policy tools, Salamon (2002) identified skills needed for the contemporary practice of public administration: negotiation and persuasion; collaboration; bringing together multiple stakeholders for a common end in a situation of interdependence; and modulation of rewards and penalties in order to elicit

cooperative behavior. In issuing guidelines, agency bureaucrats must devote attention to scientific tasks as well as to tasks of contemporary public administration, all within the context of networked action. Clearly, guidelines represent an important and substantial body of work of modern public administrators, a body of work that deserves attention and research.

Guidelines at the Centers for Disease Control and Prevention

Some agencies are enabled by legislation to issue administrative laws or regulations which carry penalties for non-compliance. For example, Medicare providers and participants must abide by regulations that set eligibility requirements and reimbursement rates. However, in addition to the span of an agency's legal authority, the nature of bureaucratic actor and agency culture influences the selection of policy tool. For example, although CDC has the authority to issue regulations, this authority is used primarily in the areas of quarantine practices and clinical laboratory practices such as the Clinical Laboratory Improvement Amendments¹ (M. Kamph, CDC Office of General Counsel, personal communication, February 18, 2003). Rather than an exercise of legal authority, much of CDC's policy action is guided by an organizational culture that includes both public health leadership as well as partnership. CDC serves as a federal focal point in leading the advancement of public health practice at federal, state and local levels. The agency conducts and translates scientific and technical research on public health issues for national and international audiences. However, since public health practice is carried out at state and local levels, CDC joins in partnership with state and local public health departments to develop guidelines and recommendations that reflect implementation challenges at state and

¹ Clinical Laboratory Improvement Amendments (1988) established quality standards for all laboratory testing to ensure the accuracy, reliability and timeliness of patient test results regardless of where the test was performed. See <http://www.cms.hhs.gov/clia/progdesc.asp>.

local levels. CDC has traditionally worked closely with intergovernmental entities, the academic community, and non-governmental disease-related organizations such as the American Cancer Society. In recent years, new public-private partnerships have been cultivated with community organizations, professional organizations and private industry. For example, CDC works with community organizations to address human immunodeficiency virus (HIV); and in partnership with fruit and vegetable growers associations to address chronic disease through nutrition.

The notion of collaborative public health partnerships is so strongly engrained in CDC's organizational culture, that formal guidelines have been designed to ensure that collaboration and cooperation are adequately included in the development of all of the agency's guidelines. For example, in its 1996 publication CDC Guidelines: Improving the Quality (CDC, 1996a), the CDC outlined 13 primary tasks associated with the guidelines development process including a chapter entitled "Group Facilitation Techniques for Aiding Group Interaction and Decision-Making" (Dunet, 1996). This publication, nicknamed "Guidelines on Guidelines," urges bureaucrats in the agency to:

“(1) take a standardized approach to guideline planning and development; (2) document the scientific rationale for the public health actions being recommended; and (3) make both the process for development of the guideline and the rationale for the recommendation clear to the end user.” (CDC, 1996a, p. 11).

The volume of guidelines issued by CDC is substantial, covering technical, scientific, disease control, and administrative areas. In just the area of disease control, the agency listed in its 1996 inventory over 400 sets of guidelines including topics such as the following:

- Technical Guidelines on the Detection and Control of Cholera Epidemics (CDC, 2002d);

- Epidemic/Epizootic West Nile Virus in the United States: Guidelines for surveillance, prevention and control (CDC, 2001);
- Human Ehrlichiosis² in the United States, Prevention and Control (CDC, 2002c);
- Sexually Transmitted Diseases Treatment Guidelines 2002 (CDC, 2002b); and
- Guidance for Comprehensive Cancer Control Planning (CDC, 2002a).

In addition to the 400 sets of disease-control guidelines, CDC issues numerous other guidelines including book-length recommendations on technical and scientific issues. For example, guidelines for conducting public health economic evaluation were released in a book published by Oxford University Press entitled: Prevention Effectiveness: A Guide to Decision Analysis and Economic Evaluation (Haddix, Teutsch, Shaffer, & Dunet, 1996). CDC also issues routine technical and administrative guidelines on topics such as how to code health data used in national health surveillance systems and financial procedures for grantees (CDC, 1992). Intra-agency guidelines have been established for personnel, travel, emergency procedures, building management, parking, employee safety, and security.

During the 1990s, CDC issued three sets of guidelines for school health in these substantive areas: tobacco (CDC, 1994), healthy eating (CDC, 1996b) and physical activity (CDC, 1997). The guideline development process led by CDC included representatives of state departments of education, state departments of health, educators, scientists, representatives of nongovernmental organizations, other interested parties and the public. The format for each set of published guidelines is a brief review of the scientific and practice literature related to the

² Related to exposure to ticks.

guideline area, followed by recommendations for adoption of specific policies and practices at the state, school district, and school levels. The guidelines are hortatory in nature, drawing on scientific evidence and expert opinion as the basis for recommending policy action in states. Each set of guidelines was published in the Morbidity and Mortality Weekly Report, a weekly publication of the CDC systematically distributed to state and local health departments and available publicly on the Internet.

The volume of guidelines issued by CDC and the agency's serious attention to guidelines as a policy mechanism make CDC guidelines a logical choice for research on guidelines as a policy tool. Since this dissertation examines federal guidelines on school health policy, some background on the evolution of schools as a setting for health policy is useful in understanding the appropriateness of guidelines as a tool in this venue. The next section presents a brief discussion.

The Evolution of School Health Programs

In many countries, the national government directs a centralized education system and mandates school policies. Although the U. S. Constitution does not mention education, the state constitutions of all 50 states authorize the state legislature to provide for a system of public schools (Sweeney & Nichols, 1998). Thus, in the United States, responsibility for much education decision-making resides at the state level and not with the federal government. The evolution of school health guidelines can therefore be traced through state-level action.

The "modern school health era" began in 1850 with the issuance of a bureaucratic report: the Sanitary Commission of Massachusetts urged the inclusion of particular health-related components in the school curriculum. The report stated:

Every child should be taught early in life, that, to preserve his own life and his own health and the lives and health of others, is one of the most important and constantly abiding duties....Everything connected with wealth, happiness and long life depends on health; and even the great duties of morals and religion are performed more acceptably in a healthy than a sickly condition. (Stattuck, L., (1850). *Report of the Sanitary Commission of Massachusetts*. Boston: Dutton & Wentworth (facsimile ed), as cited in Means, 1975).

Soon after the release of this hortatory report, the medical and public health sectors began to take advantage of the “captive audience” of children in schools in order to further efforts to control communicable disease. For example, when New York City was faced with an outbreak of smallpox in the 1860s despite the development of a smallpox vaccine years earlier, education officials agreed to permit the board of health to examine children to determine whether they had been vaccinated. In 1870, guidelines made smallpox vaccination a prerequisite for school attendance (Duffy, 1974). Although some gains were made by schools in addressing student health, schools may also have contributed to the spread of disease during this period because of unsanitary conditions. Inspections by the New York City Board of Health in the late 1860s and early 1870s revealed filthy school environments lacking modern plumbing, and sometimes overrun by rats (Duffy, 1974).

In addition to school building inspections, routine “medical inspections” of children themselves began in 1894 in Boston which appointed 50 “medical visitors” to examine “ailing” children (Institute of Medicine, 1997). Increasingly, school nurses began to assume a major role in the daily medical inspection of students, treatment of minor medical conditions, and referral of major problems to physicians. However, the effectiveness of medical inspections was tempered by the Victorian attitude toward exposing the body. As late as 1914, guidelines prohibited school inspectors from touching children, and inspections were done with children fully clothed.

When in 1915 the New York City Board of Education introduced a new requirement that all children entering the school must undergo a physical examination without clothing, critics charged that school physical exams were an intrusion and a “violation of personal liberty, and hence contrary to the principles of a free government” (Duffy, 1974).

Throughout the history of school health, politically- and emotionally-charged issues continued to play a part. In this context, guidelines were sometimes used not only to set policy but also to diffuse problems. For example, school-based medical and dental clinics sprang up in the early twentieth century, providing services that included minor surgery performed on site in schools. In New York City in 1906, several volunteer physicians removed the tonsils and adenoids of 83 indigent children at Public School 75. Unfortunately, riots resulted when a rumor spread that “school doctors were slitting the throats of school children as a prelude to a general massacre of the Jews” (Duffy, 1974, p. 37). However, these rumors were found to have been instigated by private physicians who performed the same surgery for a fee and resented the schools doing the work for free (Duffy, 1974). Guidelines were issued, playing a role both in settling this controversy and in providing an enduring framework for school health services. The guidelines established in 1911 arose from a collaboration between the National Education Association and the American Medical Association and defined the role of schools in providing health services. The philosophy embedded in the guidelines was the basis for the traditional configuration of school health services between the 1920s and the 1970s that focused on instruction in topics such as personal hygiene rather than on the provision of health services to children (Institute of Medicine, 1997).

The idealism and politics of the Great Society initiatives of the 1960s and 1970s encouraged a holistic view of children's lives, resulting in new programs for children as well as an influx of funding for school health. By 1980 however, the pendulum swung in the other direction with the emergence of the "back to basics" movement which brought into question the role of health in school curricula. By the late-1980s there was a resurgence of concern for the health and welfare of children, with renewed focus on the potential for schools to address health and social problems.

At the CDC, the Division of Adolescent and School Health was created in 1988 to advance school health initiatives and to direct demonstration research projects. Federal guidelines for coordinated school health programs were developed, recommending inclusion and integration of eight components into school health programs: (1) health education; (2) physical education; (3) health services; (4) nutrition services, (5) health promotion for staff; (6) counseling, psychological, and social services; (7) healthy school environment; and (8) parent and community involvement (Kolbe et al., 1981).

During the 1990's, three sets of school health guidelines were issued by CDC on particular health topics: tobacco, physical activity and nutrition. These three sets of guidelines are the topic of this dissertation. As more fully described below, the guidelines provided recommendations for adoption of particular policies and practices at the state, school district, and school levels.

In 2003, some observers continue to question whether school health programs go well beyond the intended function of the schools. As in the past, intergovernmental struggles are apparent. In the early 1900's when the New York State legislature proposed a bill to provide for

sanitation, ventilation, and fire protection in schoolhouses, the bill was easily defeated with charges that it “smacked of interference and paternalism in local affairs” (Duffy, 1974). These charges are echoed today as some communities oppose bureaucratic guidelines for programs of sex education or mental health counseling, insisting that local preferences should determine local policy and practices.

Currently, federal agencies continue to support and influence education through funding, collaborations, research, technical assistance, training and information dissemination. In the area of school health promotion, a particularly important and influential way that federal agencies participate in school health is through the channels of program funding and the development and promotion of guidelines (Greene & McCoy, 1998). Notably, guidelines provide a non-coercive approach to policy promotion that allows local self-determination in policy adoption, adaptation, and reinvention.

CDC’s Guidelines for School Health on Tobacco, Nutrition, and Physical Activity

At the turn of the 20th century, solutions to the morbidities facing school children lent themselves to well-defined interventions such as immunizations, eyeglasses, improved sanitary conditions and child labor laws. At the turn of the 21st century, three chronic disease conditions account for almost two-thirds of all deaths in the United States: heart disease, cancer, and stroke (McKenna, Taylor, Marks, & Koplan, 1998). During the 1990s, CDC issued three sets of school health guidelines that are related to the prevention of heart disease, cancer and stroke by promoting healthful practices on tobacco, healthy eating and physical activity.

Tobacco Guidelines. CDC’s “Guidelines for School Health Programs to Prevent Tobacco Use and Addiction” (“Tobacco Guidelines”), attached as Appendix A, state that

smoking has been causally linked with coronary heart disease, several types of cancer, and stroke. Tobacco prevention and control programs in schools were initially linked with the temperance movement throughout the late nineteenth century and early twentieth century (Institute of Medicine, 1997). Although school children have long been a target for instruction on tobacco-use prevention and cessation, it is notable that the Tobacco Guidelines recommend adoption of policies affecting not only children, but teachers and other adults in the school building such as school staff, parents, and visitors. In addition, the Tobacco Guidelines include adoption of policies prohibiting smoking by adults and children at school-sponsored extracurricular events. Smoking cessation supports are encouraged to be provided for both children and adults.

Seven major recommendations are listed in the Tobacco Guidelines. Several specific guidelines are provided under each recommendation to address the following areas: establishment of policies on tobacco use in schools; instruction for students regarding tobacco; support for tobacco use cessation among students and staff; training for school staff; family involvement; and program evaluation.

Healthy Eating Guidelines. In 1922, a collaboration among the Child Health Organization, the U.S. Department of the Interior, and the Bureau of Education published and widely distributed guidelines for child health entitled “The Rules of the Health Game” (Means, 1975). Included among the 10 rules were the following nutritional guidelines:

- Drink as much milk as possible, but no coffee or tea.
- Eat some vegetables or fruit every day.
- Drink at least four glasses of water a day. (Means, 1975).

Until the 1940s, nutrition for school children was primarily addressed through didactic education as part of school health curricula. However, when many World War II draftees were found to suffer from nutritional deficiencies, the federal government in 1946 passed the National School Lunch Act to provide funds and surplus agricultural commodities to assist schools in serving nutritious hot lunches to school children. Although didactic nutrition education programs have been continued in some schools, the need has been recognized for integration of food service, nutrition education, and parental involvement in order to meet the goal of creating lifelong healthy eating habits in children (CDC, 1996b).

The U. S. Department of Agriculture and the U. S. Department of Health and Human Services publishes “Dietary Guidelines for Americans” every five years (U. S. Department of Agriculture & U. S. Department of Health and Human Services, 1995). These guidelines outline recommended levels of macro- and micro-nutrients for various population groups including children. In the 1990’s, policy and environmental changes that support and encourage healthy eating have been recognized as potentially important strategies in meeting the nutritional recommendations for school children. CDC’s “Guidelines for School Health Programs to Promote Lifelong Healthy Eating” (“Healthy Eating Guidelines”) (CDC, 1996b) contain seven major recommendations that collectively provide a conceptual framework for school health programs and practices in support of lifelong healthy eating. Each recommendation contains additional guidelines related to school food service policies and practices; integrating school food service with nutrition education; family and community involvement in programs to promote healthy eating among school children; and program evaluation. The Guidelines are attached as Appendix B.

Physical Activity Guidelines. As early as the colonial period, Benjamin Franklin promoted inclusion of physical exercise as one of the primary subjects in the schools that were developing during his time. Despite Franklin's foresight, physical education was not widely practiced in schools until the 1920s. When many World War I draftees failed their military physical examination, there was a move to require physical education in schools (Kort, 1984; Lee & Bennett, 1985). In the 1960s, the President's Council on Physical Fitness encouraged school children to become physically fit and many schools emphasized physical exercise in the form of structured and repetitive movements such as calisthenics.

Lack of physical activity in adulthood has been shown to contribute to the risk of chronic diseases including heart disease, stroke, and cancer of the colon (CDC, 1997). In contrast to structured physical education, physical activity includes walking, bicycling, unstructured play, dancing, doing household chores or another job that has physical demands. Physical activity declines precipitously with age among adolescents (CDC, 1997). A public health goal is to increase children's opportunities to experience and enjoy physical activities that can become lifelong habits. CDC's "Guidelines for School and Community Programs to Promote Lifelong Physical Activity Among Young People" ("Physical Activity Guidelines") (CDC, 1997) lists 10 major recommendations together with a series of guidelines in areas such as establishment of environments that promote physical activity; instruction for students; training for school staff who teach physical education; family and community involvement in promoting physical activity for young people; and program evaluation. The Guidelines are attached as Appendix C.

Interestingly, despite the traditional view that agency bureaucrats promote conservative policies to maintain the *status quo*, the CDC school health guidelines provide an example of

agency action that promotes policy innovation. The practices and policies in the three sets of CDC school health guidelines recommend exemplary policy and, in some cases, ideals yet untried. Thus guidelines may be used both to promote specific policies as well as to stimulate bureaucratic innovation in states.

Adoption of Federal Guidelines by States

Issuance of guidelines marks the beginning, not the end, of a process of diffusion and adoption by state and local entities. Even when representatives and experts from state departments of education or departments of health participate in a guideline development process as they did with each of the three sets of CDC guidelines presented above, there is no assurance that state and local authorities will adopt and implement recommended policies. When the ideas inherent in guidelines meet the practical and political realities in various contexts, new questions arise regarding the patterns of diffusion and adoption of policies recommended in federal guidelines. For federal public administrators, understanding the diffusion process through a theoretical lens may provide insights useful in promoting the adoption of guidelines intended to improve the well being of citizens—either directly or indirectly through intergovernmental channels.

The history of state innovations in school health presented above suggests the possibility that certain political subdivisions may be leaders. For example, New York City was the first to implement several new health policies as were the State of Massachusetts and the city of Boston. Innovations developed in these places were eventually adopted by other states or local entities. One way to examine the diffusion of new policy is through the theoretical framework of diffusion of innovations theory (Rogers, 1995). This theory explicitly addresses the question of

regional and national leadership among entities which adopt innovations such as new policies. Policy diffusion can be distinguished from policy transfer, policy convergence, and lesson-drawing which, although related, include instances when a policy is modified or adapted from the original (Dolowitz & Marsh, 2000).

Diffusion of Innovations Theory

Although there is no assurance that state and local authorities will follow federal guidelines, many federal recommendations are indeed adopted by states. In some cases, states may look to the federal government for technical expertise and policy leadership. In other cases, federal recommendations may smooth the way for states to adopt the policies desired while softening potential local political backlash. The diffusion of innovations theory (Rogers, 1995) has been used for at least 30 years in political science to study the patterns of adoption of legislation in the group of 50 United States.³ According to Rogers, an *innovation* is defined as “an idea, practice, or object perceived as new by an individual or other unit of adoption” (Rogers, 1995, p. 11). An innovation is new relative to each person or organization. Even if others have put the idea into practice, the idea is still considered an innovation to a potential adopter. Consistent with this definition and the application of the term in political science research to legislative policy, for purposes of this dissertation “innovation” is defined as a new policy regardless of its content.

³ Although “innovation” in the public management literature appears to have acquired a focused definition relating to new management practices intended to improve operating effectiveness (see for example, Angle & Van de Ven, 1989; Daft, 1998; Peters & Waterman, 1982), in the political science literature “innovation” is commonly more broadly and generally defined to include new policy as a category of innovation. (See for example Berry & Berry, 1990; Daniels et al., 1985; Glick, 1992; Roessner, 1979).

Diffusion of innovations theory arose from the research traditions of rural sociology. Rogers describes the landmark study of Ryan and Gross (1943) who examined the diffusion of an agricultural innovation through bureaucratic and other channels. Hybrid corn was developed by Iowa State University and was released to Iowa farmers in 1928. The new seed not only increased corn yields by about 20 percent per acre, the seed fostered a set of agricultural and technological innovations in the 1930s through the 1950s such as mechanical harvesters that amounted to a revolution in farm productivity. Agricultural Extension Agents heavily promoted the new seed, actively making recommendations to farmers for the adoption of the innovation. Although hybrid corn provided a high degree of advantage over the open-pollinated seed that it replaced, the typical farmer surveyed in the study averaged about nine years from awareness of the seed to adoption of the innovation.⁴ Ryan and Gross observed that the diffusion of this innovation amounted to a kind of social snowball effect and noted the importance of communication networks in the diffusion process.

Rogers defines *diffusion* as “the process by which an innovation is communicated through certain channels over time among members of a social system” (Rogers, 1995, p. 10). On a daily basis, people are confronted with a myriad of alternatives among innovations: new products, new technologies and new practices; and in the bureaucracy, new policy recommendations. According to the diffusion of innovations theory, a person may experience discomfort with the lack of certainty and predictability about innovations, knowing neither which innovations to consider nor which to adopt. This discomfort can be relieved by information

⁴ As evidenced by a farmer's planting 100 percent of acres devoted to corn production with hybrid seed.

obtained through formal and informal communication, through media, or by observing others using an innovation—all of which channels were apparent in the Iowa hybrid corn example.

In the diffusion of innovations theory, it is assumed that interaction among potential adopters exerts influence on adoption. Interaction provides information which, in turn, promotes adoption of innovations such as new policies. As more fully discussed in Chapter 2, studies of policy adoption based on diffusion of innovations theory typically examine the influence of interaction among policy-makers at either a regional or national level. One dimension to diffusion of policy is the decision to adopt or not adopt a new policy. Another dimension is the rate at which policy innovations spread among adopters.

As of 1995, Rogers identified over 3,900 diffusion publications that use the diffusion of innovations theory to study innovations, adopters, or both, in areas ranging from economics to public health to industrial engineering. Diffusion of innovations theory predicts that the rate of adoption of an innovation will follow a normal distribution, reflecting the differing behavior of individuals. Individuals can be sorted into five “adopter categories:” (1) innovators, (2) early adopters, (3) early majority, (4) late majority, and (5) laggards (Rogers, 1995, p. 37).

Based on the original theory promoted by Rogers in his first book *Diffusion of Innovations* in 1965 and refinements through his 5th edition in 1995, Rogers asserts that there are characteristics of an innovation itself which affect the rate of adoption. These are as follows.

1. Relative advantage. Innovations with greater perceived economic, social, or convenience benefits are more likely to be adopted.
2. Compatibility. Innovations perceived to be consistent with the adopter’s values, experiences, and needs are more likely to be adopted.

3. Complexity. Complexity may slow adoption since innovations perceived to be difficult to adopt are less likely to be adopted.
4. Trialability. When people can experiment with an innovation on a limited basis, an innovation is more likely to be adopted. For example, having an opportunity to use a personal computer in a work setting allows trialability which may promote purchase of a computer for home use.
5. Observability. When others can be observed using an innovation, discussion may be stimulated, allowing a potential adopter to gain information. With more information, a potential adopter is more likely to adopt an innovation. For example, solar panels on a house are more observable than use of electronic equipment inside the home. Thus, neighbors are more likely to ask about the solar panel innovation, learn about it through discussion, and more quickly adopt it for themselves.

To summarize, the elements of diffusion of innovations theory are: an innovation; the process of diffusion of information among members of a social system; and adoption of the innovation. The federal guidelines on school health provide an opportunity to study the policy innovation in the form of CDC guidelines; diffusion of information among members of the bureaucratic “social system” of state departments of health and education; and adoption by state entities of policies recommended in the federal guidelines.

Internal Determinants Model

As explored more fully in Chapter 2, in contrast to studies based on the diffusion of innovations theory, policy research has often focused on a set of explanatory variables arranged into an “internal determinants model.” These models seek to explain policy adoption based on

certain internal characteristics of a state, assuming that each state is fully independent of the actions of other states. Unlike the diffusion of innovations models that focus on interaction, internal determinants models assume that interaction among states exerts no influence on policy adoption. Rather, the probability of a state's adopting a particular policy increases when the circumstances or needs within a state are compatible with the state's characteristics relevant to the policy being considered. Both circumstances and characteristics are influential in internal determinants models. For example, a budget shortfall in a state (circumstance) may lead to consideration of adoption of a lottery but may only be adopted in states without a strong religious opposition to gambling (characteristic).

Research Question

Understanding the diffusion of new legislative policy has been of interest to researchers for at least the last 30 years. The origins of this line of policy research are usually attributed to Walker (1969) who used the diffusion of innovations theory as a framework to examine policy adoption at a state level, concluding that regional interaction patterns influenced adoption of legislation. In 1973, Gray advanced an internal determinants framework, also with an empirical study of legislative policy (Gray, 1973). In 1978, Savage returned to the diffusion of innovations theory but devised a national, rather than regional, interaction model, again examining legislative policy (Savage, 1978).

As noted by Sabatier (1999), although many models have been used to study policy adoption, there is no consensus on which models best provide a framework. Understanding policy adoption becomes even more challenging as the array of policy tools continues to increase. Essential to theory-building is empirical evidence both within policy areas as well as

across policy areas. As discussed in Chapter 2, research to date on the diffusion of policies has focused primarily on legislative policy across substantive areas. What remains lacking are studies of contemporary non-legislative policy tools as well as studies which examine adoption of different policies within the same intergovernmental context.

Even a brief examination of bureaucratic policy-making shows that guidelines are an important and widely-used tool of public administrators. Despite the volume of guidelines issued, they have not been widely studied. To date, guidelines have not even been explicitly included in policy tool taxonomies. Guidelines deserve focused attention not only for the opportunity to understand policy tools but also because they represent a substantial body of contemporary bureaucratic action. School health represents an important area of government service as well as bureaucratic policy. CDC's issuance of three sets of school health guidelines (tobacco, physical activity, and healthy eating) affords an opportunity to examine guidelines directed at the same audience in the same context but with different substantive areas.

This dissertation addresses the following research questions:

1. What model best explains diffusion of guidelines for CDC school health policies on tobacco, healthy eating and physical activity?
2. What differences exist in CDC school health policy adoption across different substantive policy areas?

Three models will be explored: regional and national models based on the diffusion of innovations theory; and an internal determinants model. The models will be applied to the guidelines on healthy eating, physical activity and tobacco as a combined set. For the second question, the differences across the three substantive policy areas will be examined. The

research questions are intentionally narrow, allowing a sharp focus on one type of policy tool in context (guidelines issued by CDC). This approach holds constant many context- and time-related variables, allowing a close examination of guidelines directed to the same intergovernmental audience. The research has the potential to contribute to theory-building in public administration by examining differences in policies which arise from a bureaucratic process explicitly underlaid by technical and scientific expertise as compared to legislation arising from a political process. The research may also add to the body of evidence on policy tools, and perhaps, by adding guidelines to the roster of policy tools taken seriously. For public administrators, this study has the potential to contribute both to the practice of public administration in general as well as to public health administration in particular. Bureaucratic action that can be supported by theory-based research strengthens the practice of public administration. Understanding school health policy diffusion in a theoretical framework may allow agency bureaucrats to better target policies.

Chapter 2 presents a review of the relevant literature beginning with a discussion of the taxonomies of policy tools. This discussion is followed by a review of empirical literature on policy adoption using (1) regional models based on diffusion of innovations theory; (2) national models based on diffusion of innovations theory; and (3) internal determinants models. Finally, a brief review of the literature on adoption of school policies concludes the chapter.

Chapter 3 lists the hypotheses, describes the data set in detail, and explains the research methods used to test the hypotheses. Data limitations and other limitations of the research are explained. Chapters 4, 5 and 6 present the results of the analyses based on three frameworks.

Chapter 7 provides a synthesis of the three theoretical models and highlights key findings. Chapter 8 discusses and interprets the findings of the study and considers the implications of the study for public administration theory and practice. Chapter 9 offers conclusions and recommendations for further research.

CHAPTER 2

REVIEW OF THE LITERATURE ON POLICY INNOVATIONS

From pastel-colored Hush Puppy shoes to a New York City anti-crime campaign, Gladwell (2000) gives many examples of innovations that started slowly, gradually building momentum to a critical mass or “tipping point” where the phenomenon took a sudden turn and began to spread very rapidly, much like a disease epidemic. In the private sector, some organizations aggressively and systematically seek innovations in order to maintain a profitable advantage. Research and development teams create new products or product variations; marketing teams work to create a perceived need in the public for a new product.

A kind of marketing also exists in the political arena. Stone (1989) writes: “There is an old saw in political science that difficult conditions become problems only when people come to see them as amenable to human action.” By framing social problems as opportunities for government intervention, politicians may undertake a kind of marketing campaign, pointing to a public problem while offering a partisan solution.

In contrast to innovation in politics, innovation in government organizations reflects the distinctive role of agencies. For example, bureaucrats may wait for a problem to occur or a public need to arise, and only then begin looking for a solution that may involve an innovation such as a new policy or new technology (Nelson & Winter, 1977). On the other hand, as stewards of the public good, bureaucrats may also intentionally seek to identify potential problems in order to prevent their consequences. In the case of school health guidelines issued by the U. S. Centers for Disease Control and Prevention (CDC), government social scientists

intentionally sought to identify problems and potential problems in the health of school children. To address these problems, policy options were developed through a systematic assessment of scientific research. In contrast to government-issued mandates that require or force state action, the CDC guidelines instead recommended the adoption of innovative policies, in effect “marketing” policy strategies to states as a way to address social needs of children throughout the nation.

In order to gain insight into the phenomenon of guidelines as a unique tool of government, this dissertation examines CDC’s school health guidelines as an example of government action informed by scientific research, and recommending the adoption by states of particular policies. The chapter presents a review of the relevant literature beginning with innovation in government and then examining issues related to guidelines as a particular tool of government. The chapter is intentionally focused on discretionary (rather than mandated) action since guidelines recommend, rather than require action.

The first of five sections presents a brief review of the literature related to motivation for innovation in the public sector. In the second section, several competing policy tool taxonomies are presented, each followed by a brief discussion of the potential for guidelines to fit into its classification scheme. The third section presents research models reported in the literature for the study of policy innovation including internal determinants models, national interaction models, and regional interaction models. Fourth, a brief overview of major areas of influence in school health policy are presented as a context for the guidelines examined in this dissertation. The fifth section highlights recent developments both in conceptual frameworks for the study of policy innovation as well as in methodologic approaches.

Motivation for Innovation in the Public Sector

Before examining policy innovation studies, it is useful to examine briefly the question of why government organizations innovate. Innovation can be defined as “an idea, practice, or object perceived as new by an individual or other unit of adoption” (such as an organization) (Rogers, 1995). According to property rights theorists, there are disincentives for innovation in the government sector arising from the absence of a competitive environment and the inability of government to capture and retain the full marginal gains from an action. Following this line of argument, the lack of competitive environment implies that public organizations will be less efficient, less responsive to demand, and less innovative than private ones (Roessner, 1979). An opposite conclusion can be reached with arguments based on public choice economics: government organizations may be highly motivated to seek innovations in order to keep citizens satisfied (Dye, 1990; Elkin, 1983; Gray, 1994; Gray, 1973; Ostrom, 1999). Economic arguments remain unsettled regarding whether or not it is reasonable to expect government entities to be innovative, however empirical evidence has demonstrated that government organizations do adopt innovations at a rate that is at least sometimes the equivalent of private sector organizations, for example in certain public hospital services and technologies (Roessner, 1977). In addition, new forms of policy tools in and of themselves may be considered government innovations that have widely diffused.

Although both public and private organizations innovate, the reasons for innovation in each may arise from innate characteristics of their employees. Differences in employee motivation and incentives in government and non-governmental settings have been well documented. (For an extensive discussion of the topic, see Rainey, 1997). Government

managers, for example, are more intrinsically motivated than their private counterparts by a desire for recognition and prestige within an organization. Weimer (1980) posits that these characteristics may influence the propensity for adopting innovations:

...managers in public industry...may gain from adopting an innovation (in terms of prestige from increasing service levels or increased organizational slack to make management easier), but they will not be punished for not adopting. (Weimer, 1980, p. 96).

Not only are bureaucrats motivated by a desire for social prestige and recognition, public spiritedness and idealism also play a role in the public sector that can influence innovation. Rainey (1983) found that agency managers rated the “opportunity to engage in meaningful public service” as more important than managers in private firms. In one of the earliest studies of innovation in local public health departments, Mohr (1969) examined the relationship between policy actors and policy innovation, finding that higher levels of “activism and ideology” of the local health officer were positively related to the rate of adoption of innovative public health programs. Thus, factors that motivate *individual* bureaucrats may ultimately have an impact on whether or not a governmental *organization* adopts an innovation.

Another somewhat unique factor in the public setting that influences innovation is the surrounding political environment. Roessner (1979) suggests that politicians may promote adoption of a “solution” to a non-existent problem in order to win favor among their constituents. The level and type of innovations adopted may also be influenced by citizen opinion reflected in democratic elections whereby representatives are expected to respond to citizen preferences.

Of course, the technological and social environments surrounding an innovation also exert an influence. Owen, Ntoko, Zhang and Dong (2002) note that rapid mass adoption of innovation may result by lowering perceived risk to all members of a social system. They also suggest that without an appropriate infrastructure, innovations may not be adopted.

Policy Adoption as Innovation

School health policy guidelines are based upon scientific evidence and professional judgment; however they are also motivated by a desire to encourage improvements in public health practice and move the field forward. In the political science literature, “innovation” is commonly defined as enactment of legislation, with regard neither to the content of the policy nor the importance of its effect (see for example, Berry & Berry, 1990; Daniels & Darcy, 1985; Glick, 1992; Roessner, 1979). In the public management literature, “innovation” has acquired a definition relating to new management practices intended to improve operating effectiveness regardless of whether a policy is adopted in connection with the improvement (see for example, Angle & Van de Ven, 1989; Daft, 1998; Peters & Waterman, 1982). In the public management literature, “innovation” is commonly equated with cutting-edge ideas.

In this dissertation, “innovation” is defined as the adoption of a policy regardless of its content. Two concepts are embedded in this definition: (1) formal policy adoption and (2) an intention to make an improvement. The terms “innovation” and “policy adoption” are used interchangeably throughout the remainder of this dissertation. “Policy diffusion” is also distinguished from such concepts as “policy learning” because policy diffusion does not connote any specific mode by which the spread of policy innovations occurs (Jorgens, 2001).

Some public entities may engage in innovation because they are specifically charged with the task of developing new policies. According to the Institute of Medicine's report *The Future of Public Health* (Institute of Medicine, 1988), one of the three vital functions of a state public health agency is policy development. Similarly, state boards of education play a key role in policy development, ranging from general guidance to setting strict protocols for such things as health records (Sweeney & Nichols, 1998). Therefore, notwithstanding political and other motivational factors, bureaucrats may see policy innovation as a specific job responsibility.

Nice (1994) notes that in some instances policy change may consist of repeal of existing policies, for example the deregulation of intimate behavior. Thus, repeal of an existing policy could be construed as an innovation. However, policy changes that involve innovative changes to existing policies are often evidenced by new legislation such as the U.S. Constitutional Amendment that marked the onset of Prohibition and another that marked its end. Therefore, for purposes of this dissertation, innovation is considered to be a new policy regardless of whether its purpose is to impose or to repeal.

Policy Tool Taxonomies

The use of a particular policy tool may be promoted as an end in and of itself. For example, purchase-of-service contracting has been heartily endorsed by conservative politicians as a way to reduce the rolls of government employees and cut costs. In other cases, bureaucrats may select a policy tool to match an intended policy goal. The type of policy tool used is not neutral; rather its type may influence policy adoption at a state level. For example, Welch and Thompson (Welch & Thompson, 1980) studied civil rights, transportation and economic policy, finding that incentives worked to speed policy

diffusion from the federal government to states, while innovations that spread more slowly were associated with penalties.

As noted in Chapter 1, the range of policy tools available has expanded enormously in the late 20th century. Between 1983 and 2002, several taxonomies of policy instruments have been advanced, each using a slightly different tool dimension as the basis for groupings. The next several sections present taxonomies of traditional and contemporary policy tools and their underlying theories. A key theme among the taxonomies, and especially the most recent, is the notion of identifying characteristics of policy tools so that they can be appropriately matched to policy goals, thereby increasing the chances that policies will have the intended impact on society. However, despite their widespread use in government, “guidelines” have not been explicitly included in any of the taxonomies to date. With one exception, guidelines do not fit well into the categories created by the various authors as discussed below.

Hood’s Taxonomy. In one of the earliest classification schemes, Hood (1983) asserted that the tools of government can be studied in order to understand government itself, in much the same way as an anthropologist can understand a civilization by examining its artifacts. Hood draws on a form of systems theory called cybernetics which deals with how systems function and how they communicate with other systems or with their own components. Hood focuses specifically on the interface of government and citizens as a system. The resultant classification scheme is based on two different dimensions of government: (1) the role of government for which a tool is used; and (2) the governmental resources the policy enlists. On Hood’s first dimension, government uses a tool to obtain information (with tools classified as “detectors”); or in other cases, policy tools aim to have an impact on citizens (with tools classified as

“effectors”). On Hood’s second dimension, government resources are organized by *nodality*, or place in a communication network; *treasure* or resources; *authority* or legal power; and *organization* or the physical ability to act.

Guidelines were not included in the types of policy tools assessed by Hood and do not easily fit within the framework primarily because of Hood’s emphasis on the interface of government with citizens. As discussed at length in Chapter 1 of this dissertation, the audience for guidelines is often bureaucrats in their professional roles rather than ordinary citizens. Although guidelines intended for a citizen audience could be classified as “effectors” under Hood’s first criterion in the taxonomy, further classification even for this type of guideline would be difficult under his framework. For example, under the dimension of “treasure,” Hood divides policy tools based on the resources associated with the desired citizen action. The use of resources to implement guidelines varies however--sometimes needing the expenditure of resources--but other times not. For example, a physical activity guideline calling for parents to reduce or limit a child’s time spent watching television has no associated cost (other than, perhaps, a parent’s exasperation in having more personal contact with an unoccupied child). On the other hand, a guideline recommending that physical education teachers be professionally trained could result in increased costs for teacher training or higher salaries for better-trained teachers. As seen in these examples, it would not be possible to generally classify physical activity guidelines under the dimension of “treasure” in the Hood framework. The other dimensions of this framework present similar conceptual challenges.

McDonnell and Elmore’s Taxonomy. In contrast to a focus on government roles and resources, McDonnell and Elmore (1987) use intervention strategies themselves as the basis for

sorting policy tools into four major divisions: (1) mandates or rules which require action; (2) inducement tools that transfer money in return for certain actions; (3) capacity-building tools that involve the transfer of money as an investment for future action; and (4) system-changing tools that transfer official authority among individuals to allow action. McDonnell and Elmore (1987) point out that how a public problem is framed often points to a particular policy tool “solution.”

Once again, guidelines do not fit into this classification scheme for several reasons. Guidelines are not rules or mandates; rather they are hortatory in nature, imploring rather than demanding action. Second, guidelines do not involve the transfer of money, as would be required in the McDonald and Elmore categories of inducements or capacity-building. Finally, guidelines do not involve the transfer of official authority; rather the strength of guidelines is often by virtue of the credibility and reputation of the issuing agency.

Schneider and Ingram’s Taxonomy. Schneider and Ingram (1990) focus on citizens (“targets”) or other agents for action, rather than policy-makers in their classification scheme. These authors begin with an assumption that policies almost always attempt to get people to do things that they might not do otherwise; or enable people to do things they might not have done otherwise. In their framework, Schneider and Ingram link their assumptions about human motivation with expected behavior, resulting in five categories of policy tools. (1) *Authority tools* rely on the inherent legitimacy found in hierarchical arrangements, such as when citizens stop for a red traffic light even at 2:00 a.m. when there is no other traffic. (2) *Incentive tools* assume that individuals are utility maximizers who will change their behavior in accord with the net tangible payoffs offered by a situation. (3) *Capacity tools* assume that individuals may lack information, resources, skills, or may rely on decision heuristics; however these biases and

deficiencies can be corrected by policy. (4) *Symbolic or hortatory tools* assume that individuals are motivated from within, and that policy can induce the desired behavior by manipulating symbols and influencing values. (5) *Learning tools* assume that agents and targets do not know what needs to be done, or what is possible to do, and that policy tools can be used to promote learning and consensus building (Schneider & Ingram, 1990, p. 527). Schneider and Ingram argue that those who select and employ a particular policy tool reflect certain underlying beliefs about human motivation and action.

Schneider and Ingram's framework is intentionally focused on citizens as targets. As with Hood's taxonomy, the focus on citizens limits the possibility that guidelines directed at bureaucratic action can be fit into the framework. Of course, some guidelines are aimed at individual citizens and could be classified as "capacity tools" when they provide information that citizens lack. For example, guidelines on childhood immunizations could be construed as advising individual parents about the inoculations their children should receive. As discussed in Chapter 1, many guidelines are aimed not at citizens but at bureaucrats and other professional audiences. Thus, even with the immunization example, organizations including public health departments, the health care system, and schools may be more important audiences.

"Learning tools" under the Schneider and Ingram framework are policy tools used by organizations in "promoting learning" and "building consensus." Despite the fact that guidelines development processes often include consensus-building activities, guidelines themselves may not be intended to build consensus. Instead, federal policies may be intended to advance and improve professional practice, or "raise the bar."

Intuitively, one would assume that guidelines should fit into the category of “symbolic or hortatory tool” in the Schneider and Ingram model. However guidelines are precluded from being classified as such because guidelines often contain scientific or background information. Schneider and Ingram limit their category of symbolic or hortatory tool in this way:

It is important to notice that symbolic and hortatory tools do not alter the tangible payoffs in the situation, *nor do they insert factual information* or resources into the decision situation [emphasis added]. (Schneider & Ingram, 1990, p. 521).

Overall, retrospectively fitting guidelines into the Schneider and Ingram framework is at best clumsy.

Gormley’s Taxonomy. Taking a very different stance, Gormley (1989) redefines “tools of government” to explicitly mean not only bureaucratic action but the “tools by which government officials control *other government officials*, either directly or through surrogates [emphasis added]” (p. 11). Gormley contends that such controls are less visible and less controversial than controls aimed at citizens. He further asserts that the tools of government not only provide a basis for classification but, on a deeper level, the controls imposed by the tools of government reflect an ongoing struggle to balance bureaucratic authority with bureaucratic discretion. In his book, *Taming the Bureaucracy: Muscles, Prayers and Other Strategies* (1989), Gormley examines bureaucratic power and control in addition to presenting his taxonomy of policy tools.

According to Gormley, coercive controls (“muscles”) reduce bureaucratic discretion and are intended to “tame the bureaucracy.” He associates coercive controls with the New Deal era, noting that coercive controls may provide speed, coherence and predictability. The trade-off, however, is that with coercive controls, discretion is reduced without reducing bureaucratic

vulnerability to criticism. Less coercive controls afford greater bureaucratic independence which Gormley suggests has roots in the Progressive Era. Catalytic controls (“prayers”) require action by raising consciousness of bureaucrats without forcing a predetermined course of action. Examples of catalytic controls in modern public administration include environmental impact statements, Freedom of Information Act requirements, and ombudsmen, all designed to attract bureaucratic attention and spur bureaucratic action.

Gormley asserts that:

In many policy settings, neither muscles nor prayers will work. Muscles may trigger unnecessary resentment, rigidity, and litigation; prayers may result in slow, fitful progress toward important social goals. Fortunately, the bureaucracy’s sovereigns have other instruments at their disposal. These instruments may be thought of as hortatory controls. In effect, they rely upon a “jawboning”⁵ strategy to induce cooperation from a reluctant bureaucracy.

...Jawboning has become commonplace in intergovernmental relations, after a decade of experimentation with muscles (mandates) and prayers (general revenue-sharing) (Gormley, 1989, p. 228).

Gormley points out that hortatory controls preserve some discretion for state and local governments while retaining some federal influence. He asserts that by the late 1980s, pure revenue-sharing and pure mandates had both “lost their luster” (Gormley, 1989, p. 175). “In short,” he writes, “there has been a regression to the mean, with weak and strong controls evolving over time into more moderate controls that stress intergovernmental bargaining.” (Gormley, 1989, p. 175). Gormley argues that this is as it should be given the special character of American federalism. Some states and local governments lack the skill and resources to achieve federal goals, yet these governments must be treated with respect for both political and

⁵“Jawboning” is defined in the American Heritage Dictionary of the American Language (2000) as a slang term meaning “to urge voluntary compliance with official wishes or guidelines.” (2000)

constitutional reasons. Gormley concludes that “In intergovernmental relations, selective, hortatory controls are usually best.” (Gormley, 1989, p. 176).

Guidelines fit squarely within Gormley’s category of hortatory controls or jawboning. Although he states that hortatory controls are “usually best” in intergovernmental relations, he reaches this conclusion without the apparent benefit of empirical research. Instead, based on his reasoning with regard to political power, Gormley develops a model intended to guide the matching of policy needs with policy instruments. Then, based on this model, he arrives at the conclusion that jawboning will work best in intergovernmental settings. Although this dissertation does not compare different types of federal intervention for school health, guidelines can be construed as an example of jawboning in an intergovernmental setting. The research will provide both a description of guidelines adoption as well as an empirical examination of differences across substantive areas using the same policy tool. If the study findings vary across substantive areas, Gormley’s conclusion that jawboning works “best” can be further challenged.

Vedung’s Taxonomy. Nearly ten years later, Vedung (1998) continued Gormley’s emphasis on the amount of coercion involved in policy, also asserting that discourse on public policy instruments is inherently a discourse on governmental power. However, Vedung returns to an expanded definition of policy tools as actions of governments on their citizens, not just policies aimed at bureaucratic action. First, Vedung concludes that a taxonomy of policy instruments must presume that the government has already decided to take some action. Secondly, he argues that a decision can be made about government resources ranging from minimalist to maximalist. Based on this resource approach, Vedung then uses the degree of constraint intended by the policymaker to advance a tripartite taxonomy: regulation (in

Vedung's vernacular, "sticks"); economic means ("carrots"), and information ("sermons.") Vedung reaches a normative conclusion that in order to pursue "legitimacy as well as effectiveness, governments should combine stimulative and repressive policy instruments" (Vedung, 1998, p. 53).

Vedung's terminology (carrots, sticks and sermons) closely matches the concepts inherent in Gormley's terminology (muscles, prayers and jawboning). Guidelines would fall within Vedung's category of "sermons" or information. Although he does not mention a diffusion theory, Vedung's notion of information being instrumental in policy adoption is consistent with several concepts in the diffusion of innovations theory. According to this theory, interpersonal communication is a key channel through which to obtain information about an innovation. Vedung draws attention to the importance of "personal advice...government example...[and] publicity" as ways that information about policy is transmitted, and proposes that "forms of information" be sorted into two categories by mode of transmission: "mediated transmission" and "interpersonal transmission."

Vedung also draws attention to the notion of demonstration as an interpersonal channel of diffusion. He notes that

The idea underlying a *demonstration* is that if a particular technology, material, program or process can be viewed in actual operation, the probability of its adoption and use will increase. In addition, a demonstration allows the innovation to be evaluated in practical operation. (Vedung, 1998, p. 50).

In the diffusion of innovations theory, observability is another key channel through which information about innovations is transmitted; observable innovations are more likely to be adopted. Although Vedung does not include guidelines in his taxonomy, the concepts embedded

in his classification reinforce the idea that diffusion of innovations theory is an appropriate framework with which to study adoption of guidelines as policy tools.

Salamon's Taxonomy. Most recently, Salamon (2002) asserts that the proliferation of new tools of public action reflects a new approach to public problem-solving. In addition, rather than focusing on public agencies or public programs as a unit of analysis, Salamon promotes the idea that the new unit of analysis for public policy analysis must be the distinctive tool(s) or technology used to address a public problem. This "new governance approach" recognizes that different tools have features and characteristics that impart a distinctive twist to post-enactment of policies. Policy tools, Salamon says, specify the process as well as the network of actors who will play important roles and the nature of the roles they will perform. As a result, the role of the public manager has become increasingly complex not only because of the growing need for skills in collaboration, technology management, and networked action, but also because of the increasingly large array of policy instrument options that may have varying effects on policy implementation.

Salamon draws from the policy science literature to summarize criteria commonly used for assessment of policy interventions: effectiveness, efficiency, equity, manageability, legitimacy and political feasibility. Building on the notion that the selection of a policy tool is in itself a type of intervention, Salamon develops a new taxonomy of policy instruments that incorporates an assessment of the criteria outlined above. Five dimensions are used to sort policy tools: (1) degree of coercion; (2) directness (whether government employees deliver services directly or through agents); (3) automaticity (whether the instrument uses an existing administrative infrastructure to produce its effect rather than creating a new or special

infrastructure); (4) visibility; and (5) manageability. Salamon concludes that, unfortunately, policymakers are under increasing political pressure to select particular tools for public action that, while popular, are the most difficult to manage and the hardest to keep focused on their public objectives. He argues that empirical evidence should be used to guide the selection of policy tool to match its intended purpose.

Within Salamon's book, Weiss (2002) discusses "public information" as a tool of government. Weiss notes that information published by government often carries the weight of credibility: some citizens may place greater trust in government sources of information than in commercial sources, for example in searching the Internet. Weiss also points out, however, that public information released by the government also carries a burden of democratic responsibility: bureaucrats must ensure that government information does not suppress freedom of expression and a diversity of viewpoints essential to democracy. Despite recent publication Salamon's (2002) book, Weiss's chapter (2002) fails to mention guidelines as a policy tool, focusing more narrowly on information directed to the general public rather than to multiple audiences such as bureaucrats.

As in most of the taxonomies discussed above, guidelines do not fit neatly into the categories proposed by Salamon because guidelines span a wide array of policy goals. In addition, although Salamon acknowledges the importance of networked action in public administration, his overall classification scheme implies that policy tools are primarily aimed at citizens as a target audience rather than other policymakers.

Empirical Studies of Policy Tools

Builders of policy tool taxonomies repeatedly call for empirical research to test and refine their models. Although efforts in this direction reported in the literature are few, one recent study explored the relationship of policy tool types to program outcomes. Yu et al. (1998) examined policy instruments, their variations, and their interactive effects used to reduce toxic waste in the United States. These authors found that the type of policy used by a state was related to its levels of waste reduction and that informational policies seemed to matter more than both authoritative enforcements and general pollution prevention regulations. Further, they concluded that interactive effects of policy types were important.

In order to develop an overall theory of policy tools that is consistent with and useful for practice, at least two types of evidence are needed. First, as the taxonomies suggest, differences across policy tools must be understood. Although several authors cited above build a case that there are important differences in policy tool types, much of what is written is based on reasoning rather than evidence. This dissertation adds empirical evidence to advance understanding of guidelines as a unique type of policy tool. Secondly, greater understanding is needed of how each type of policy tool functions in different contexts and across policy areas. For example, although grants might be generally considered a “carrot” or incentive tool, there is good reason to expect differences among grants for highway building, controversial sex education curricula, coastal wetlands conservation, or basic research—even if only by virtue of the differences in actors and networks in each policy area. This dissertation informs the second dimension of needed research by sharply focusing on the use of guidelines across three policy areas while holding constant many context variables.

The next section presents a review of the empirical literature on adoption of policy innovations and the two major types of research models used to study them: (1) internal determinants models and (2) interaction models (regional and national) based on the diffusion of innovations theory.

Research Models Used to Study Policy Adoption

As discussed in Chapter 1, guidelines are widely used by government officials to recommend and promote particular policies and practices. Despite their wide usage, bureaucratic guidelines have been under-studied. One of the few areas where federal guidelines have been studied is clinical medicine where it has been found that guidelines often exert their influence through organizational channels despite their primary audience of individual practicing physicians. For example, Lomas (1991) studied the consensus process used by the National Institutes of Health (NIH) in developing guidelines for physician practice in the treatment of specific health conditions. Some guidelines recommend that certain health screening tests be administered such as mammography for early detection of breast cancer. Other guidelines may recommend the use of particular types of pharmaceutical drugs or surgical procedures to treat a specific type of heart condition. The NIH consensus process involves a formal and systematic method for selecting medical topics or medical procedures for review; choosing of panel members who review and consider the scientific literature; setting criteria upon which to base judgments; and resolving conflicts of opinion and professional judgment with recommended negotiation procedures and mediation strategies. Lomas found that although individual physicians were aware of NIH guidelines in general and held the NIH consensus process in high esteem, physicians were often completely unaware of the content of guidelines that were issued

by NIH. However, Lomas found that despite the lack of knowledge of individual physicians about particular guidelines, NIH recommendations were implemented indirectly through impact on organizations such as health maintenance organizations and insurance companies that used the NIH guidelines to develop practice algorithms or to set criteria for insurance reimbursement. A similar conclusion was reached by Woolf, DiGuseppi, Atkins, & Kamerow (1996) in studying the impact of guidelines issued by the U. S. Task Force for Clinical Preventive Services. Thus, even when guidelines are aimed at individual practice, the effect may be strongest through the channel of changes to organizational policy.⁶

Because few examples exist in the literature for studies of the diffusion and adoption of non-medical guidelines, it is reasonable to turn to studies of other innovations and especially to studies of legislation as a policy tool that parallels guidelines in many respects. Like guidelines, legislation ranges across a vast array of policy areas. Like guidelines, legislation often seeks to improve the health and well being of citizens by changing the behavior of bureaucratic or other organizations. In some cases, the substantive area of legislation and guidelines overlap. For example, worksite safety equipment may be mandated by law or recommended by guideline.

Perhaps the most commonly used models for the study of adoption of legislative innovation are internal determinants models described below. Because of the popularity of this model-type and its long history, an abundance and wide assortment of streams of research are

⁶ Notably, CDC's school health guidelines for tobacco, physical activity and health eating contain recommendations to improve practice by teachers and food service staff; however the CDC guidelines recommend the adoption of particular policies at the organizational levels of schools, school districts, and state boards of education (U.S.Centers for Disease Control and Prevention, 1994; U.S.Centers for Disease Control and Prevention, 1996b; U.S.Centers for Disease Control and Prevention, 1997).

present in the literature. The multiple streams of research cross and overlap, sometimes appearing to create more of a swamp than a solid field of research crossed by streams of social science investigation. Therefore the following section presents a discussion of selected streams of research deemed most relevant to the study of guidelines as policy.

Internal Determinants Models. The study of legislative policy adoption has traditionally focused on a set of explanatory variables arranged into an “internal determinants model,” that is, a model which seeks to explain policy adoption based on certain internal characteristics of a state. In these models, it is assumed that the probability of a state’s adopting a particular policy increases when the circumstances or needs within a state are compatible with the state’s characteristics relevant to the policy being considered. Both circumstances and characteristics are influential in internal determinants models. For example, a budget shortfall in a state (circumstance) may lead to consideration of adoption of a lottery but may only be adopted in states without a strong religious opposition to gambling (characteristic).

Characteristics of Innovations vs. Characteristics of Adopters. Research using internal determinants models can be roughly divided into studies which observe characteristics of an innovation that appear related to the speed or frequency of adoption; and studies which observe characteristics of the adopters or actors. Mohr (Mohr, 1969) contends, however, that characteristics of a policy innovation and characteristics of adopters are mirror images. If one views a policy as expensive to implement, one could alternatively look at state resources as an explanatory variable. Thus, one can measure whether a policy is costly—or measure whether a state has abundant resources. Both are economic measures that Mohr suggests capture the same concept. Because of this

conceptual overlap, it is difficult to draw clear lines in sorting studies for review.

Therefore, empirical studies reviewed here are arranged by similarity of dimension rather than by adopter/policy type.

Perception of Innovation. Empirical research has demonstrated that perceptions about an innovation influence its adoption. In fact, Moore & Benbasat (1991) contend that perception of innovation is a separate construct deserving its own research focus. As a result, they develop a standardized instrument to measure perceptions about technological innovations related to personal computer work stations. In another study, “cognitive maps” or frames of reference of municipal managers were found to be important factors in decisions about adoption of computer innovations (Kearns, 1992). Even perceptions about whether or not an innovation has been adopted by an organization may vary depending upon a person’s frame of reference. Ware et al. (Ware, Librett, Friedrichs, & Paras, 2002) note that school principals were more optimistic than teachers in reporting the number of innovations that were adopted in Utah schools.

Perceptions are easily apparent as a potential influence on whether an innovation is adopted by an individual, since a person must first judge whether an innovation is appropriate and beneficial. Grilli & Lomas (1994) review 23 studies of innovation in physician practice and find that practice guidelines perceived to be complex had lower compliance rates than those low on complexity. However, Downs and Mohr (1976) contend that despite the role of personal perceptions, some innovations may have innate characteristics so marked that any person would share the same perspective. For

example, some innovations would be judged “expensive” by everyone no matter what their income or role in an organization.

Openness to Innovation. Perception can also influence openness to innovation. Roessner (1979) asserts that how a person views a problem makes a difference in the kinds of policies considered. A problem of city crime, for example, could be perceived as a problem of lack of police enforcement or perceived as a lack of employment opportunities for criminals. Thus, proposed policy innovations to solve a problem may differ greatly. Feller and Menzel (1977) argue that perception of the need for innovation and the adoption of new technologies are importantly shaped by performance gaps and citizen demand among other factors.

Innovation and Networks. In a 1970 study of three states, Becker concludes that a public health professional’s personal innovativeness actually determined his centrality in communication networks (Becker, 1970). Becker notes that innovators actively participated in networks with the explicit purpose of seeking information in order to discover new and innovative ideas. Communication networks have been emphasized in recent research examining the phenomenon of networked, multi-organizational arrays in governance and implementation. Hall and O’Toole (2000) for example, note that a “huge majority” of significant new legislation enacted between 1993-1994 called for involvement on the part of multiple actors rather than a single administrative unit. Thus, lawmakers may sometimes prescribe the use of networks at least implicitly in an effort to promote the adoption and implementation of innovative programs or policies contained in the legislation.

Culture. Similar to the perceptions and characteristics of individuals, Bemelmans-Videc (1998) asserts that the characteristics and culture of an organization are important determinants of the types of policy innovations developed and used. Glick (1992) finds that adoption of “living will laws” was slower in states with larger Catholic populations. However, sometimes expectations about characteristics of an organization and innovation adoption are proved incorrect. For example, Steckler et al. (1989) hypothesize that in counties in North Carolina, the level of tobacco production in a county would retard its adoption of an anti-tobacco curriculum in schools; however the authors find no association between these tobacco production and curriculum adoption. The same study also examined adoption of policies restricting tobacco use in schools finding a weak, but statistically significant relationship between stricter policies and less tobacco production (Nice, 1994; Steckler et al., 1989). Bressers and O’Toole (1998) assert that attributes of an organization related to policy networks and the interconnectedness of policy actors will also influence choice of policy tool.

Political Competitiveness. Important to political scientists are perceptions of citizens reflected in the electoral process and its outcomes. Internal determinants models used to study legislation usually include a variable to portray the political conditions within a state. Sometimes this is expressed as a measure of ideology, for example liberal/conservative or Democrat/Republican (Berry & Berry, 1992; Glick, 1992; Mintrom, 1997; Nice, 1994; Skocpol, Abend-Wein, Howard, & Lehmann, 1993). In one study, McIver, Erikson, and Wright (1994) find that in liberal states, policies enacted tend to be liberal; however, they also

find that in some instances, public ideology appeared to exert no influence. Other research employs a more direct measure of the political process such as the timing of elections (Berry et al., 1992; Mintrom, 1997; Smith & Taebel, 1985). For example, in studying adoption of gasoline tax and individual income tax laws, Berry and Berry (1992) speculate that politicians are loathe to jeopardize their chances of election by promoting unpopular policies such as tax increases. The authors posit that tax legislation would not be as likely to be levied immediately before an election and find that “a state is least likely to adopt a tax in election years and most likely to adopt in those years that are as far away as possible from the next election” (Berry & Berry, 1992, p. 736.)

Although political competitiveness figures prominently in the study of legislation, political competition may be less important in the study of non-legislative policy tools such as guidelines. A cardinal tenet of traditional public administration is that it is best left to neutral professionals organized in public agencies. Both the neutrality and professionalism of the bureaucracy are expected to transcend ephemeral political issues: career bureaucrats are expected to apply their long-term expertise in understanding and applying scientific or other objective evidence in addressing public problems. This is not to say, however, that the politics of the President bear no influence on agency policy, especially when issues are controversial. A hypothetical example from clinical medicine would be when an agency head declined to issue a recommendation based on scientific evidence of a new technology that improved patient outcomes from

abortion because of agency concerns about repercussions from a conservative White House. At the state level, political feasibility may be observed as adoption or non-adoption of a particular federally-recommended policy.

Organization Size and Wealth. Regardless of political factors, the size of an organization is often found to be a factor related to speed or frequency of innovation. From the standpoint of organizational wealth and resources, two opposing arguments can be mounted: one in support of increased innovation and the other opposing it. On one hand, if an organization has slack resources, more resources may be available to pursue new programs and activities. Thus, innovation could be expected to be positively related to slack resources. Studies often show wealth as a factor related to innovation (for example Berry et al., 1992; Downs, 1976; Gottlieb, Lloyd, & Bounds, 1987; Kraemer, Gurbaxani, & King, 1992; Mooney & Lee, 1995; Smith et al., 2001). Relatedly, in his study of local public health departments, Mohr (1969) finds that budget may moderate a manager's desire to innovate. However, Nice (1994) reports little support for the slack resources argument based on his examination of policy adoption across several policy areas including teacher competency tests, sunset laws, and property tax relief. In contrast to the proposition that slack resources foster innovation, it may be argued that *scarce* resources provide even greater incentive to adopt new and creative ways to meet needs or cut costs: the rise in policy innovations may in themselves reflect political pressure for improved efficiency through technological innovation or policy tool innovations in the form of purchase-of-service contracting, loan guarantees, and so forth.

Organizational Readiness. Related to the concept of changing resource levels is the concept of readiness. Feller (1977) notes that an array of factors can contribute to a “state of readiness” including performance gaps, the supply of alternatives, relationships, marketing of an innovation, knowledge, citizen demand, and intergovernmental relationships. “Readiness” underscores the reality that context changes over time. One of the first discussions of innovation and changing context was presented by Elkin (1983) who outlines what he called a “contextual approach” and promoted the use of data to capture real-time changes in environment. In a 1998 review, Bemelmans-Videc (1998) asserts that context variables such as the characteristics of a nation, the structure of its government, and its culture are also important in determining the array of policy tools selected for use by government organizations.

Change Agents in Organizations. Sometimes context changes “naturally;” other times intentional action is taken to attempt to change context. Studies examining the influence of policy entrepreneurs--political actors who promote policy ideas—include Mintron’s study of school choice. Mintron finds that policy entrepreneurs were important in influencing adoption of a voucher system in states (Mintrom, 1997). McKinney, Barnsley & Kaluzny (1992) find that “change agents” and “innovation brokers” are important determinants of innovation as well as networks for action in adoption of NIH cancer prevention recommendations. In studying the adoption of mothers’ pensions, Skocpol et al. (1993) find that “agenda setters” were important. In their model of living will laws, Hays and Glick (1997) include an interactive variable for “agenda-setting” equal to the demand by citizens for these laws. Gray (1994) calls for

inclusion of policy entrepreneurs in models of policy adoption, citing models of policy creation such as Kingdon's "policy streams" (Kingdon, 1995) as reason to expect that entrepreneurs influence policy *adoption* as they do policy creation and promotion. The notion of change agents and policy entrepreneurs can, in turn, be linked back to the discussion earlier in this chapter related to motivation to innovate, as the work of policy entrepreneurs can be construed as generating need for a policy or re-framing an issue so that a particular innovation is apparently required.

Process Champions in Organizations. In addition to advocating for the adoption of a policy innovation, key individuals may also play a role during the process of developing an innovation. In an examination of strategic planning activities at city, county, and nursing unit levels, Bryson and Roering (1989) find that "process champions" were instrumental in keeping planning activities on track. Similarly, Manz, Bastien, Hostager, & Shapiro (1989) find that leadership played a central role in adoption of innovations, even across different types of leadership styles. Although innovations may receive a boost from issue leaders and champions, these individuals may not be in a decision-making role. However, managers, supervisors, and others also play an important role in determining whether and to what extent innovations are adopted. Downs (Downs, 1976) finds that the best predictor about adoption of an innovation to de-institutionalize juvenile offenders was a supervisor's opinion. In studying adoption of no-smoking programs at schools, Parcel, Perry, & Taylor, (1990) also find that commitment from management reinforced adoption of innovations.

Themes from Internal Determinants Research. Despite the smorgasbord of variables studied in internal determinants models, some themes emerge that have application to the study of adoption of federal guidelines by states. First, size and wealth are often related to innovation. Second, characteristics of organizations such as openness to innovation and culture (liberal/conservative, religious/non-religious) are factors. Third, context is important. Even though overall wealth may be important, the context of short-term budget changes may impact policy adoption. Finally, policy actors and networks may play an important role both in selection of policy tools and in adoption of innovations.

Interaction Models Based on Diffusion of Innovations Theory. Many of the internal determinants models include variables related to the individuals involved in the innovation process as well as communication among them. Some internal determinants' studies have explicitly focused on communication mode as a determinant of innovation. For example, Parcel et al. (1990) indicates that one category of "innovation failure" is when a policy message fails to reach its intended audience. In his study of cholesterol screening and nutrition education, Parcel goes on to recommend audience segmentation and tailored messages to improve communication and boost adoption rates. Lucas (1983) also stresses the importance of matching communication channel with policy purpose.

As discussed in Chapter 1, communication theory is an important piece of the foundation for diffusion of innovations theory, a theory that has been applied to the study public policy innovations, often in the form of legislative policy. Jack Walker is usually attributed with

initiating this line of research.⁷ Walker (1969) contends that states have traditionally been judged according to the relative speed with which they have accepted new ideas:

Wisconsin, because of its leadership during the Progressive period and its early adoption of the direct primary, the legislative reference bureau, and workmen's compensation, gained a reputation as a pioneering state which it has never lost. Reputations of this kind are usually based only on random impressions and they may be inaccurate or misleading... (Walker, 1969, p. 881).

In order to test the notion of "leader states" and "laggard states," Walker studied 88 innovations adopted by legislative enactment at a state level. The legislative intent of the innovations studied by Walker represented a broad range of policy ideas—from modest innovations like the establishment of a "Council on the Arts" and the initiation of "Beauticians' Licensing" to sweeping innovations like establishment of a "State Police and Highway Patrol" and a "State Tax Commission." In addition, the time period over which the legislation was adopted ranged from the "latter half of the nineteenth century" through 1965 (Walker, 1969).

Walker's seminal work examined three explanations for diffusion of the policy innovations studied. He begins with a national interaction model and concludes from this line of investigation that there were consistent leader states (states that adopted more policies more rapidly) and laggard states (fewer policies and less rapidly) across the policy areas studied. Second, in order to examine factors related to leadership and laggardness, Walker employs an internal determinants model and concludes that leader states were bigger, wealthier, more urban, more industrialized, and had more political turnover than other states.

⁷ Walker's application of diffusion of innovation theory to the study of policy is, in and of itself, considered an innovation in the field of policy studies.

For the third approach to the issue, Walker turns to a model most closely related to the original roots of diffusion of innovations theory: a regional interaction model. Invoking the concept of satisficing,⁸ Walker suggests that state policymakers look for quick and easy policy examples from another state that appears to successfully solve problems over time. In addition, Walker contends that federal policy often “raises the bar” and that states may perceive themselves unable to attain the highest levels of performance. Instead, states self-select into groupings where performance expectations are adjusted to levels thought to be more realistic for the state’s circumstances and characteristics. Walker calls these groupings “leagues” and continues this sports analogy to suggest that states themselves decide the “league” in which to “play.”

Within each league, one or two leader states emerge which then serve as referents for other states in the group. Policy diffusion is described by Walker as a “spreading ink blot” where one or two leader states in a league are first to adopt a policy that is then emulated by other states in the group. Walker concludes that groupings are stable over time. Although leagues tend to be associated with geographic region, some are not. In addition, some states may identify with more than one league. Most important to Walker’s findings was the evidence of national leaders as well as the concept of regional self-perceived peer-group influences on policy adoption. His notion that federal policy often raises expectations on performance is especially pertinent to the study of guidelines since guidelines are often intended to improve practice.

⁸ The term “satisficing” was coined by March and Simon in the 1959 book *Organizations*. The Public Administration Dictionary defines satisficing as “The process of finding a decision alternative that meets the decision maker’s minimum standard of satisfaction.” (Chandler & Plano, 1982, p. 139)

Virginia Gray (1973) challenges both Walker's selection of policies as well as his regional interaction approach. In contrast to Walker's 88 policies, Gray focuses on three legislative policy areas and, within each area, a few policies over a total span of 185 years:

Civil rights 3 policies, from 1937 – 1966

Education 5 policies, from 1784 – 1969

Welfare 4 policies, from 1883 – 1945

Gray points out that Walker's research presented an analysis of a mixture of policies, some of which received federal grants-in-aid and others of which were "state independent." Gray asserts that federal influence in the form of grants-in-aid may influence policy adoption; therefore she selected policies that she contends apparently involve no federal funding.⁹

Like Walker, Gray first tests a national interaction model where there is the assumption of free interaction among all states, not just among neighboring states. Adoption of Gray's 12 policies closely followed the pattern of cumulative adoption predicted by diffusion of innovations theory: an S-shaped curve, indicating early adoption by one or a few pioneering states, followed by adoption by a majority of states, with a few laggard states at the "late" end of the curve. Although Gray asserts that in her research "each innovation has been studied separately, in contrast to the method used by Walker" (Gray, 1973, p. 1183), Gray in fact calculates a composite score for earliness of adoption (innovativeness) for each state by averaging each state's rank for each of the three policy areas as well as an overall rank. These

⁹ It is debatable, however, that these policies bore no federal financial influence despite their intentional selection. For example, Old Age Assistance laws and Public Accommodations in the area of civil rights that were included in Gray's study might eventually be supported by federal funds even if states received no initial incentive to adopt policies in the form of a grant-in-aid.

composite data are used to support Gray's conclusion that innovativeness is not a consistent trait--either nationally or within regions.

Although Gray does not use an internal determinants model *per se*, she draws on research reported in the literature on internal determinants of policy adoption to select variables for further analyses of the 12 policies. Gray finds that early adoption by a state of the 12 policies studied was related to a state's wealth and political competitiveness. Based on the evidence of this study, Gray concludes overall that innovativeness is not a pervasive factor; rather, it is "issue- and time-specific at best." (Gray, 1973, p. 1185)

Following the publication of Gray's article, a lively debate ensued in the literature between Walker and Gray, each challenging the other's methodology and conclusions (Walker, 1973; Gray, 1973). Although a number of points were clarified in the discussion, each author ultimately maintained his original position and conclusions.

In his 1978 book entitled *Policy Innovativeness in the States*, Savage writes that "Gray may have been too hasty in discounting a general innovativeness trait as a variable characteristic of American states" (Savage, 1978, p. 218). Savage bases this conclusion on his study of 181 policies which he divided into three time periods: nineteenth century, 1900-1929, and 1930-1970. As with Walker's 1969 study, the range of laws considered by Savage was wide. For example, included are broad issues like female suffrage and child labor laws as well as narrow issues like licensing for dentists and establishment of an agency for public library extension.

Savage devises a new method to account for variability in innovation that adjusted for the fact that some policies were adopted by all 50 states within a few years; other policies were adopted by all states over a time period of 60 years or more; and still other policies had not been

adopted by all 50 states at the time of study. Savage ranks states according to overall innovativeness (a function of more policies and policies adopted earlier). In addition, he ranks states based on innovativeness within each of the three time periods studied. Savage finds a lack of stability in rankings, especially for the later 20th century policies. Despite the instability overall, however, Savage finds that a few states were relatively consistent across time. He reports that California, Minnesota and Ohio “stand out as consistently strong innovators by ranking in the top quartile across all three time periods” (Savage, 1978, p. 218). “On the other end,” Savage reported, “four states—Delaware, Georgia, Mississippi and South Carolina—have been especially notable as laggards, scoring consistently in the lowest quartile of states” (Savage, 1978, p. 218).

In drawing his conclusion that there were national-level leaders and laggards among the 50 states, Savage urges that the notion of regional differences not be lost. He notes that political, social and cultural differences were apparent in different regions within the U.S. He conjectures that when relevant issues arise and strike responsive chords within a given region of the nation, new innovation leaders may emerge from among the states. Thus, despite his finding of consistent leaders and laggards, Savage acknowledges the continued possibility of regional interaction among policy makers that could influence policy adoption.

Glick (1992) observes in his study of living will laws that an important issue arises in examining regional interaction: are regional effects achieved by virtue of interaction among border state policy-makers--or--do border states share so many characteristics and circumstances that policies are adopted by virtue of similar policy needs? This issue is particularly important in models discussed below that combine internal determinants with regional or national approaches

because of the danger of over-determination. Berry and Berry (1999) make an observation similar to Glick's adding that regional interaction models include the assumption that if state B adopts after state A, state A had an influence on state B's adoption. The timing of adoption may be coincidental or due to a set of factors other than interaction. Berry and Berry suggest the use of models that blend internal determinants and regional/national models. This approach as well as other evolving models and methods are discussed in the next section.

Other Conceptual Models Used for the Study of Policy Innovation. In the 1990s, the debate continued among scholars regarding an appropriate framework for the study of policy adoption. Although many issues remain unresolved, the field turned toward combinations of approaches as a new alternative to studying policy adoption. In 1994, Virginia Gray re-entered the debate with publication of a chapter in a book entitled *New Perspectives on American Politics* (1994), in which she reviews research findings and compares interaction models based on diffusion of innovation theory, internal determinants models, and process models like Kingdon's 1984 policy streams. As noted above, Gray argues that what is needed are models that combine not only diffusion of innovation and internal determinants, but qualitative studies of processes that include the notion of policy entrepreneurs. Qualitative and mixed-method studies are not new to policy analysis. Perhaps the most well-known example is Pressman and Wildavsky's (1984) account of implementation of a model cities program in Oakland, California, a study that presented both quantitative and qualitative analyses of the same issue.

Gray (1994) also directs attention to the concept of "vertical diffusion" or the spread of policy ideas that originate in states and diffuse *upward* to become federal-level policies. Gray builds an argument in support of vertical diffusion based on political theory. She notes that state

initiatives from the 1920s were the models for federal New Deal programs in the 1930s, and offers the contemporary example of the Clinton administration's consultation with states when the federal task force on health care reform was initiated in the 1990s. In 1999, Berry and Berry also discuss vertical diffusion but from the standpoint of policy that spreads *downward*. Berry and Berry characterize this as a "learning model" whereby states emulate the example of the federal government, often motivated by federal incentives in addition to a desire to "learn."

Innovations in methodology have also been adopted in the last 10 years. Two interesting examples have recently been applied by Berry and Berry: event history analysis and computer simulation.

Innovations in Methodology to Study Policy Innovation

Event History Analysis. As discussed in Chapter 1, the application of an old idea or technology to a new situation can be considered innovative. As long as the idea is perceived to be new to the adopter, it is an innovation. The methodology used by Frances Stokes Berry and William Berry (Berry et al., 1990) to study state lottery adoption re-introduced as innovative an analytic approach suggested as early as 1969 by Mohr. The method, which the Berrys call "event history analysis," tracks context variables over time as predictors of state adoption of a particular policy. In Mohr's words:

An organization may be more likely to innovate when its environment is rapidly changing than when it is steady. In this sense, "environment" includes such factors as market conditions, technological changes, clientele needs and demands, and the labor market. (Mohr, 1969, p. 112).

Important to the event history analysis approach is the recognition that internal determinants models often include variables for context at one time point that may be relevant to policy

adoption by a pioneering state even though many years may pass before a policy diffuses throughout the U. S. Berry and Berry argue that context variables should be assessed regularly throughout the period from first adoption to last adoption noting that short-term changes may indeed influence the decision to adopt a policy innovation. Context variables can be routine, such as those that capture the cycle of state elections; or they may record unpredictable circumstances, such as unexpected budgetary changes, historic events, or natural disasters. In short, event history analysis quantifies aspects of the surrounding history of a policy innovation.

In a study of adoption of state lotteries, Berry and Berry (1990) use event history analysis to create time-ordered variables that are then included in an internal determinants model and a variation of a neighbor model. They find that changing context makes a difference. Adoption of a state lottery was related to certain variables such as poor fiscal health, election year, central party split, high per capita income, and low religious fundamentalism in a state. However, neighbors were also important: when the circumstances in a state were favorable, the action of neighbor states in adopting a lottery had a positive impact. Mooney (2001) challenges these findings, however, based upon his re-analysis of the Berry and Berry lottery study. Using a statistical adjustment method he calls the “average proportion of adjacent adopters,” Mooney concludes that event history analysis studies that do not make this adjustment (including the Berry and Berry work) may be biased in favor of finding regional effects on policy adoption.

Mintrom (1997) uses event history analysis to examine education reform, specifically vouchers for school choice in states from 1987 to 1992. In this study, policy entrepreneurs were identified as advocates in 26 states where their presence raised the probability of legislative consideration and approval. Mintron concludes that policy entrepreneurs were important;

however if no entrepreneur was present in a state, then number of prior adopting neighbors was most important.

Event history analysis is explicitly a predictive model. States are modeled as a risk pool, with the probability of a state's adoption of a particular policy in a given year based on selected context variables. Since the unit of analysis for event history analysis is the number of states in a given time period eligible for adoption, this method adds statistical power to studies with a small sample size. For example, in the Berry and Berry lottery study, only 3 percent of the cases in the sample scored "adoption" with 97 percent of cases representing state-years when no lottery was adopted.

Although event history analysis offers certain clear advantages, data requirements for this method can be enormous. To appropriately track an event history, each variable must be recorded for each state at regular intervals over a specified time period. Considering that the time lag between first and last adoption of a particular policy can be as long as 50 years or more, this in itself may be a formidable challenge. In addition, as a result of factors such as re-definition of racial or ethnic demographic categories, standard historical data sets may not capture data in exactly the same form from year to year. Also, all variables of interest may not be reliably recorded across all 50 states especially when participation in data collection is elective. Thus, it may be extremely difficult to find disaggregated data that are reliable and comparable data when the time period of adoption is long. On the other hand, a short time-frame from first to last adoption may be even more problematic. In rapidly-changing contexts, it is difficult to find data that can satisfactorily reflect subtle changes in variables such as personal affluence with enough measurement points to be meaningful. Depending on the time frame of an

event history analysis, the effects of variables such as party control might be missed since they are stable in the short term.

Simulation. Simulation by computer-generated data was another innovation in policy research. In a study by Frances Stokes Berry in 1994, data were generated from simulated innovation processes with known characteristics. Her overall hypothesis in this simulation modeling is that “single explanation” models (i.e., purely internal determinants or purely regional interaction models) are inferior to a blended model. For the regional simulation, the number of border states adopting was manipulated by computer until a stage when a state was entirely surrounded by adopters. Berry also simulates internal determinants models for seven policies with four variables she calls “classic:” per capita income, urbanization, interparty competition, and legislative professionalism. The simulation supports traditional models for the presence of regional diffusion, national interaction, or internal determinants; Berry reports that her simulation provided no evidence that these models failed to show an impact where one exists. However, she indicates that “‘false positives’ abound;” that is, traditional single-explanation methodologies had a tendency to detect the presence of both internal determinants and national interaction when neither was present and when, instead, policy adoptions followed a purely regional diffusion pattern. As noted above, Mooney (2001) also uses computer simulation to model policy adoption with a particular statistical adjustment technique. Mooney notes that in some cases regional effects appear to change over the course of policy diffusion. Also, some policies appear to diffuse without any regional effect.

As mentioned above, a concern about blended or mixed-model approaches is the danger of over determination. For example, regional effects may be due to a proclivity of policy makers

to interact with geographic peers resulting in more frequent opportunities to share policy ideas. The opposite side of the coin, however, is that states within a region such as the South may share a common culture as well as many of the same policy problems that lead them to the same policy solutions regardless of interactions. Thus, using a variable for “region” combined with variables for attributes such as ideology, politics, or wealth runs the risk of duplicating concepts in a model and reaching an erroneous conclusion.

Time Frame for Policy Adoption Studies. In his 1985 article, Savage asserts that there may be policies whose “time has come” that is, some problems become so widespread that proffered solutions are readily snapped up by state governments (Savage, 1985). Thus, comparisons of the length of time from first to last adoption among states may be misleading because they reflect different phenomena. Another situation is illuminated by Daniels et al. (1985) who examines the adoption by states of a constitutional amendment for equal rights. Although an Equal Rights Amendment (ERA) had been adopted by a number of states, Daniels finds that anti-ERA groups targeted opposition in laggard states to increase the chances that they would remain laggards and never adopt. Daniels’ article highlights the reality that the “world” looked different in the span of 10 years from first adoption to the last hold-outs, especially when interest groups were focusing attention and action at the end of the time period in order to prevent adoption.

Glick (1992) notes that many studies assume equivalence of policies that generally cover the same goal no matter when they are adopted. Glick argues that policy content may be dramatically different between two time periods, especially when the time period is long. States, he argues, learn from the experience of other states over time, making it likely that later versions

of a law incorporate improvements suggested by experience. A corollary to this argument is that policy adoption may not be static: a state may customize, change, or revoke a policy over time. Sabatier and Jenkins-Smith's Advocacy Coalition Framework (1999) also notes the process of policy change through "policy-oriented learning." This involves increased knowledge of problem parameters and the factors affecting them, feedback loops concerning policy effectiveness, and resultant changes in perceptions of the probable impacts of alternative policies. Thus, studies over long time periods may mistakenly equate policies bearing the same title that in reality have important differences.

Contemporary scholars of policy adoption conclude that research is needed focused on specific time periods and specific policy areas. In her 1994 review, Gray cautions against generalizing policy adoption research over time periods. Berry and Berry (1999) concur, adding the advice that global models of policy adoption will fail to adequately capture the nuances important to build a useful theory of policy tools and policy adoption. They urge research to focus on specific policies and programs.

One conclusion clearly emerges from a discussion of policy adoption studies: policy adoption is generally a complex, multi-actor process potentially influenced by an array of important variables related to the context in which the policy is adopted and in which it will be implemented. Since the policies examined in this dissertation are in the context of school health, the next section presents an overview of complexity of school health policy and the ways in which federal guidelines are applied in this context.

School Health Policy in the United States

State Participation in School Health. In the United States, responsibility for much education and health decision making resides at the state and local levels, and not with the federal government. State legislatures often delegate authority to state school boards of education and to state departments of health. Typically, boards of education have the power to set statewide curriculum standards; establish requirements for high school graduation; determine qualifications for education personnel; establish testing and assessment programs; establish standards for the accreditation of local school districts and preparation programs for teachers and administrators, administer federal assistance programs; review and approve state education agency budgets; and develop rules and regulations for the administration of state programs (National Association of State Boards of Education, 1995). Every state education agency has a food service director as well as a staff member who is responsible for directing or coordinating school health education (Kolbe et al., 1995).

On the health department side, a state health official heads a state health agency in each state with a broad range of responsibilities including improving the health and well-being of children and youth in their state (Association of State and Territorial Health Officials, 1995). State health agencies have varying levels of involvement in school-related activities through their divisions of maternal and child health; health promotion and chronic disease prevention; primary care; and communicable disease. State courts may also play a role in school health through judicial decisions that affect school policies, the application of school legislation, or mandates to legislatures to take specific action in connection with school systems (National Conference of State Legislatures, 1997).

Non-governmental and private organizations also contribute at a state level to school health programs. For example, education-related organizations include National Parent Teacher Association; the National School Boards Association; the American Association of School Administrators; the National Association of Elementary School Principals; and the American School Counselor Association. State teacher colleges and universities exert an influence through teacher training and by consulting as advisors to state health and education agencies. Businesses may also work to promote state-level change in school education or school health in order to promote a steady supply of trained workers (Greene & McCoy, 1998). Non-governmental and private organizations may also be health-related, for example the American Public Health Association, the National Association of Social Workers, and the R. W. Johnson Foundation provide advocacy, collaboration, funding, research, information and technical assistance on health-related issues.

Federal Participation in School Health. A particularly important and influential way that federal agencies participate in school health is through the channels of program funding and the development and promotion of guidelines. In addition to funding inducements, federal agencies exert influence through regulations under which federally-funded programs function. For example, the 1995 School Meals Initiative for Healthy Children was created by the U.S. Department of Agriculture, requiring that school meals meet certain dietary guidelines. In order for schools to receive reimbursement for school meals provided, regulations such as these must be followed.

In addition to regulations that may involve sanctions, federal agencies have established guidelines for school health programs that serve as exhortations including the CDC guidelines

that are studied in this dissertation. As explained in Chapter 1, invited participants in the process of guidelines development may include scientists, educators, representatives of nongovernmental organizations, the public, and other interested parties.

Numerous federal programs research children's health. The National Institutes of Health has many ongoing research programs, for example the Child and Adolescent Trial for Cardiovascular Health which tracks development of cardiovascular risk factors and disease over the life span, beginning in youth. The Centers for Disease Control and Prevention has several "surveillance systems" which use periodic surveys to capture health habits and behaviors of a large, systematic sample of various populations. The Youth Risk Behavior Surveillance System (YRBSS) (Kolbe, Kann, & Collins, 1993) and the *Monitoring the Future* study (Bachman, Johnston, & O'Malley, 2002) are federally-sponsored surveys related to youth. The YRBSS monitors risky behaviors of high school students. The Monitoring the Future study surveys drug use and related attitudes by annual survey of a sample of students as well as a longitudinal study of a subset of students into young adulthood.

Few studies, however, examine school policy *per se*. A study by Brener, Jones, Kann, & McManus (2003b) affirms the dearth of scientific study and peer-reviewed journal articles on school policy, especially at the federal level. A body of informal literature relevant to school health policy consists of the many technical assistance materials produced by various organizations. For example, the National Association of State Boards of Education presented a "school health policy guide" entitled *Fit, Healthy, and Ready to Learn* (Bogden, 2000), a "how-to" manual on developing policy goals, writing policy, and promoting implementation. The manual draws upon scientific and programmatic literature in an informal way, resulting in a

“best practices” approach in the areas of tobacco, physical activity, and nutrition policy.

Another typical example of technical assistance aid is the School Health Index developed by CDC in 2000 (CDC, 2000a). This self-assessment and planning tool translates scientific findings into practical advice, providing a step-by-step manual for schools and school districts in creating long-term plans. Many technical assistance tools such as these are available as resources to state boards of education, school districts, and schools; however although the materials are often widely disseminated, their impacts are rarely evaluated systematically.

Conclusion

Despite over 30 years of research, the study of legislative policy adoption has not followed a steady, clear course. The field continues to slowly evolve with new conceptual approaches as well as new methodologic approaches, reinforcing the conclusion that at this time, no consensus has been reached regarding theoretical models.

The literature reviewed indicates that various factors motivate governments to adopt new policy, often through non-traditional “policy tools” that are contemporary innovations in and of themselves. Guidelines issued by federal agencies are non-legislative, non-coercive policy tools which, despite their extensive use in government, have been consistently overlooked in classification schemes of policy tools with the exception of Gormley’s (1989) category of “jawboning.” Hortatory policy may be especially useful for intergovernmental policy action such as school health, where policy adoption involves a complex, multi-actor environment that is representative of the increasing emphasis on networked action in public administration. Although sparse, published research on guidelines *per se* indicates that effects of federal guidelines are often through organizational channels.

Three models have traditionally been used to study state-level adoption of legislative policy: internal determinants, national models, and regional models. This dissertation builds on the legacy of internal determinants and interaction models by examining school health policy with each of three dominant policy adoption analysis frameworks. However, rather than a wide array of policies that may reflect different actors, different contexts, different time frames, and different policy goals, this dissertation takes a sharply focused view. Three sets of school health guidelines are examined, each issued by the same federal agency, to the same state agencies, concurrently measured by the same data collection survey, urging similar types of action by school staff and others, through the same organizational mechanism of formal policy adoption at a state level. The relatively short time frame of this study (six years) is more likely to reflect action by the same networks involving the same cast of policy actors such as career bureaucrats and long-time board of education employees in the states. By holding many context variables as close to constant as possible by design rather than by statistical manipulation, a clearer picture may emerge concerning how a policy tool is affected by policy area.

This research should kindle interest among scholars as well as among practitioners of public administration. Findings will contribute to theory-building by examining policy developed intentionally through the channel of non-legislative guidelines, supported by bureaucratic expertise and scientific research rather than by political processes. In addition, findings will contribute to theory-building in the area of intergovernmental diffusion of bureaucratic policy, an area that is relatively unexplored empirically in the public administration literature.

Study results may be of interest to public administrators not only in deepening their understanding of bureaucratic action, but in offering information potentially useful in improving planning for diffusion and implementation of agency policy. Results may also offer insights to help public administrators better target guidelines diffusion efforts.

Finally, of 3900 studies using diffusion of innovation theory catalogued by Rogers through 1995, no studies examined federal guidelines as innovation (Rogers, 1995). This dissertation also adds to the body of empirical literature on diffusion of innovations.

The next chapter discusses in detail the methods used in this study. School health guidelines issued by CDC and the subset of the CDC guidelines examined in this dissertation are further described, together with data sets and data limitations. Also noted are limitations imposed by the study of federal guidelines as an ongoing phenomenon in a complex and changing environment—a phenomenon enacted by bureaucrats who often strive to solve public problems without data needed to fully understand them.

CHAPTER 3

DATA AND METHODS

Research Questions

Contemporary public administrators have at their disposal an expanding array of policy tools for bureaucratic action. Research has demonstrated that (1) the nature of the actor influences the policy tool selected (Bressers & O'Toole, 1998); and (2) the policy tool selected makes a difference in how a policy is implemented (Yu et al., 1998). In addition, the context in which a policy is developed, adopted, and implemented has been shown time and again to exert an important influence (Angle & Van de Ven, 1989; Goggin, Bowman, Lester & O'Toole, 1990; Pressman & Wildavsky, 1984) .

Studies of adoption of *legislative* policy have been amply represented in the literature for over half a century. Although non-legislative policy has also been studied, research has tended to focus on traditional policy tools such as grants-in-aid. Less is understood about emerging policy tools such as tradable permits and negative taxation, in part because of their short history. However, despite the long history of federal guidelines and the enormous volume of bureaucratic action represented by guidelines discussed in Chapter 1, very few studies have examined the adoption of guidelines. In addition, although several taxonomies of policy tools have been developed as discussed in Chapter 2, none of the taxonomies to date have included guidelines as a policy tool.

This research examines three sets of federal guidelines issued by the U.S. Centers for Disease Control and Prevention (CDC) during the 1990s recommending adoption by state

departments of education of school health policies for healthy eating, physical activity, and tobacco. This study was designed to sharply focus on one type of policy tool, in context, but across different substantive areas in order to address the following research questions:

1. What theoretical model best explains adoption of CDC school health guidelines for healthy eating, physical activity, and tobacco?
2. To what extent does CDC school health policy adoption vary across the substantive areas of healthy eating, physical activity, and tobacco?

Three models described below are used to examine adoption of three sets of CDC school health guidelines issued in the 1990s. Although contextual variables are not held constant, the effects of context are minimized by using a short analytic time frame for the study. In addition, the unique features of the School Health Policies and Programs 2000 (SHPPS 2000b) data set allow a research design for this dissertation that offers several advantages over traditional legislative policy innovation studies.

CDC School Health Guidelines

In the United States, responsibility for much education decision-making resides at the state level and not with the federal government. In the area of school health promotion, a particularly important and influential way that federal agencies participate in school health is through the development and promotion of guidelines (Greene & McCoy, 1998). As noted above, the nature of a bureaucratic actor influences its selection of policy tool. Although CDC does issue some regulations, the culture of the organization is one of collaboration and partnership with state and local health departments. Thus, a guidelines process is often used as a way to involve public health partners in developing recommendations while still providing CDC

an avenue for federal action to promote the adoption of public health policy among state and local entities.

In 1988, the Division of Adolescent and School Health (DASH) was established as part of CDC. DASH's mission includes (1) conducting data collection activities to monitor health risk behavior in school children; (2) developing guidelines for effective school health programs; (3) enabling constituents to implement effective school health programs; and (4) evaluation (CDC, 2002f). During the 1990s, DASH coordinated the development and promulgation of three sets of guidelines for school health: healthy eating (CDCb, 1996), physical activity (CDC, 1997), and tobacco (CDC, 1994). The guideline development process led by CDC included representatives of state departments of education, state departments of health, school principals, educators, scientists, representatives of nongovernmental organizations, and other interested parties.

The format for each set of DASH guidelines is a brief review of the scientific and practice literature related to the substantive area, followed by recommendations for adoption of specific policies and practices at the state, school district, and school levels. The guidelines are hortatory in nature, encouraging rather than mandating ideal school policies based on recommendations derived from scientific evidence and expert opinion.

CDC's 1996 *Guidelines for School Health Programs to Promote Lifelong Healthy Eating* (Appendix B) contain seven major recommendations that collectively provide a conceptual framework for school health programs and practices in support of lifelong healthy eating. Recommendation areas include school food service; curricula in nutrition education; instruction for students; training for school staff; integration of school food service and nutrition education;

family and community involvement; and program evaluation. For each recommended area in the framework, several guidelines are presented urging adoption of specific policies and practices.

Similarly, CDC's 1997 *Guidelines for School and Community Programs to Promote Lifelong Physical Activity Among Young People* (Appendix C) lists 10 major recommendations together with a series of guidelines in areas such as establishment of environments that promote physical activity; instruction for students; training for school staff; family and community involvement; and program evaluation.

CDC's 1994 *Guidelines for School Health Programs to Prevent Tobacco Use and Addiction* (Appendix A) lists seven major recommendations together with guidelines for establishing policies on tobacco use in schools; instruction for students; support for tobacco use cessation among students and staff; training for school staff; family involvement; and program evaluation.

The first release of the three sets of school health guidelines was through publication in CDC's *Morbidity and Mortality Weekly Report (MMWR)*. This publication is the main venue for official communication between CDC and state departments of health. First published by CDC in 1961, the *MMWR* is widely recognized in the public health community as an authoritative source for public health information. The *MMWR* serves as a dissemination channel for CDC guidelines related to health but does not contain administrative guidelines related to issues such as funding. After 1994, the *MMWR* became available in electronic format through the World Wide Web in addition to the traditional paper version (J. Ward, CDC Epidemiology Program Office, personal communication, November 8, 2002).

Two important additional dissemination channels currently support adoption of CDC's school health guidelines: The *School Health Index* (CDC, 2000a) and *Fit, Healthy, and Ready to Learn* (Bogden, 2000). Both of these publications, however, were disseminated after data collection for SHPPS 2000. The *School Health Index*, developed by CDC staff, is a self-assessment tool intended to be used at the school level to guide planning for improvements in school health policies and practices. *Fit, Healthy, and Ready to Learn* was developed by the National Association of School Boards of Education with funding by CDC. This document explicitly discusses strategies to promote policy adoption and provides model policies as templates.

School Health Guidelines Included in this Study. In this study, a set of fifteen policies was selected, five each from guidelines on healthy eating, physical activity, and tobacco. The chief criterion for policy selection was the availability of state-level data that explicitly measure whether a CDC-recommended guideline was adopted. In addition, to facilitate comparisons across the three policy areas (healthy eating, physical activity, and tobacco), when possible guidelines were chosen that were similar across policy areas. For example, the healthy eating guidelines recommend that training in nutrition be required for staff who teach nutrition, and the physical activity guidelines recommend that training in physical education be required for staff who teach physical education. Appendices A, B and C contain the full text of the *MMWR* publication of CDC's guidelines on healthy eating, physical activity, and tobacco. The fifteen guidelines included in this study can be summarized as follows:

Healthy Eating Guidelines Included in This Study and Variable Name

1. Serving healthy and appealing food on the school premises (HLTHFD).
2. Allowing students adequate time to eat (EATTIME).
3. Requiring training in nutrition for staff who teach nutrition (NUTRAIN).
4. Requiring that students receive instruction in nutrition and diet (TEANUT).
5. Banning the use of food for reward or punishment (FDRWRD).

Physical Activity Guidelines Included in This Study

1. Requiring the use of protective gear when children are engaged in physical activity or sports at school (GEAR).
2. Allowing students adequate time to exercise (RECESS).
3. Requiring training in physical education for staff who teach physical education (PETRAIN).
4. Requiring that students receive instruction in physical activity and fitness (TEAPE).
5. Banning the use of exercise as punishment (requiring students to exercise as punishment; or excluding students from physical activity as punishment for misbehavior in another class) (REPUNPE).

Tobacco Guidelines Included in This Study

1. Prohibiting students from smoking on school grounds and at school-sponsored events (KDSMK).
2. Requiring that students receive instruction in tobacco use prevention (TEATOB).
3. Providing students support for tobacco use cessation (KQUIT).
4. Prohibiting students from wearing tobacco logos at school (LOGOS).
5. Prohibiting smoking by faculty, staff and visitors in schools and at school-sponsored events (FTYSMK).

Description of Data

School Health Policies and Programs Study 2000 (SHPPS 2000b). Primary data for the study come from the SHPPS 2000 conducted by CDC (Smith et al., 2001). Questionnaire development for SHPPS 2000 took place from July 1997 through December 1999 and included review by expert panels as well as review and written comment from nearly 150 representatives from national organizations and government agencies. Under the direction of CDC, question wording and questionnaire format for SHPPS 2000 underwent rigorous formative evaluation and field testing. In addition, reliability and validity assessments for SHPPS 2000 included formal interviews with state, school district, and school staff to confirm respondents' understanding of the term "policy" and to determine how familiar respondents were with the policies addressing the SHPPS 2000 questionnaire topic (Brener, Kann & Smith, 2003a).

State-level data were collected from all 50 United States plus the District of Columbia. During the period of January through August 2000, all 51 (100 percent) state and District of Columbia education agencies completed the state-level questionnaires for which they were eligible. State-level respondents "were generally those staff members who had primary responsibility for, or were the most knowledgeable about, policies or programs addressing the particular school health program components" (Smith et al., 2001). In addition, a published study by CDC examined the reliability and validity of SHPPS 2000 data by conducting formal interviews with state staff who completed the SHPPS 2000 questionnaires (Brener et al., 2003a). Those interviewed were asked to read aloud any documentation that supported answers provided on the original questionnaire. The study concluded that "interviews with respondents generally indicated the mailed questionnaires provided valid data" (Brener et al., 2003a, p. 34).

Appendices D, E, and F present excerpts of the CDC guidelines on healthy eating, physical activity, and tobacco juxtaposed with the text of SHPPS questions, illustrating how the adoption of each guideline is explicitly measured by SHPPS. SHPPS 2000 data are publicly available in SPSS and SAS formats on CD-ROM (CDC, 2000b). SHPPS 2000 included surveys at three levels: state, school district, and schools. SHPPS 2000 data are cross sectional and do not contain the date of policy adoption associated with each policy. Although SHPPS 2000 used a nationally representative sample, sampling methods preclude a satisfactory examination of adoption of CDC guidelines matching state-, district-, and school-level data. Therefore, only data obtained from state-level questionnaires are examined in this study.

SHPPS 2000 was the second of two surveys conducted by CDC on school health policies and programs. In 1994 and prior to the issuance of the CDC guidelines examined in this study, CDC conducted its first formal survey (SHPPS 1994) on school health policies and programs (CDC, 1995). Although there is some overlap of policy areas queried in SHPPS 1994 and SHPPS 2000, the survey questions are markedly different. According to school health officials at CDC, SHPPS 1994 questionnaires underwent a “major overhaul” in preparation for the SHPPS 2000 survey (N. Brener, CDC Division of Adolescent and School Health, personal communication, October 28, 2002). Recently, CDC undertook an analysis of the extent to which SHPPS 1994 questions corresponded with SHPPS 2000 questions. The conclusion of this analysis was that although several components of school health are included in both surveys, satisfactory comparisons cannot be made across time periods using SHPPS 1994 and SHPPS 2000 because of major differences in the wording of questions (N. Brener, personal communication, October 28, 2002).

Secondary Data. Variables used for the internal determinants model in this study included secondary data obtained from a variety of sources. Chapter 6 details each variable and its data source.

Adoption of School Health Guidelines as Policy Innovation

School Health Guidelines Promote Ideal Practice. Legislation is frequently crafted to institute action while granting administrative agencies the power to develop, implement, and change the systems and details of how the legislation is implemented in the field. For example, 42 U.S.C. Section 300K (1998) instituted a national breast cancer screening program for low-income women, leaving most administrative details to CDC as the implementing agency. In this case as in many, CDC devised policies, procedures, recommendations and guidelines that support the daily operation of the screening program.

CDC issues guidelines to address at least three different types of public health practices. Guidelines such as those that define administrative procedures for fiscal management and reporting, set forth acceptable practice. Other guidelines summarize state-of-the-science and recommend disease-control practices such as measures for dealing with biological contamination in hospitals. These scientific guidelines promote best known practices since they are based on evidence from existing programs. Still other CDC guidelines promote ideal practices by recommending the adoption of particular policies, procedures or practices in order to advance strategic public health goals. Although the three practice categories are not mutually exclusive, the school health guidelines clearly promote ideal practices. In some cases, the policies and practices recommended in the school health guidelines had never been implemented anywhere and represent new, untried strategies intended to advance public health.

School health policy guidelines are based upon scientific evidence and professional judgment; however they are also motivated by a desire to encourage improvements in public health practice and move the field forward. In the political science literature, “innovation” is commonly defined as enactment of legislation, with regard neither to the content of the policy nor the importance of its effect (see for example, (Berry & Berry, 1990; Daniels & Darcy, 1985; Glick, 1992; Roessner, 1979). In the public management literature, “innovation” has acquired a definition relating to new management practices intended to improve operating effectiveness regardless of whether a policy is adopted in connection with the improvement (see for example, Angle & Van de Ven, 1989; Daft, 1998; Peters & Waterman, 1982). In the public management literature, “innovation” is commonly equated with cutting-edge ideas.

Innovation Defined. In this dissertation, “innovation” is defined as the adoption of a CDC guideline on school health. Two concepts are embedded in this definition: (1) formal policy adoption and (2) an intention to improve practice. For simplicity, in the remainder of this chapter, “state” refers to the 50 United States and the District of Columbia, inclusive, unless explicitly stated.

Measurement of Policy Innovation in Other Studies

Studies of government innovation and legislative policy have commonly measured innovation as a combination of the *speed* with which new policies are adopted and the *number* of new policies adopted. Several problems can be noted with the way each of these concepts has been used in research to date. In this section, problems are outlined followed by a discussion of the manner in which the research design of this dissertation addresses potential sources of bias.

Problems in Measurement of Policy Innovation Related to Time. First, when a set of policies is examined to assess speed of adoption, the disparate time periods among policies from first to last adoption can create potential bias. Speed of adoption is typically represented by a value calculated to standardize the relative elapse of time between early and late adopters. For example, Walker (1969) calculated the total number of years from first to last adopter, and then calculated the inverse of the percentage of time elapsed when each state adopted the policy. Thus, if 20 years elapsed from adoption by the first state to adoption by the last state, the earliest adopter could be assigned a score of 100 (the inverse of 0 time elapsed) and a state that adopted in Year 20 a score of 0 (the inverse of 100 percent time elapsed). A state that adopted in Year 10 would receive a score of 50 (for 50 percent time elapsed).

Although using a standard score has certain advantages, the approach remains problematic. If a policy took 100 years to be adopted by all states, a state that adopted after 50 years would get a score of 50 (for 50 percent time elapsed). For another policy that was *rapidly* adopted by all 50 states (for example, child restraint laws were adopted by the 50 states over a period of only four years), a state that adopted in the first year would score 100, and a state that adopted in Year 3 would receive a score of 50. The standardization implies that the degree of innovativeness of a score of 50 is equal, no matter whether the time elapsed is two years or 50 years. In studies that examine a wide array of policies with widely disparate adoption periods, potential bias is of even greater concern.

Secondly, standard scores reflecting time periods also raise the question of whether standard scoring adequately captures “innovativeness” for policies that are slowly adopted. Should a state that takes 50 years to adopt a policy be considered “innovative” to any degree? In

cases of very *rapid* adoption, it is possible that lag time may be related to procedural delays such as having a biennial legislature rather than meaningful differences in innovativeness.

A third time-related issue is associated with studies that examine policies not yet (or never) adopted by all states. In these studies, a cut-point is established, typically a few years prior to the date of the research study (Walker, 1969; Gray, 1973). Elapsed time is then calculated from the date a policy is adopted by the first adopter to the cut-point date. When standard scores are derived, the scores do not truly represent time elapsed from first to last adoption but rather they represent time from first adoption to the cut-point date. Potential distortion can arise from this method because the true length of time from first to last adoption is not yet known. Thus, a state can earn a score of 0 when it is the last to adopt a policy but can also receive a score of 0 when it simply has not adopted by the arbitrary cut-point date.

A fourth time-related issue concerns the assumption of policy equivalence over time. Gray (1973) included in her study of education policy the institution of a school board of education. First adoption was in 1784 and “last” adoption was in 1949, a period of 165 years.¹⁰ Policy innovation studies rarely even acknowledge the possibility of policy mutation or reinvention even when studies examine policies with extended time periods from first to last adoption. The phenomenon of “policy reinvention” has been noted when state or local entities try to build a greater sense of local ownership of a policy issue by modifying another state’s policy rather than adopting it wholesale (see for example Glick, 1992).

¹⁰ Gray reported that 40 states adopted this policy. Thus Gray’s time period does not in fact represent adoption by all of the 48 states existing in 1949 and should not technically be considered date from first to last adoption.

Finally, policy revocation is a fifth potential confounding factor. This is of particular concern when elapsed time from first to last adoption is long. Policies may be revoked, amended, replaced, strengthened or weakened over time. Thus, studies that analyze policy innovation by assessing speed of adoption often compromise or sacrifice important concepts by virtue of the research designs.

Problems with Policy Innovation Measurement Related to Quantity of Policies

Adopted. In addition to speed of adoption, the *number* of policies adopted is typically measured in studies of innovativeness in legislative policy. Problems can also arise from this approach. Studies that lump together a wide range of policies make an implicit assumption that the innovativeness represented in adoption of a new policy is equal across policies. This assumption is often seriously flawed. Policies may vary importantly in the risks involved in adoption, the intended effect of a policy, its span of influence, and the targets for change. For example, Walker (1969) included 88 policies in his study of adoption of legislative policies. The roster of policies examined included eight separate policies for licensing accountants, architects, beauticians, chiropractors, dentists, engineers, nurses, and pharmacists. In the same study, the following policies were also included: “Anti-Age Discrimination Laws,” “Controlled Access Highways,” “Equal Pay for Females,” “Fair Trade Laws,” “Gasoline Tax,” “Merit System,” “Minimum Wage Law,” “Old Age Assistance (Social Security), and “Workmen’s Compensation.” Walker’s study implicitly equates innovativeness represented by a beautician licensing law with innovativeness represented by institution of workmen’s compensation. Thus, the research design itself may obscure the true innovativeness of the states studied.

A few studies have grouped policies by substantive area in order to address differences across policy areas; however, even these studies pose a similar problem. In Gray's 1973 innovation study of 12 policies, five education policies were grouped: State Boards of Education; Chief State School Officer; Compulsory School Attendance; Degree Requirement for Teaching in Elementary School; and Degree Requirement for Teaching in High School. Although the substantive area was education, it could be argued that there is no equivalence of importance between the policy imposing a degree requirement for elementary school teachers and the more far-reaching policy for compulsory school attendance.

The lack of equivalence among policies with identical titles may also be misleading. Glick (1992) noted in his study of living will laws that policy content varied widely among adopting states. To address this issue, Glick created a 28-point index to measure whether each of 28 provisions considered most permissive was included in the enactment. Among the several states that had adopted "living will laws," Glick's scores ranged from a high of 20 points in Alaska, Maine and Montana to a low of 6 points in Connecticut and Idaho. As illustrated by living will laws, a simple tally of the number of adopted policies without examination of policy content can result in misleading conclusions.

Even more important than differences in policy title and policy content are differences in the extent to which policies are implemented. In discussing methodologic issues related to assessing innovation by scoring states based on the number of policies adopted, Downs (1976) noted:

Although [the adoption/nonadoption] method of scoring produces an interesting ordering of adopting units, it does not differentiate between "superficial" and

“deep” adoption—that is, it reveals nothing about the extent to which the innovation has been employed...(Downs, 1976, p. 39).

Perhaps the most accurate way of assessing policy innovation is to assess implementation practices as well as policy adoption. Case studies have been used for in-depth examination of particular policies including the conditions surrounding their adoption and the extent to which the policies have been implemented. (See for example Hays & Glick, 1997; Skocpol, Abend-Wein, Howard, & Lehmann, 1993.) Case study designs rarely allow examination across the 50 states, however, especially when more than one policy is considered.

How Policy Innovation is Measured in This Study: Indices of Innovation. As fully described below, three theoretical models were used to frame the research design for this study: regional interaction; national interaction; and internal determinants. All three models used the same indices constructed from SHPPS 2000 and described in detail below. One index was devised for innovativeness in each of the three substantive areas (healthy eating, physical activity, and tobacco) as well as an overall index of school health innovativeness by summing the three policy areas.

The Healthy Eating Innovation Index represents a score related to the number of healthy eating policies adopted by a state. Healthy eating policies in the categories listed on Page 78 were assigned the following variable names: HLTHFD, EATIME, NUTRAIN, TEANUT and FDRWRD. Appendix G lists the SHPPS 2000 questions that were used to assign values to each variable. A value of 1 was assigned for each policy adopted as evidenced by SHPPS 2000 data, and a value of 0 was assigned for non-adoption. For three variables HLTHFD, NUTRAIN and TEANUT, more than one SHPPS 2000 question was relevant. In these cases, all of the SHPPS

2000 questions that were relevant were scored 0 or 1, and a mean score was then calculated and used for that variable. In addition, EATTIME and FDRWRD, policies were measured in terms of whether action was “required” or “recommended.” Policies that required action were scored 1 but policies that recommended action were scored 0.5. Of the 714 data points for healthy eating (51 entities x 14 sub-questions), 8 percent (n=51) were missing and recoded as 0. The Healthy Eating Innovation Index is the sum of the values of HLTHFD, EATIME, NUTRAIN, TEANUT and FDRWRD.

The Physical Activity Innovation Index represents a score related to the number of healthy physical activity policies adopted by a state. Physical activity policies in the categories listed on Page 78 were assigned the following variable names: GEAR, RECESS, PETRAIN, TEAPE, and REPUNPE. Appendix H lists the SHPPS 2000 questions that were used to assign values to each variable. A value of 1 was assigned for each policy adopted as evidenced by SHPPS 2000 data, and a value of 0 was assigned for non-adoption. For all variables except RECESS, more than one SHPPS 2000 question was relevant. In these cases, all of the SHPPS 2000 questions that were relevant were scored, and a mean score was then calculated and used for that variable. In addition, RECESS and REPUNPE included policies measured in terms of whether action was “required” or “recommended.” Policies that required action were scored 1 but policies that recommended action were scored 0.5. Of the 714 data points for physical activity (51 entities x 14 sub-questions), 6 percent (n=46) were missing and recoded as 0. The Physical Activity Innovation Index is the sum of the values of GEAR, RECESS, PETRAIN, TEAPE, and REPUNPE.

The Tobacco Innovation Index represents a score related to the number of anti-tobacco policies adopted by a state. Tobacco policies in the categories listed on Page 78 were assigned the following variable names: KDSMK, LOGOS, FTYSMK, TEATOB, and KQUIT. Appendix I lists the SHPPS 2000 questions that were used to assign values to each variable. A value of 1 was assigned for each policy adopted as evidenced by SHPPS 2000 data, and a value of 0 was assigned for non-adoption. For TEATOB, three SHPPS 2000 questions were relevant. In this case, all three relevant SHPPS 2000 questions were scored, and a mean score was then calculated and used for TEATOB. Of the 357 data points for tobacco (51 entities x 7 sub-questions), 1 percent (n=4) were missing and recoded as 0. The Tobacco Innovation Index is the sum of the scores for KDSMK, LOGOS, FTYSMK, TEATOB, and KQUIT.

Each innovation index was constructed for the 50 states individually and the District of Columbia. The *School Health Innovation Index* is a 15-point scale consisting of the sum of the Healthy Eating Innovation Index, the Physical Activity Innovation Index, and the Tobacco Innovation Index. A state's score on this index is denoted a "Total Innovation Score."

Advantages to Using Indices of Innovation. Despite the limitations imposed by a lack of time-series data for this study, important advantages were gained due to the nature of the CDC guidelines process and the SHPPS 2000 data set used for this study. Innovation has been defined in this study to include two concepts: adoption of a new policy and an intention to achieve ideal practice. CDC school health guidelines explicitly recommend adoption of new policies and explicitly promote ideal practice. SHPPS 2000 captures both of these concepts by measuring whether the recommended components of ideal practice have been adopted as state-level policies.

Secondly, the choice of data for this study addresses the issues of policy equivalence and reinvention. Each question in SHPPS 2000 focused on a specific state-level policy and explicitly queried whether or not a state had “adopted a policy” on a specific issue. The precise wording of SHPPS 2000 resulted in measurement not of policy titles, but of policy constructs and features. This wording provides an important advantage by allowing confirmation that the intent and extent of a policy is consistently measured.

The guidelines selected for this study also address the issue of policy equivalence. As noted above, each of the 15 policies examined here were explicitly recommended as ideal policies in the CDC school health guidelines. Similarities in the content of policies also guided policy selection. For example, three of the policies included are:

Requiring that students receive instruction in nutrition and diet;

Requiring that students receive instruction in physical activity and fitness; and

Requiring that students receive instruction in tobacco use prevention.

Thus, the selection of policies by virtue of their content, scope, effect, and importance achieves a balance not found in studies that lump together large sets of unrelated policies.

Policy modification and revocation are addressed indirectly in this study by assessing policy equivalence at a single point in time that is relatively close to the time the CDC school health guidelines were released. The CDC guidelines on tobacco were issued in 1994; healthy eating guidelines in 1996; and physical activity guidelines in 1997. SHPPS 2000 recorded whether a policy was in place in the year 2000 when data were collected. The relatively short analytic timeframe of this study reduces the probability of policy modifications and revocations more likely to be experienced over a period of many years.

The short analytic timeframe for this study also supports the notion that innovation represents new ideas. Unlike studies where policies are examined over a period of a hundred years or more, it could be argued that states which adopted a policy for the CDC school health guidelines by the year 2000 were truly policy innovators.

As discussed above, certain limitations accrue from the use of a cut point date. However, the design for this study does not arbitrarily assign a value for time elapsed to the cut point date. Rather, the date of SHPPS 2000 is used precisely as a cut point—a point in time at which the data have been “cut.” This design avoids the risk of distortion inherent in studies which quantify innovation by speed of adoption.

A question arises concerning whether some states may have already had policies in place before the issuance of the CDC school health guidelines. Data are not available that could measure this directly. However, because some of the participants on the guidelines development panels were from states, there is a possibility that model policies developed by states served as fodder for the development team. Fortunately, however, even if this were the case, the measure of innovativeness would remain unbiased. If a state had a model policy in place before the release of the CDC guidelines, that state could still be considered an innovator in school health by virtue of its progressive policy.

Although not held constant, variables such as the organizational culture of the CDC and state departments of education and even some key staff are likely to remain relatively unchanged over the span of less than six years.

Importantly, in the case of the CDC school health guidelines for state departments of education, adoption of a policy literally equals policy implementation. CDC guidelines

recommend “adoption of a policy.” Although it is obvious that implementation of such an adopted policy and improvements in school practices were intended by the CDC guidelines, at least literally, a state would have fulfilled the CDC guideline once it adopted a state-level policy. The Indices used in this dissertation explicitly measure adoption of policies at the state level.

Research Design

Three theory-based frameworks were used to examine the patterns of adoption of guidelines: (1) a regional interaction model based on diffusion of innovations theory (Rogers, 1995); (2) a national interaction model also based on diffusion of innovations theory; and (3) an internal determinants model. The conceptual and theoretical approaches that underlie this research were presented in Chapters 1 and 2. The following section presents a discussion of the application of each model to CDC’s school health guidelines for this dissertation.

Interaction Models Based on Diffusion of Innovations Theory.

(1) Regional models. Walker (1969) assessed the innovativeness of states in adoption of 88 policies and assigned them a “Composite Innovation Score.” Walker then used factor analysis to sort states into “leagues” which he asserted represented self-selection of states into peer groups. For the first analysis of the investigation reported here, an assessment was made of the influence of region on policy adoption by grouping states into Walker’s regions and then comparing a state’s Composite Innovation Score (Walker, 1969) (a “Walker Score”) with the Healthy Eating Innovation Index, the Physical Activity Innovation Index, the Tobacco Innovation Index, and the School Health Innovation Index. Alaska, Hawaii, and the District of Columbia were omitted from this analysis because they were not included in Walker’s original analysis. The remaining 48 states were grouped into the leagues defined by Walker (see

Appendix J). SPSS was used to generate a correlation matrix for the four school health indices using only the sub-set of states within each league defined by Walker. The null hypotheses are as follows:

H1: There is no correlation between a state's Healthy Eating Innovativeness Index score and its Walker Score.

H2: There is no correlation between a state's Physical Activity Innovativeness Index score and its Walker Score.

H3: There is no correlation between a state's Tobacco Innovativeness Index score and its Walker Score.

H4: There is no correlation between a state's Total Innovativeness Index score and its Walker Score.

To explore the possibility that regionalism may be geographic rather than by league or affinity, a second analysis was performed using four U.S. Census Regions. All 50 States and the District of Columbia were included and were first grouped by four U.S. Census Region. For this analysis, "regional leader" was defined as a state or the District of Columbia having the highest score in each Index of Innovation when compared to other entities within its U.S. Census Region. "Regional laggard" was defined as a state or the District of Columbia as being the lowest scoring entity across all of the school health indices when compared to other entities within its U.S. Census District. The hypotheses for this descriptive analysis are:

H5: When states and the District of Columbia are grouped by U.S. Census Region, there are no regional leaders.

H6: When states and the District of Columbia are grouped by U.S. Census Region, there are no regional laggards.

(2) National models. National models assume that the most innovative states will be consistent early policy adopters across policy areas. SHPPS 2000 data show that by the year 2000, at least two entities (a state or the District of Columbia) had adopted each of the 15 policies included in this study. Because all policies were adopted by at least some states or the District of Columbia, consistently early adopters of new policies can be identified. The first analysis to determine the presence of national leadership on school health policy consisted of a simple assessment of whether any of the 50 states and the District of Columbia had adopted some level of all of the five policies recommended in each substantive area. Leadership was defined as adoption of any level of all five policies within a substantive area.¹¹ The hypotheses for analysis of national leadership were:

H7: Among the 50 States and the District of Columbia, there are no national leaders for healthy eating policy.

H8: Among the 50 States and the District of Columbia there are no national leaders for physical activity policy.

H9: Among the 50 States and the District of Columbia there are no national leaders for tobacco policy.

H10: Among the 50 States and the District of Columbia there are no national leaders for total school health innovativeness.

¹¹ Includes adoption of a policy recommending action as well as a policy requiring action.

Laggardness was defined as being one of the two lowest scoring entities within each substantive area and across policy areas. The hypotheses for analysis of national laggardness were:

H11: Among the 50 States and the District of Columbia, there are no national laggards for Healthy Eating Policy.

H12: Among the 50 States and the District of Columbia there are no national laggards for Physical Activity Policy.

H13: Among the 50 States and the District of Columbia there are no national laggards for Tobacco Policy.

H14: Among the 50 States and the District of Columbia there are no national laggards for total school health innovativeness.

In addition to these analysis, a Spearman (rank) correlation analysis of 48 states (excluding Alaska, Hawaii and District of Columbia) was performed to compare the four indices of innovativeness for school health policy with rankings for leadership and laggardness reported by Walker (1969), Gray (1973), and Savage (1978). The rankings of states based on the Healthy Eating Innovation Index, the Physical Activity Innovativeness Index, the Tobacco Policy Innovation Index, and the School Health Innovation Index were correlated with Walker's national rankings for 88 policies; with Savage's national rankings for 181 policies; and for Gray's rankings of five education policies.

Internal Determinants Model

The third theoretical model used for this study was an internal determinants model derived from the political science literature. As discussed in Chapter 2, a wide array of variables

has been used to explain policy adoption in the states. Nineteen variables were assessed here including variables related to state demographics, school demographics, as well as variables related to eating, physical activity and tobacco. As noted above, secondary data for these analyses were obtained from various sources (see Table 3.0) and are further detailed in Chapter 6. Examples of variables included are per capita income, teacher/pupil ratio, and a state's urban/rural designation.

Spearman correlations were performed to measure association between the 19 variables and the index for healthy eating, the index for physical activity, the index for tobacco policy, and the index for school health policy. Although an hypothesis could be expressed for each of the 19 variables and the four indices, the null hypotheses can be succinctly stated as follows:

H15: Innovation in school health is not related to state size.

H16: Innovation in school health is not related to per capita income.

H17: Innovation in school health is not related to teacher/pupil ratio.

H18: Innovation in school health is not related to state liberalness (percent Democrat).

H19: Innovation in school health is not related to the percentage of children eligible for free or reduced price school lunches.

Participation by CDC Experts

Although the input of CDC experts was not a formal part of this study, my employment in the Division of Nutrition and Physical Activity at CDC made it possible to routinely converse with several highly-experienced and high-ranking CDC experts in nutrition, physical activity, tobacco, school health, and health policy. Several of these professional colleagues were invited to provide informal consultations during all phases of this research. They provided guidance on

the selection of policies for analysis and the inclusion of variables for the internal determinants model. Draft chapters were reviewed as a professional courtesy by several CDC colleagues with suggestions for additions, revisions and improvements. In addition, several CDC colleagues reviewed preliminary results from the analyses and offered their interpretations.

Dr. Nancy Brener, Research Psychologist and Lead for SHPPS; Dr. Howell Weschler, Chief of the Research Applications Branch; and Jennifer Osorio (Associate Director for Policy and Legislation) of CDC's Division of Adolescent and School Health; and other CDC experts in school health were consulted regarding many details of SHPPS as well as on other issues related to school health policy. Dr. Terry Pechacek, Associate Director for Science, and Rosemarie Henson, Director, both of CDC's Office on Smoking and Health, provided further assistance in understanding tobacco-related issues as did policy experts Alison Kelly and Julie Fishman, of CDC and formerly of CDC's Office on Smoking and Health. In addition, Dr. David Freedman, a member of the doctoral committee for this dissertation, is a CDC expert in the Division of Nutrition and Physical Activity who provided guidance on technical issues and the interpretation of study results. Consultations with staff in CDC's Chronic Disease Nutrition Branch were provided by Sarah Kuester, Nutritionist; Dr. Michele Maynard, Epidemiologist; Dr. Michele Reyes, Epidemiologist; Dr. Laura Kettel-Khan, Deputy Branch Chief; Dr. Jennifer Seymour, Epidemiologist; Dr. Mary Serdula, Branch Chief; and Susan Anderson, CDC Nutritionist formerly of USDA. For a perspective on aspects unique to physical activity, consultation was provided by Dr. Greg Heath, Lead Scientist, and Refilwe Moeti, Program Analyst, both of the Physical Activity and Health Branch; and Robin Hamre, Team Lead for CDC's Nutrition, Physical Activity and Obesity Prevention Program.

The study reflects the suggestions and input from various CDC experts; however no generalizations are made about other informal comments received from colleagues.

Study Limitations

Data limitations include the cross-sectional nature of SHPPS 2000. Time-series data would allow a fuller understanding of policy adoption, especially as related to time-sensitive context variables.

Use of a cut point to measure policy adoption has potential problems as discussed above; however by setting an early cut point, this study attempts to capture innovativeness. In so doing, however, the study may measure innovativeness more accurately than guidelines adoption *per se*.

The study is further limited by the use of state-level data from SHPPS 2000. In many cases, state-level policy is intended to have its effect in schools. However school-level data were not included in this study because of the limitations of the SHPPS 2000 sampling design.

Although all 50 states and the District of Columbia responded, limitations inherent in self-reports are a factor here. In addition, more than one individual may have been responsible in a single state for completing the state-level SHPPS 2000 questionnaire, further raising the issue of accuracy of self-reported data.

The next chapters present results for the analyses conducted.

Table 3.0

**Variables Examined as Potential Internal Determinants
of State Adoption of CDC School Health Policy Guidelines for
Healthy Eating, Physical Activity, and Tobacco**

(Data are for each of the 50 United States and the District of Columbia unless otherwise noted.)

1. **Population size** as of 2000, (Statistical Abstract of the U.S. 2001, p. 21).
2. **Median per capita income** for a family of four (in 1998 dollars), (Statistical Abstract of the U.S. 2000, p. 426).
3. **Pupil/teacher ratio** (Educational Statistics of the United States 2001, p. 447).
4. **Expenditures per pupil** in average daily attendance in public and elementary schools 1998-1999 (in 1998-1999 dollars), (Digest of Education Statistics 2001, p. 193).
5. **Popular Vote Cast Democrat** for President in the year 2000, (Statistical Abstract of the United States 2001, p. 236).
6. **Percent of school revenues obtained from the federal government** for elementary and secondary schools, 1997-1998 (Digest of Education Statistics 2001, p. 180).
7. **Number of federally-funded full time positions** in a state's education agency (Digest of Education Statistics 2001, p. 181).
8. **Urban/Rural designation**, as percent of state population residing in a metropolitan area (Statistical Abstract of the United States 2001, p. 30).
9. **Number of Policy Actors**, as the number of school districts in a state (Education Statistics of the United States 2001, page 444).
10. **High School Completion Rates** for 1997-1999 (Education Statistics of the United States 2001, p. 446).
11. **Educational achievement**, as average of math and verbal portions on the Scholastic Achievement Test (SAT), (Education Statistics of the United States 2001, p. 451.)
12. **Percent of students eligible for free or reduced price lunch** public schools, 1998-1999, (Education Statistics of the United States 2001, p. 445.)
13. **Fruit and vegetable consumption**, as the percentage of adults who reported eating fewer than five servings of fruits and vegetables per day, (CDC, 2002e, p. 51).
14. **Obese adults**, as percent of adults who were obese¹² in the year 2000, (Mokdad, 2001).
15. **Inactive adults**, as percent of adults who report no leisure-time physical activity, (CDC, 2002e, p. 45).
16. **Adjusted rates of death due to lung** cancer for 1999, (CDC, 2002e, p. 19).
17. **Tobacco production**, as percentage of cash receipts from total crops, (USDA, 2001, p. 46). Sixteen states had tobacco production ranging from 0.3 percent of cash receipts in Wisconsin to 60.4 percent in Kentucky. States with no reported cash receipts were included in the analysis with a value of 0.0 percent for tobacco production.
18. **Adult smokers**, as percent of adults who report current cigarette, (CDC, 2002e, p. 39).
19. **High school smokers**, as percent of high school students who reported cigarette smoking, (CDC, 2002e, p. 41). Data were available for only 34 states.

¹² Having a body mass index (BMI) equal to or greater than 30.0 kg/m². BMI is calculated as a person's body weight in kilograms divided by the square of height in meters.

CHAPTER 4

RESULTS OF REGIONAL MODELS

Part of the unique history of the United States is its origin as a collection of individual colonies marked by cultural and political differences, grouped together to form a country that acknowledges these origins even in its name “United States.” States have been grouped for study based on typography, climate, demographics, economics, industry and politics (Sharkansky, 1968). The question of whether a tendency to form groupings of states is part of the U.S. national identity is beyond the scope of this dissertation. However, one question addressed by this dissertation is whether patterns of adoption of school health policy correspond with regional groupings of states. This chapter presents the results of analyses of adoption by state departments of education of recommendations issued by the U. S. Centers for Disease Control and Prevention (CDC) for school health policies in healthy eating, physical activity and tobacco. Three types of groupings are examined: regions defined by Walker (1969); four major regions defined as U.S. Census Regions; and nine smaller U.S. Census Districts.

Background on Regionalism in America

Regional groupings of states within the United States during the early history of the country have been attributed to both distance and diversity. The distance between states in the colonial era of primitive means of transportation and communication and the ideologic and cultural differences among states help explain such early groupings as the North and South (Sharkansky, 1972). In the 1960s and 1970s, political scientists continued to direct attention to

differences among states as a means to understand political phenomena. Some writers developed characterizations based on historical observation coupled with analysis of features such as a state's economic base. For example, Sharkansky's 1972 description of Massachusetts, Wisconsin and Georgia illustrate the kinds of stereotypes that were offered:

For the observer who is sensitive to regional patterns, Massachusetts means political clambakes; Italian, Irish, and Yankee names balancing one another on the state ballot; intense Catholic versus Protestant feelings about public schools and birth control; and frequent exposes of public corruption. Georgia's politicians make their public appeals with behavior and sweetened iced tea or Coca-Cola; their names are as uniformly Anglo-Saxon as the characteristics in *Dick and Jane*; and their campaigns center on roads, schoolteachers' salaries, the associated economic woes of the little man, and the external verities of Old and New Testaments. While Georgia's politicians abstain in public, Wisconsin's slosh beer with the voters. German bratwurst takes the place of barbecue or clambake. (Sharkansky, 1972, p. 20-21).

In contemporary times, states are grouped in multiple ways for various purposes such as commercial sales areas; airline scheduling and planning; time zones; telephone service; and political strategies. In government, states are grouped into U.S. Census areas not only for purposes of the U.S. Census, but also for administration of federal services.

Regionalism in Studies of Policy Adoption

In the area of policy adoption, Walker (1969) is credited as being among the first to examine regional groupings of states in relation to adoption of legislative policy. Walker examined 88 legislative policies adopted by 48 United States during the time period of 1870 to 1966. Defining innovation as a combination of speed of adoption and number of policies adopted, Walker used factor analysis of innovativeness in states to devise five regional groupings. The Walker regions do not follow geographic patterns despite Walker's having assigned names to regions that appear to be geographic. For example, Iowa, South Dakota and

Nevada are included in Walker's "South" region, even though these states are rarely, if ever, considered part of the geographic south. In addition, some states (e.g., Illinois, Pennsylvania and New York) are included in more than one region. Appendix J shows the regions defined by Walker.

Based on an assessment of states within the five regions he defined, Walker concluded that policy adoption followed regional patterns. He asserted that state policymakers look to each other for policy ideas and to see the results of policy experiments. However, Walker contended that states paid particular attention to other states that were similar in size, wealth, and ideology. Walker described this process of self-selection into groupings as a state's choice of the "league in which to play." Within each of these leagues, Walker suggested that one or two leader states would be the first to adopt a new policy, followed by other states within the region. He called this a "spreading ink blot" pattern of policy adoption.

Walker's thesis of regionalism in policy adoption has been both challenged and supported in the literature. As discussed at length in Chapter 2, Gray (1973) challenged Walker's conclusion that regionalism was important, concluding instead from her analysis of 15 policies that policy adoption was more dependent on factors associated with time and with the substantive issues addressed by a policy. As also discussed in Chapter 2, Savage (1978) examined regionalism in policy adoption, building upon Walker's original analysis and improving the assessment of speed of adoption by standardizing measures of elapsed time. Savage examined 181 policies including some of the same policies included in the Walker (1969) analysis. Among his other findings, Savage concluded that "regional differences persist"

in the patterns of adoption when measured by the number of policies adopted and the speed of adoption.

In 1994, Berry used computer simulation to test whether the presence of regionalism could be detected by traditional models. Data were generated from a simulated innovation process. For the regional simulation, the number of border states adopting a policy was manipulated by computer until a stage when a state was entirely surrounded by adopters. Berry reported that traditional models accurately detected regionalism when regional effects were simulated in the computer model.

Since traditional regional models have been confirmed to some extent by empirical research as well as by computer simulation, an examination of policy adoption patterns in school health policy were first examined according to the regions defined by Walker (1969) in his seminal study.

Results of Analysis Using Five Regions Defined by Walker (1969)

Correlational Analyses. Walker (1969) developed a “Composite Innovation Score” for 48 United States based (1) on the number of policies adopted of his set of 88 policies examined and (2) the speed of adoption. For the first set of regional analysis in this dissertation, only 48 states were examined excluding Alaska, Hawaii and the District of Columbia in order to allow comparisons based on Walker’s Composite Innovation Score. The measure of innovativeness for school health policy is the number of CDC guidelines that have been formally adopted as state-level policies. As detailed in Chapter 3, School Health Indices were devised by summing scores assigned to states for each policy adopted. Although state scores are more fully discussed in Chapter 5, the reader is directed to Table 5.1 for a listing of scores received by each state for

each of the School Health Indices. The level of adoption for each of the 15 policies considered in this study are summarized in Appendix M.

For the regional analysis, states were first divided into Walker's five regional groups. Tables 4.0 through 4.4 show states grouped into these regions, arranged in descending order of Walker's Composite Innovation Score. State scores for each of the four School Health Indices are also shown in each table together with descriptive statistics. Higher scores on Walker's Composite Innovation Score represent greater innovativeness. Similarly, higher scores on the School Health Indices indicate that a state adopted more of the CDC-recommended policies than other states in the region.

If the regional effects Walker found for legislative policy adoption were present for school health policy, it was expected that a positive correlation would be found between Walker's Composite Innovation Score and the School Health Indices. To assess this, Spearman's (rank) correlations were used to compare the rank of each state based on Walker's Composite Innovation Score with its rank based on the School Health Indices. Table 4.5 summarizes the results of the correlation analyses.

The correlation analyses do not show the hypothesized pattern of consistent positive associations between Walker's Composite Innovation Score and the School Health Indices. For the Healthy Eating Index, correlations ranged from a strongly negative association in the "Border, Great Lakes and California" region ($r_s = -0.53$)¹³ to a strongly positive association in the "Mountains and Northwest" region ($r_s = 0.49$). For the Physical Activity Index, negative

¹³ r_s = Spearman's (rank) correlation.

correlations were found for three of the Walker regions, with positive correlations in the “New England” and “Mountains and Northwest” regions ($r_s = 0.57$ and 0.27 respectively). The “South” region showed a negative association between Walker’s Composite Innovation Score and the Tobacco Index ($r_s = -0.06$) with the four other regions showing positive correlations. The Total Innovation Index for school health policies showed similar instability, with correlations ranging from a strongly positive association in the “New England” region ($r_s = 0.69$) and the “Border, Great Lakes and California” region showing a negative association ($r_s = -0.46$). None of the correlations in the analysis achieved statistical significance at $p < .05$.

In general, correlations suggest that Walker’s regional model of legislative policy adoption offers no useful explanation of adoption patterns for school health policies. Correlations in the model varied widely; importantly, both positive and negative associations were observed when only positive associations were expected.

Analysis of Leaders and Laggards. Walker also expected that within the groupings of states, leader and laggard states could be found especially related to leadership on particular policy issues. Although the first analysis did not show consistency in overall patterns across regions, a second analysis examined whether there were consistent regional leaders and laggards by policy area within each region. For this analysis, states were again grouped into five regions as defined by Walker. Within each region, the highest and lowest scoring states were identified for each of the four School Health Indices. Table 4.6 lists the results of this analysis.

Results of this analysis suggest the possibility--if not the presence--of leaders and laggards in some of the regions. The State of Missouri appeared to be a leader in the “Border, Great Lakes and California” region, exceeded by another state only on the Tobacco Index.

Similarly, Massachusetts emerged as a leader in the “New England” region, scoring highest on all School Health Indices except the Physical Activity Index.

Stronger indications are present for persistent laggardness than leadership across policy areas. In each of the five regions, one state was consistently the lowest scoring on at least three of the four School Health Indices, suggesting that laggardness persists in these states across policy areas. In the “Mountains and Northwest” region, New Mexico was the lowest-scoring state in three of the four School Health Indices: Physical Activity, Tobacco, and Overall Innovativeness. In the “South” region, Florida was the lowest scoring state on all School Health Indices except for the Tobacco Index, again suggesting laggardness across policy areas.

Interpretation of the results of this analysis are complicated by the fact that Walker’s regions are not mutually exclusive. For example, Nebraska is included in both the “South” and “Border, Great Lakes and California” regions. When considered among the states in the “South” region, Nebraska scored lowest only in one index--the Physical Activity Index. However, when included in the “Border, Great Lakes and California” region, Nebraska had the lowest score across all four School Health Indices.

Similarly, Pennsylvania was included both in Walker’s “New England” region and his “Mid Atlantic and Great Lakes” region. In the “New England” grouping, Pennsylvania was a consistent laggard across all school health policy areas, scoring lowest in all four School Health Indices. Furthermore, even when grouped differently and included in the “Mid Atlantic and Great Lakes” region, Pennsylvania persisted as a laggard. In this grouping of states, Pennsylvania scored lowest in three of the four School Health Indices, with Indiana scoring lowest on the Tobacco Index.

Additional Regional Analyses

The original protocol for this dissertation to examine regional effects included only an analysis of policy adoption based on the five regions defined by Walker. As the research progressed, other regional groupings were considered in order to more fully examine the possibility of regional influences in school health policy adoption. Several additional analyses were conducted, grouping states by the four U. S. Census Regions and by the nine U.S. Census Districts. Results of these analyses are presented in the next sections.

Results of Analyses Using Four U.S. Census Regions

For this analysis, all 50 states and the District of Columbia were grouped into the four U.S. Census Regions identified as West, South, Northeast and Midwest (see Appendix K). Tables 4.7 through 4.10 list the states in each U.S. Census Region and the score in each of the four School Health Indices arranged in descending order by the Total Innovation Index. Descriptive statistics are shown at the bottom of each table. Table 4.11 presents a summary table to allow more convenient comparisons of descriptive statistics across the four U.S. Census Regions.

As shown in Table 4.11, of the four regions, states in the South region had the highest mean Total Innovativeness Score (mean = 6.67, standard deviation. = 2.07). Southern states had the highest scores in the Healthy Eating Index and Physical Activity Index (mean = 1.69 and 2.26 respectively); however on the Tobacco Index states in the Northeast region had the highest mean score (mean = 2.96, standard deviation. = 0.48). Interestingly, for each of the four School Health Indices, states in the South exhibited the

widest range of scores compared to states in the other three geographic regions; however the South is also the largest region with 17 states.

The Total Innovation Index for states in the Northeast U.S. Census Region was second highest and near the score for the South (Northeast, mean = 6.40; and South, mean = 6.67). States in the Northeast were the most tightly clustered of all the groups with the lowest standard deviations across all four categories; however, the Northeast has the smallest number of states (N = 9) among the four U.S. Census Regions.

States in the West region showed the lowest levels of policy adoption across all school health policy areas analyzed. Total Innovativeness Score averaged 4.22 with a standard deviation of 2.18 for these states. Mean scores for the Healthy Eating, Physical Activity, and Tobacco Indices (mean = 0.92, 1.30 and 2.00 respectively) were also lower in the West than in the other three U.S. Census Regions. It should be noted, however, that low levels of policy adoption may reflect a preference for local control and do not necessarily reflect a lack of support for school health.

Overall leaders and laggards were then examined. Results of this analysis are presented in Table 4.12. As with the Walker regions, laggardness appeared more consistently observable than leadership. Pennsylvania was the lowest scorer across all four school health policy areas in the Northeast region. Florida scored lowest in three of the four school health policy areas in the South region as did New Mexico in the West. No laggard emerged from the analysis of states in the Midwest region.

Apparent leaders emerged in two of the four U.S. Census Regions. Massachusetts ranked highest in three of the four School Health Indices in the Northeast region.

Similarly, the District of Columbia ranked highest in three of the four School Health Indices in the South region. The U.S. Census Regions are based on geographic proximity unlike the Walker regions which are supposedly reflective of self-chosen “leagues.” Overall, grouping states by the four U.S. Census Regions yielded conclusions very similar to the Walker models in terms of identifying leadership and laggardness. Florida, Pennsylvania and New Mexico emerged as laggards in both models. Massachusetts emerged as an apparent leader in both models. The District of Columbia was omitted from the Walker analysis; thus no comparison can be made between the Walker regions and the South Region where the District of Columbia emerged as a leader. The next analysis considers another regional grouping based on nine, smaller U. S. Census Districts.

Results of Analysis Using Nine U.S. Census Districts

All 50 states and the District of Columbia were grouped into the nine smaller U.S. Census Districts identified as New England, Middle Atlantic, South Atlantic, East North Central, West North Central, East South Central, West South Central, Mountain and Pacific (see Appendix K). Composition of the Districts ranges from three states in the Mid Atlantic District to nine states in the South Atlantic District. Tables 4.13 through 4.21 list the states in each U.S. Census District and the score in each of the four School Health Indices in descending order based on Total Innovativeness. Descriptive statistics are also shown.

States in the South Atlantic District showed the highest average on the Physical Activity Index (mean = 2.53, standard deviation = 1.42). However, on the three other School Health Indices, states in the East South Central District had the highest average of all groups (Healthy Eating, mean = 1.83; Tobacco, mean = 3.75; Total, mean = 7.85). Interestingly, although the

District of Columbia was the highest scorer among all 51 entities on three indices (Healthy Eating, Physical Activity and Total), the District of Columbia is in the South Atlantic District, and not in the highest-scoring East South Central District.

Analysis of leaders and laggards was also performed. Here clearer patterns emerged in terms of leadership and laggardness. Table 4.22 lists the high and low scoring states in the nine U.S. Census Districts. In four instances, one state emerged as a leader or laggard across all four school health indices. In the Middle Atlantic District, New York scored highest on all four indices as did the District of Columbia in the South Atlantic District. Pennsylvania again emerged as a laggard, scoring lowest across all four indices in the Middle Atlantic District. Texas scored lowest across all four School Health Indices in the West South Central District. When an assessment is made of states that scored highest or lowest in three of the four indices, six additional states may be classified as regional leaders (Massachusetts, Missouri, Oklahoma, Ohio, Oregon and Utah) and five additional states may be classified as regional laggards (Alaska, Florida, New Hampshire, Tennessee and Wisconsin.)

Overall, the analysis suggests that there is a trend toward consistency in leadership or laggardness across policy areas by certain states. There are a few notable exceptions. In the New England District, Vermont tied with Massachusetts as the highest scorer on the Healthy Eating Index; however Vermont ranked lowest on the Physical Activity Index. In the East South Central District, Kentucky, Tennessee, Alabama and Mississippi all score highest on one of the School Health Indices within the East South Central District; however each of these states also scores the *lowest* on at least one of the four School Health Indices. This suggests that within this District, policy adoption may be policy-specific rather than a function of a generic tendency

toward leadership or laggardness on policy issues. The East South Central District contains only four states. Thus, the findings may have been influenced by the small n of this group. However, despite the fact that there are only three states in the Middle Atlantic group, New York was the highest scoring state in the group across all four School Health Indices and Pennsylvania was the lowest scoring state across all four School Health Indices as well. Therefore, when leadership or laggardness is clearly present, a small n may not make a difference to the analysis.

Summary

Three regional models were explored by grouping states based on five regions identified by Walker; four major U.S. Census Regions; and nine smaller U.S. Census Districts. Across all three of the grouping schemes, Pennsylvania emerged as a consistent laggard and Massachusetts emerged as a consistent leader.

Grouping states by four major U.S. Census Districts yielded similar results to those of the Walker groupings. In both grouping schemes, Massachusetts was a regional leader; and New Mexico, Florida and Pennsylvania were regional laggards. Of importance, however, is that U. S. Census groupings are standard groupings, commonly recognized, understood and used, in contrast to the Walker regions.

Analyses of leaders and laggards among the nine smaller U.S. Census Districts suggested that certain states were consistent leaders and laggards across policy areas except in the East South Central District where considerable cross-over between leadership and laggardness was noted among the four states in the district.

The next chapter as well as Chapter 7 provide additional discussion of regional analyses. The national model considers leadership and laggardness across policy areas

when the 50 United States and the District of Columbia are considered as a whole rather than analyzed by sub-groupings.

Table 4.0

**Comparison of Walker's Composite Innovation Scores
With State Scores on School Health Indices
For Walker's "Mountains and Northwest" Region
(N=14)**

	Walker's Composite Innovation Score	School Health Indices			Total Innovative- ness
		Healthy Eating	Physical Activity	Tobacco	
Oregon	.544	2.17	2.50	2.00	6.67
Washington	.510	1.67	1.67	3.00	6.33
Maryland	.482	1.00	2.50	3.00	6.50
Louisiana	.459	2.50	2.00	2.00	6.50
Utah	.447	1.67	1.67	4.00	7.33
North Dakota	.444	0.67	0.92	3.00	4.58
Arkansas	.394	1.83	1.00	2.00	4.83
Idaho	.394	0.67	1.00	1.00	2.67
West Virginia	.386	2.50	2.17	3.00	7.67
Montana	.378	1.67	3.00	2.00	6.67
New Mexico	.375	0.67	0.00	1.00	1.67
Oklahoma	.368	1.00	2.50	3.00	6.50
South Dakota	.363	1.00	1.33	1.00	3.33
Wyoming	.346	0.00	1.00	1.00	2.00
Mean	.421	1.36	1.66	2.21	5.23
Std. Deviation	.061	0.76	0.83	0.98	2.05

Table 4.1

**Comparison of Walker's Composite Innovation Scores
With State Scores on School Health Indices
For Walker's "Mid Atlantic and Great Lakes" Region
(N = 7)**

	Walker's Composite Innovation Score	School Health Indices			
		Healthy Eating	Physical Activity	Tobacco	Total Innovative- ness
New York	.656	2.00	2.83	3.00	7.83
New Jersey	.585	1.89	1.58	3.00	6.47
Pennsylvania	.560	0.33	0.33	2.00	2.67
Wisconsin	.532	1.17	1.00	3.00	5.17
Minnesota	.525	2.17	1.67	3.00	6.83
Illinois	.521	1.67	3.00	2.00	6.67
Indiana	.464	1.33	2.67	1.67	5.67
Mean	.549	1.51	1.87	2.52	5.90
Std. Deviation	.060	0.63	1.01	0.60	1.66

Table 4.2

**Comparison of Walker's Composite Innovation Scores
With State Scores on School Health Indices
For Walker's "Border, Great Lakes and California" Region
(N = 7)**

	Walker's Composite Innovation Score	School Health Indices			
		Healthy Eating	Physical Activity	Tobacco	Total Innovative- ness
California	.604	1.00	1.92	3.00	5.92
Michigan	.578	1.67	1.00	3.00	5.67
Ohio	.528	2.00	2.00	4.00	8.00
Illinois	.521	1.67	3.00	2.00	6.67
Nebraska	.425	1.00	0.00	2.00	3.00
Kentucky	.419	2.00	2.67	3.00	7.67
Missouri	.377	2.00	3.50	3.00	8.50
Mean	.493	1.62	2.01	2.86	6.49
Std. Deviation	.087	0.45	1.20	0.69	1.87

Table 4.3

**Comparison of Walker's Composite Innovation Scores
With State Scores on School Health Indices
For Walker's "New England" Region,
(N = 8)**

	Walker's Composite Innovation Score	School Health Indices			
		Healthy Eating	Physical Activity	Tobacco	Total Innovative- ness
New York	.656	2.00	2.83	3.00	7.83
Massachusetts	.629	2.00	2.33	4.00	8.33
Connecticut	.568	1.67	3.33	3.00	8.00
Pennsylvania	.560	0.33	0.33	2.00	2.67
Rhode Island	.503	1.67	2.00	3.00	6.67
New Hampshire	.482	1.00	2.50	2.67	6.17
Maine	.455	1.67	1.17	3.00	5.83
Vermont	.414	2.00	0.67	3.00	5.67
Mean	.533	1.54	1.90	3.00	6.40
Std. Deviation	.085	0.59	1.07	0.55	1.82

Table 4.4

**Comparison of Walker's Composite Innovation Scores
With State Scores on School Health Indices
For Walker's "South" Region
(N = 17)**

	Walker's Composite Innovation Score	School Health Indices			Total Innovative- ness
		Healthy Eating	Physical Activity	Tobacco	
Louisiana	.459	2.50	2.00	2.00	6.50
Virginia	.451	2.00	2.75	3.00	7.75
North Carolina	.430	1.00	3.33	1.00	5.33
Nebraska	.425	1.00	0.00	2.00	3.00
Iowa	.413	1.33	2.00	2.00	5.33
Alabama	.406	1.67	3.42	4.00	9.08
Florida	.397	0.33	0.00	2.33	2.67
Arkansas	.394	1.83	1.00	2.00	4.83
Tennessee	.389	2.00	1.33	3.00	6.33
West Virginia	.386	2.50	2.17	3.00	7.67
Georgia	.381	1.33	0.67	3.00	5.00
Delaware	.376	1.33	3.33	1.00	5.67
South Dakota	.363	1.00	1.33	1.00	3.33
Texas	.362	0.67	1.00	2.00	3.67
South Carolina	.347	1.67	3.50	3.00	8.17
Nevada	.323	1.67	2.67	1.00	5.33
Mississippi	.298	1.67	1.67	5.00	8.33
Mean	.388	1.50	1.89	2.37	5.76
Std. Deviation	.042	0.59	1.16	1.11	1.96

Table 4.5
Relation* of Walker's Composite Innovation Score to
School Health Index Score

Composite Innovation Score (Walker, 1969)	School Health Indices			
	Healthy Eating	Physical Activity	Tobacco	Total Innovative -ness
South (N = 17)	0.13	- 0.01	-0.06	-0.05
New England (N = 8)	0.23	0.57	0.27	0.69
Mountains and Northwest (N = 14)	0.49	0.27	0.49	0.43
Mid-Atlantic and Great Lakes (N = 7)	0.18	-0.29	0.77	0.18
Border, Great Lakes, and California (N = 7)	-0.53	-0.54	0.22	-0.46

*Spearman (Rank) correlation coefficient

Note: None of the correlations were statistically significant at $p \leq 0.05$.

Table 4.6

**Highest and Lowest Scoring States on School Health Indices,
Grouped by Walker Regions**

School Health Index	Highest	Score	Lowest	Score
Mountains and Northwest				
Healthy Eating	West Virginia	2.50	Wyoming	0.00
Physical Activity	Montana	3.00	New Mexico	0.00
Tobacco	Utah	4.00	Idaho, New Mexico, South Dakota, Wyoming	1.00
Total Innovativeness	West Virginia	7.67	New Mexico	1.67
Mid Atlantic and Great Lakes				
Healthy Eating	Minnesota	2.17	Pennsylvania	0.33
Physical Activity	Illinois	3.00	Pennsylvania	0.33
Tobacco	Minnesota, New Jersey, New York, Wisconsin	3.00	Indiana	1.67
Total Innovativeness	New York	7.83	Pennsylvania	2.67
Border, Great Lakes, and California				
Healthy Eating	Kentucky, Missouri, Ohio	2.00	California, Nebraska	1.00
Physical Activity	Missouri	3.50	Nebraska	0.00
Tobacco	Ohio	4.00	Illinois, Nebraska	2.00
Total Innovativeness	Missouri	8.50	Nebraska	3.00
New England				
Healthy Eating	Massachusetts, New York, Vermont	2.00	Pennsylvania	0.33
Physical Activity	Connecticut	3.33	Pennsylvania	0.33
Tobacco	Massachusetts	4.00	Pennsylvania	2.00
Total Innovativeness	Massachusetts	8.33	Pennsylvania	2.67
South				
Healthy Eating	Louisiana, West Virginia	2.50	Florida	0.33
Physical Activity	South Carolina	3.50	Florida, Nebraska	0.00
Tobacco	Mississippi	5.00	Delaware, Nevada, North Carolina, South Dakota	1.00
Total Innovativeness	Alabama	9.08	Florida	2.67

Table 4.7
School Health Index Scores for
States in U.S. Census South Region
(N = 17)

South Region	School Health Index			
	Healthy Eating	Physical Activity	Tobacco	Total Innovativeness
District of Columbia	4.17	4.50	3.00	11.67
Alabama	1.67	3.42	4.00	9.08
Mississippi	1.67	1.67	5.00	8.33
South Carolina	1.67	3.50	3.00	8.17
Virginia	2.00	2.75	3.00	7.75
Kentucky	2.00	2.67	3.00	7.67
West Virginia	2.50	2.17	3.00	7.67
Louisiana	2.50	2.00	2.00	6.50
Maryland	1.00	2.50	3.00	6.50
Oklahoma	1.00	2.50	3.00	6.50
Tennessee	2.00	1.33	3.00	6.33
Delaware	1.33	3.33	1.00	5.67
North Carolina	1.00	3.33	1.00	5.33
Georgia	1.33	0.67	3.00	5.00
Arkansas	1.83	1.00	2.00	4.83
Texas	0.67	1.00	2.00	3.67
Florida	0.33	0.00	2.33	2.67
Mean	1.69	2.26	2.73	6.67
Standard Deviation	0.85	1.16	0.94	2.07
Range	3.84	4.50	4.00	9.00

Table 4.8
School Health Index Scores for
States in U.S. Census Midwest Region
(N = 12)

Midwest Region	School Health Index			
	Healthy Eating	Physical Activity	Tobacco	Total Innovativeness
Missouri	2.00	3.50	3.00	8.50
Ohio	2.00	2.00	4.00	8.00
Minnesota	2.17	1.67	3.00	6.83
Illinois	1.67	3.00	2.00	6.67
Michigan	1.67	1.00	3.00	5.67
Indiana	1.33	2.67	1.67	5.67
Iowa	1.33	2.00	2.00	5.33
Wisconsin	1.17	1.00	3.00	5.17
North Dakota	0.67	0.92	3.00	4.58
Kansas	0.00	1.50	2.00	3.50
South Dakota	1.00	1.33	1.00	3.33
Nebraska	1.00	0.00	2.00	3.00
Mean	1.33	1.72	2.47	5.52
Standard Deviation	0.62	0.99	0.82	1.77
Range	2.17	3.50	3.00	5.50

Table 4.9
School Health Index Scores for
States in U.S. Census Northeast Region
(N = 9)

Northeast Region	School Health Index			
	Healthy Eating	Physical Activity	Tobacco	Total Innovativeness
Massachusetts	2.00	2.33	4.00	8.33
Connecticut	1.67	3.33	3.00	8.00
New York	2.00	2.83	3.00	7.83
Rhode Island	1.67	2.00	3.00	6.67
New Jersey	1.89	1.58	3.00	6.47
New Hampshire	1.00	2.50	2.67	6.17
Maine	1.67	1.17	3.00	5.83
Vermont	2.00	0.67	3.00	5.67
Pennsylvania	0.33	0.33	2.00	2.67
Mean	1.58	1.86	2.96	6.40
Standard Deviation	0.53	0.95	0.48	1.61
Range	1.67	3.00	2.00	5.66

Table 4.10
School Health Index Scores for
States in U.S. Census West Region
(N = 13)

West Region	School Health Index			
	Healthy Eating	Physical Activity	Tobacco	Total Innovativeness
Utah	1.67	1.67	4.00	7.33
Oregon	2.17	2.50	2.00	6.67
Montana	1.67	3.00	2.00	6.67
Washington	1.67	1.67	3.00	6.33
California	1.00	1.92	3.00	5.92
Nevada	1.67	2.67	1.00	5.33
Hawaii	0.33	1.50	2.00	3.88
Idaho	0.67	1.00	1.00	2.67
Alaska	0.50	0.00	2.00	2.50
Colorado	0.00	0.00	2.00	2.00
Arizona	0.00	0.00	2.00	2.00
Wyoming	0.00	1.00	1.00	2.00
New Mexico	0.67	0.00	1.00	1.67
Mean	0.92	1.30	2.00	4.22
Standard Deviation	0.76	1.07	0.91	2.18
Range	2.17	3.00	3.00	5.67

Table 4.11

**Comparison of School Health Index Scores
of States and District of Columbia by U.S. Census Regions**

	U. S. Census Region			
	South (N=17)	Midwest (N=12)	Northeast (N=9)	West (N=13)
Mean				
Healthy Eating	1.69	1.33	1.58	0.92
Physical Activity	2.26	1.72	1.86	1.30
Tobacco	2.73	2.47	2.96	2.00
Total Innovativeness	6.67	5.52	6.40	4.22
Standard Deviation				
Healthy Eating	0.85	0.62	0.53	0.76
Physical Activity	1.16	0.99	0.95	1.07
Tobacco	0.94	0.82	0.48	0.91
Total Innovativeness	2.07	1.77	1.61	2.18
Range				
Healthy Eating	3.84	2.17	1.67	2.17
Physical Activity	4.50	3.50	3.00	3.00
Tobacco	4.00	3.00	2.00	3.00
Total Innovativeness	9.00	5.50	5.67	5.67

South: AL, AR, DE, DC, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA, WV

Midwest: IL, IN, IA, KS, MI, MN, NE, ND, OH, SD, WI

Northeast: CT, ME, MA, NH, NJ, NY, PA, RI, VT

West: AK, AZ, CA, CO, HI, ID, MT, NV, NM, OR, UT, WA, WY

Table 4.12

**Highest and Lowest Scoring States on School Health Indices,
Grouped by Four U.S. Census Regions**

School Health Index	Highest	Score	Lowest	Score
Northeast Region (N=9)				
Healthy Eating	Massachusetts, New York, Vermont	2.00	Pennsylvania	0.33
Physical Activity	Connecticut	3.33	Pennsylvania	0.33
Tobacco	Massachusetts	4.00	Pennsylvania	2.00
Total Innovativeness	Massachusetts	8.33	Pennsylvania	2.67
Midwest Region (N=12)				
Healthy Eating	Minnesota	2.17	Kansas	0.00
Physical Activity	Missouri	3.50	Nebraska	0.00
Tobacco	Ohio	4.00	South Dakota	1.00
Total Innovativeness	Missouri	8.50	Nebraska	3.00
South Region (N=17)				
Healthy Eating	District of Columbia	4.17	Florida	0.33
Physical Activity	District of Columbia	4.50	Florida	0.00
Tobacco	Mississippi	5.00	Delaware, North Carolina	1.00
Total Innovativeness	District of Columbia	11.67	Florida	2.67
West Region (N=13)				
Healthy Eating	Oregon	2.17	Arizona, Colorado, Wyoming	0.00
Physical Activity	Montana	3.00	Arizona, Alaska, Colorado, New Mexico	0.00
Tobacco	Utah	4.00	Idaho, Nevada, New Mexico, Wyoming	1.00
Total Innovativeness	Utah	7.33	New Mexico	1.67

Table 4.13
School Health Index Scores
States in U.S. Census South Atlantic District
(N = 9)

U.S. Census South Atlantic District	School Health Index			
	Healthy Eating	Physical Activity	Tobacco	Total Innovativeness
District of Columbia	4.17	4.50	3.00	11.67
South Carolina	1.67	3.50	3.00	8.17
Virginia	2.00	2.75	3.00	7.75
West Virginia	2.50	2.17	3.00	7.67
Maryland	1.00	2.50	3.00	6.50
Delaware	1.33	3.33	1.00	5.67
North Carolina	1.00	3.33	1.00	5.33
Georgia	1.33	0.67	3.00	5.00
Florida	0.33	0.00	2.33	2.67
Mean	1.70	2.53	2.48	6.71
Standard Deviation	1.11	1.42	0.87	2.52
Range	3.83	4.50	2.00	9.00

Table 4.14
School Health Index Scores
States in U.S. Census East North Central District
(N = 5)

U.S. Census East North Central District	School Health Index			
	Healthy Eating	Physical Activity	Tobacco	Total Innovativeness
Ohio	2.00	2.00	4.00	8.00
Illinois	1.67	3.00	2.00	6.67
Indiana	1.33	2.67	1.67	5.67
Michigan	1.67	1.00	3.00	5.67
Wisconsin	1.17	1.00	3.00	5.17
Mean	1.57	1.93	2.73	6.23
Standard Deviation	0.32	0.93	0.93	1.13
Range	0.83	2.00	2.33	2.83

Table 4.15
School Health Index Scores
States in U.S. Census West North Central District
(N = 7)

U.S. Census West North Central District	School Health Index			
	Healthy Eating	Physical Activity	Tobacco	Total Innovativeness
Missouri	2.00	3.50	3.00	8.50
Minnesota	2.17	1.67	3.00	6.83
Iowa	1.33	2.00	2.00	5.33
North Dakota	0.67	0.92	3.00	4.58
Kansas	0.00	1.50	2.00	3.50
South Dakota	1.00	1.33	1.00	3.33
Nebraska	1.00	0.00	2.00	3.00
Mean	1.167	1.56	2.28	5.01
Standard Deviation	0.75	1.07	0.76	2.04
Range	2.17	3.50	2.00	5.50

Table 4.16
School Health Index Scores
States in U.S. Census New England District
(N = 6)

U.S. Census New England District	School Health Index			
	Healthy Eating	Physical Activity	Tobacco	Total Innovativeness
Massachusetts	2.00	2.33	4.00	8.33
Connecticut	1.67	3.33	3.00	8.00
Rhode Island	1.67	2.00	3.00	6.67
New Hampshire	1.00	2.50	2.67	6.17
Maine	1.67	1.17	3.00	5.83
Vermont	2.00	0.67	3.00	5.67
Mean	1.67	2.00	3.11	6.78
Standard Deviation	0.37	0.96	0.46	1.13
Range	1.00	2.67	1.33	2.67

Table 4.17

**School Health Index Scores
States in U.S. Census Mountain District
(N = 8)**

U.S. Census Mountain District	School Health Index			
	Healthy Eating	Physical Activity	Tobacco	Total Innovativeness
Utah	1.67	1.67	4.00	7.33
Montana	1.67	3.00	2.00	6.67
Nevada	1.67	2.67	1.00	5.33
Idaho	0.67	1.00	1.00	2.67
Arizona	0.00	0.00	2.00	2.00
Colorado	0.00	0.00	2.00	2.00
Wyoming	0.00	1.00	1.00	2.00
New Mexico	0.67	0.00	1.00	1.67
Mean	0.79	1.17	1.75	3.71
Standard Deviation	0.78	1.20	1.04	2.35
Range	1.67	3.00	3.00	5.67

Table 4.18
School Health Index Scores
States in U.S. Census Pacific District
(N = 5)

U.S. Census Pacific District	School Health Index			
	Healthy Eating	Physical Activity	Tobacco	Total Innovativeness
Oregon	2.17	2.50	2.00	6.67
Washington	1.67	1.67	3.00	6.33
California	1.00	1.92	3.00	5.92
Hawaii	0.33	1.50	2.00	3.88
Alaska	0.50	0.00	2.00	2.50
Mean	1.13	1.52	2.40	5.05
Standard Deviation	0.78	0.93	0.55	1.80
Range	1.83	2.50	1.00	4.17

Table 4.19
School Health Index Scores
States in U.S. Census West South Central District
(N = 4)

U.S. Census West South Central District	School Health Index			
	Healthy Eating	Physical Activity	Tobacco	Total Innovativeness
Louisiana	2.50	2.00	2.00	6.50
Oklahoma	1.00	2.50	3.00	6.50
Arkansas	1.83	1.00	2.00	4.83
Texas	0.67	1.00	2.00	3.67
Mean	1.50	1.63	2.25	5.38
Standard Deviation	0.83	0.75	0.50	1.39
Range	1.83	1.50	1.00	2.83

Table 4.20
School Health Index Score
States in U.S. Census East South Central District
(N = 4)

U.S. Census East South Central District	School Health Index			
	Healthy Eating	Physical Activity	Tobacco	Total Innovativeness
Alabama	1.67	3.42	4.00	9.08
Mississippi	1.67	1.67	5.00	8.33
Kentucky	2.00	2.67	3.00	7.67
Tennessee	2.00	1.33	3.00	6.33
Mean	1.83	2.27	3.75	7.85
Standard Deviation	0.19	0.95	0.96	1.17
Range	0.33	2.08	2.00	2.75

Table 4.21
School Health Index Scores
States in U.S. Census Mid Atlantic District
(N = 3)

U.S. Census Mid Atlantic District	School Health Index			
	Healthy Eating	Physical Activity	Tobacco	Total Innovativeness
New York	2.00	2.83	3.00	7.83
New Jersey	1.89	1.58	3.00	6.47
Pennsylvania	0.33	0.33	2.00	2.67
Mean	1.41	1.58	2.67	5.66
Standard Deviation	0.93	1.25	0.56	2.68
Range	1.67	2.50	1.00	5.17

Table 4.22

**Highest and Lowest Scoring States on School Health Indices,
Grouped by U.S. Census Districts**

School Health Component	Highest Scoring States	Score	Lowest Scoring States	Score
New England (N = 6)				
Healthy Eating	Massachusetts, Vermont	2.00	New Hampshire	1.00
Physical Activity	Connecticut	3.33	Vermont	0.67
Tobacco	Massachusetts	4.00	New Hampshire	2.67
Total Innovativeness	Massachusetts	8.33	New Hampshire	5.67
Middle Atlantic (N = 3)				
Healthy Eating	New York	2.00	Pennsylvania	0.33
Physical Activity	New York	2.83	Pennsylvania	0.33
Tobacco	New Jersey, New York	3.00	Pennsylvania	2.00
Total Innovativeness	New York	7.83	Pennsylvania	2.67
South Atlantic (N = 9)				
Healthy Eating	District of Columbia	4.17	Florida	0.33
Physical Activity	District of Columbia	4.50	Florida	0.00
Tobacco	District of Columbia, Georgia, Maryland, South Carolina, Virginia, West Virginia	3.00	Delaware, North Carolina	1.00
Total Innovativeness	District of Columbia	11.67	Florida	2.67
East North Central (N = 5)				
Healthy Eating	Ohio	2.00	Wisconsin	1.17
Physical Activity	Illinois	3.00	Michigan, Wisconsin	1.00
Tobacco	Ohio	4.00	Indiana	1.67
Total Innovativeness	Ohio	8.00	Wisconsin	5.17

Table 4.22, Continued

**Highest and Lowest Scoring States on School Health Indices,
Grouped by U.S. Census Districts**

West North Central (N = 7)				
Healthy Eating	Minnesota	2.17	Kansas	0.00
Physical Activity	Missouri	3.50	Nebraska	0.00
Tobacco	Minnesota, Missouri, North Dakota	3.00	South Dakota	1.00
Total Innovativeness	Missouri	8.50	Nebraska	3.00
East South Central (N = 4)				
Healthy Eating	Kentucky, Tennessee	2.00	Alabama, Mississippi	1.67
Physical Activity	Alabama	3.42	Tennessee	1.33
Tobacco	Mississippi	5.00	Kentucky, Tennessee	3.00
Total Innovativeness	Alabama	9.08	Tennessee	6.33
West South Central (N = 4)				
Healthy Eating	Louisiana	2.50	Texas	0.67
Physical Activity	Oklahoma	2.50	Arkansas, Texas	1.00
Tobacco	Oklahoma	3.00	Arkansas, Louisiana, Texas	2.00
Total Innovativeness	Louisiana, Oklahoma	6.50	Texas	3.67
Mountain (N = 8)				
Healthy Eating	Montana, Nevada, Utah	1.67	Arizona, Colorado, Wyoming	0.00
Physical Activity	Montana	3.00	Arizona, Colorado, New Mexico	0.00
Tobacco	Utah	4.00	Idaho, Nevada, New Mexico, Wyoming	1.00
Total Innovativeness	Utah	7.33	New Mexico	1.67
Pacific (N = 5)				
Healthy Eating	Oregon	2.17	Hawaii	0.33
Physical Activity	Oregon	2.50	Alaska	0.00
Tobacco	California, Washington	3.00	Alaska, Hawaii, Oregon	2.00
Total Innovativeness	Oregon	6.67	Alaska	2.50

CHAPTER 5

RESULTS OF NATIONAL MODEL

No matter what regional groupings may exist by virtue of affinity or geography, the United States often function as an entire national system rather than clusters of neighboring states. This is especially apparent when federal government agencies develop a policy with the expectation that it will diffuse throughout the U. S. to state and local governments to achieve national goals. School health guidelines developed by the U. S. Centers for Disease Control and Prevention (CDC) for healthy eating, physical activity, and tobacco represent an example of federal policy developed with the explicit purpose of promoting state and local policy adoption in order to improve national health outcomes.

Notably, CDC policy guidelines were not tailored to geographic regions or population sub-groups; rather the guidelines were intended to effect policy adoption by all states in all regions of the country no matter what the local needs or preferences. In this chapter, using the framework of a national interaction model, the 50 United States and the District of Columbia are considered collectively to examine patterns of adoption of 15 CDC school health guidelines for healthy eating, physical activity and tobacco.

National Models of Policy Adoption

Even before the enormous improvements in communication technology since 1990, policy scholars contended that despite the vast geographic distances between the east and west coasts of the United States, modern communication has contributed to an ever-increasing capability to share policy ideas (Savage, 1978). Policymakers are likely to attend national

professional meetings which draw participants from throughout the country and sometimes, the world. Professional organizations have been found to exert a positive influence on policy diffusion through individual members as well as through advocacy efforts of the organization itself for particular policies (Balla, 2001; Goodwin & Schroedel, 2000).

Most recently, information technology has contributed greatly to the impression that geographic distance can be instantly spanned electronically, allowing people throughout the United States and throughout the world to share ideas via the Internet. Furthermore, advanced computer technology increasingly affords opportunities to link or share information throughout the government for purposes such as law enforcement, scientific research, and bioterrorism prevention. In some cases, computer linkages that take a citizen from a federal website to a state or local site can create the appearance of a seamless “government” that makes political subdivisions nearly invisible.

Despite the easy accessibility of policy examples and a move toward national standardization and unification in technology applications, differences remain across states in the policies adopted and implemented. States continue to be classified as conservative or liberal, reflecting the reality that even when states address the same substantive issue, the intent and content of state policies may differ widely. In addition, while some states show a preference for formal policy adoption, other states appear to prefer to devolve policy decisions to a local level.

The question of whether states follow certain predictable patterns of policy adoption continues to be studied. As with the regional models examined in Chapter 4, legislative policy has been examined for leadership and laggardness among states (Walker, 1969; Gray, 1973; Savage, 1978; Berry & Berry, 1992). This chapter presents the results of analyses of the 50

United States and the District of Columbia considered collectively. Using the framework of a national model of policy adoption, CDC's school health recommendations are considered based on the number of policies adopted by state-level education agencies. A second analysis compares the performance of states on the School Health Indices with three national models taken from the literature on legislative policy adoption.

Research Using National Models of Policy Adoption

As discussed at length in Chapter 4, Walker (1969) is best known for his pioneering research using regional models to explain legislative policy adoption. However, the 48 states were also examined collectively by Walker. Based on the number of legislative policies adopted and the speed of policy adoption, Walker created a "Composite Innovation Score for the American States" (Walker, 1969) to assess relative innovativeness. Despite Walker's findings that adoption of the legislative policies he studied fell along regional lines, he noted:

Decision makers in the states seem to be adopting a broader, national focus based on new lines of communication which extend beyond regional boundaries.
(Walker, 1969, p. 896.)

Other research using a national policy model framework include the work of Virginia Gray (1973) who studied the adoption of 12 legislative policies from 1784 to 1969: three policies involving civil rights; five in education; and four in welfare. Gray used communication theory to develop a model based on interaction—a model very closely aligned with the diffusion of innovations theory. Gray's premise was that policymakers would be influenced by interacting with one another and sharing policy ideas and the results of policy experiments. As a measure of interaction, Gray used the cumulative proportion of states having adopted a particular law. This approach assumed

that as more states adopted a policy, the chances would increase that a policymaker from a non-adopting state would interact with a policymaker from an adopting state. Gray found that interaction among policymakers had a positive association with legislative policy adoption.

Gray also considered the effects of interaction separately for each of the three policy areas she studied (civil rights, education and welfare), finding little stability in a state's rank in one policy area compared with its rank in another. Based on her assessment of the three policy areas in the 48 states, Gray concluded that “‘innovativeness’ is not a pervasive factor; rather, it is issue- and time-specific at best” (Gray, 1973, p. 1185).

In another study, Savage (1978) examined 181 legislative policies, separating them by three time periods: pre 1900 (58 policies); 1900-1929 (54 policies); and 1930-1970 (69 policies). Based on the speed of adoption and the number of policies adopted, Savage concluded that there were consistent leaders and laggards across the three time periods. He found that California, Minnesota and Ohio ranked within the top quartile across all three time periods. Four states—Delaware, Georgia, Mississippi and South Carolina--he found notable as laggards, scoring consistently in the lowest quartile of states. In addition Savage concluded:

And just as the more innovative states have tended to become relatively more innovative, the laggards have likewise tended to become relatively more laggardly....Gray may have been too hasty in discounting a general innovativeness trait as a variable characteristic of the American states (Savage, 1978, p. 218).

This chapter examines the 50 United States together and compares state adoption of school health policy with state adoption of policies examined by Walker (1969), Gray (1973), and Savage (1978).

Results of Analysis Using National Model

In this dissertation, the measure of innovativeness for school health policy is the number of CDC guidelines that have been formally adopted as state-level policies. As fully explained in Chapter 3, the School Health Indices were devised by summing scores assigned to states for each policy adopted and, in some cases, for the level of policy adopted (for example, a policy “requiring” an action was scored higher than a policy “recommending” an action). Thus, a score of 1.0 represents that a state adopted a policy responsive to a CDC guideline, and when applicable, that the state policy *required* rather than merely recommended action. For simplicity throughout this chapter, policy adoption is referred to as the number of policies adopted even though the School Health Indices reflects a distinction between required and recommended action.

The first analysis was to determine if any states had adopted all 15 of the school health policies, followed by a sub-analysis of the Healthy Eating Index, the Physical Activity Index, and the Tobacco Index to determine which states had adopted all five components comprising each index. Table 5.0 presents the results of these analyses.

As of the date of compilation of the School Health Policies and Programs Study 2000, none of the states adopted policies for all 15 CDC guidelines. The District of Columbia adopted Healthy Eating Policies in each of the five CDC guidelines areas. The District of Columbia also

adopted policies in all five of the Physical Activity guidelines areas, as did Connecticut, Delaware, and North Carolina. Mississippi was the only state to have adopted policies in Tobacco in all of the five CDC tobacco guidelines areas.

Table 5.1 lists the four School Health Indices, showing in rank order the states and their innovation score for the respective index. Higher scores indicate that a state adopted more policies. The range of scores clearly indicates that some states have adopted more CDC-recommended policies than other states. For the Total Innovativeness Index, scores ranged from a high of 11.67 for the District of Columbia and a low of 1.67 for New Mexico. At least one state or the District of Columbia had adopted some version of all five policies considered for healthy eating, physical activity, and tobacco. However, four states had adopted none of the healthy eating policies and six states had adopted none of the physical activity policies. Regarding tobacco policy, all 50 states and the District of Columbia had adopted *at least one* CDC guideline as a formal policy. However there was no “common denominator” among tobacco policies adopted; no single policy of the five tobacco policies examined had been adopted by all 51 entities.¹⁴

The District of Columbia scored highest in three of the four indices (Healthy Eating, Physical Activity and Total), with Mississippi scoring highest in the Tobacco Index. Other than the District of Columbia, Alabama was the only other entity to score

¹⁴ States with a score of 1.0 on the tobacco index adopted at least one policy, but did not necessarily adopt the *same* policy as other states with a score of 1.0.

consistently within the top five across three categories (Physical Activity, Tobacco, and Total).

Table 5.2 presents a listing of states which consistently scored in the upper 40 percent and states which consistently scored in the lower 40 percent. The 40 percent cutpoint was selected because many states had the same score, making analysis by quartile difficult. The 40 percent cutpoint provided a reasonable “natural break” in the data. As shown in Table 5.2, in addition to the District of Columbia and Alabama, an additional eight states scored in the upper 40 percent across all four School Health Indices.

On the laggard side, Arizona, Colorado, New Mexico and Wyoming were consistently among the lowest five scorers in three of four School Health Indices. Table 5.2 shows nine additional states that scored in the lowest 40 percent across all four School Health Indices.

Correlation Analysis

Next, correlations were calculated to examine the overall consistency among the states across the three policy areas of healthy eating, physical activity and tobacco as well as the relationship between these policy areas and total innovativeness. Table 5.3 presents the results of the correlation analyses.

State rank on the Healthy Eating Index was moderately correlated with state rank on all three of the other School Health Indices, significant at $p < .01$. Healthy Eating was correlated with Physical Activity ($r_s = 0.53$, $p < .01$); with Tobacco ($r_s = 0.51$, $p < .01$); and Total Innovativeness ($r_s = 0.80$, $p < .01$). In contrast, there was only a weak correlation between scores

for the Physical Activity Index and the Tobacco Index ($r_s = 0.20$) and not statistically significant at $p < .05$. Physical Activity Index was, however, highly correlated with Total Innovativeness ($r_s = 0.78$, $p < .01$).

As expected, a high score on the Healthy Eating Index, Physical Activity Index or Tobacco Index is strongly associated with a high score on Total Innovativeness since Total Innovativeness is derived by summing the scores across the three other indices. Total Innovativeness was correlated with Healthy Eating at $r_s = 0.80$; with Physical Activity at $r_s = 0.78$, and with Tobacco at $r_s = 0.71$ ($p < .001$ for each). Coupling the results of the leader/laggard analysis discussed in the previous sections and the correlation analysis, the rate of school health policy adoption suggests that the states may be consistent in their level of policy adoption across the three policy areas studied.

Comparison of School Health Indices with Other National Rankings

The rankings of states on the School Health Indices were then compared with the rankings of states found by others who have examined policy adoption. Three sets of national rankings were compared to the rankings of states on the School Health Indices: (1) Walker's (1969) Composite Index of Innovation of the American States; (2) Savage's (1978) Policy Innovativeness Indices and Rankings, Later Twentieth Century Ranking; and (3) Gray's (1973) Ranks of States According to Order of Adoption of Laws, Averaged by Issue Area, Average Education Rank. Table 5.4 lists the 50 states and the District of Columbia alphabetically and shows the rank of each for four School Health Indices as well as the Walker, Savage and Gray rankings. Table 5.5 then shows a correlation analysis among all seven of the ranking scales.

As discussed above, correlations among the School Health Indices were generally strong, positive, and statistically significant except between the Physical Activity Index and the Tobacco Index ($r = 0.20$, $p = 0.15$). Considering the correlations between the School Health Indices and the Walker, Savage and Gray scales, correlations ranged from an inverse correlation between the Physical Activity Index and Savage's score for later 20th century policy adoption ($r_s = -0.11$, $p = 0.46$) to moderate correlations between the Tobacco Index and the Walker score ($r_s = 0.31$, $p = 0.03$). The correlation between the Tobacco Index and the Walker score was the only correlation in this analysis to achieve statistical significance at $p < .05$. Rankings on the Walker, Gray and Savage scales were not strongly associated with any rankings on the School Health Indices.

Interestingly, higher levels of inter-correlation were noted among the Walker, Savage and Gray scales than between these scales and the School Health Indices. Further, the inter-correlations among the Walker, Gray and Savage scales were all in a positive direction. Walker's score was correlated with Savage's score ($r_s = 0.59$, $p < .001$). This is not surprising since Savage's analysis of 181 policies included some of the same policies analyzed in the Walker study. Surprising, however, is the correlation between Gray's education score and Walker's score ($r_s = 0.33$, $p = 0.02$). As discussed in Chapter 2, Walker and Gray debated in the literature the existence of leader and laggard states. Although Gray concluded that there was no evidence of leadership or laggardness across policy areas, the correlation between her rankings for state adoption levels of a set of education policies with Walker's 88 policies drawn from a broad spectrum of policy areas suggests otherwise. Both the results of the school health policies

correlation analysis and the analysis among the Walker, Savage and Gray rankings further support Savage's assertion in 1978 that:

Gray may have been too hasty in discounting a general innovativeness trait as a variable characteristic of the American states (Savage, 1978, p. 218).

Although it is easy to rank states by innovativeness in policy adoption and to designate top scorers as leaders and lowest scorers as laggards, what remains more difficult is the determination of whether predictable patterns of leadership and laggardness exist more widely among the states as a group. A correlation of $r = 0.3$ as was found between the Walker and Gray rankings may suggest a trend toward consistent tendencies in states for policy adoption and non-adoption. However, such a correlation can just as easily be claimed as evidence that there is little consistency.

Summary

Overall, the data show clear variation in the number of school health policies adopted among the 50 United States and the District of Columbia, with Total Innovation Index scores ranging from a high of 11.67 in the District of Columbia to a low of 1.67 in New Mexico. The model suggests the existence of national leaders in school health policy in specific policy areas with some stability across policy areas.

Regarding leadership, Alabama and the District of Columbia were among the top five scorers for three of the four School Health Indices. Casting a wider net, ten entities scored in the upper 40 percent across all four School Health Indices: Alabama, Connecticut, District of Columbia, Kentucky, Massachusetts, Missouri, New York, South Carolina, Virginia and West Virginia.

Western states emerged as apparent laggards when considered by the number of school health policies adopted. Arizona, Colorado, New Mexico and Wyoming were consistently among the lowest five scorers across three of the four School Health Indices. A total of 12 states scored in the lowest 40 percent across all four School Health Indices: Alaska, Arizona, Colorado, Hawaii, Idaho, Kansas, Nebraska, New Mexico, Pennsylvania, South Dakota, Texas, and Wyoming.

Based on correlation analyses, adoption of school health tobacco policy and adoption of physical activity policy appear to be unrelated. However, all other correlations in the model among all of the other School Health Indices were found to be positive and statistically significant $p < .01$. This suggests that for the school health policies examined, states appear to be consistent in their patterns of policy adoption and non-adoption across policy areas.

In explaining the variation among states and reasons why certain states may be consistent leaders or laggards, several potential variables that reflect a state's characteristics or circumstances can be examined. For example, adoption of tobacco policies may be less likely in states where tobacco is a major cash crop. Similarly, adoption of federally-recommended policies may be more likely in states that receive relatively greater federal financial support for schools. The next chapter reports the results of internal determinants models of policy adoption which examine several potentially relevant variables related to state demographics and politics as well as to the health status of citizens for nutrition, physical activity, and tobacco.

Table 5.0
States that Adopted Policies
for CDC-Recommended Guidelines
(by School Health Index)

<u>CDC Guidelines Topic</u>	<u>Adopted at least some portion of each of the recommended guidelines</u>
Healthy Eating (5 policies):	District of Columbia
Physical Activity (5 policies):	Connecticut Delaware District of Columbia North Carolina
Tobacco (5 policies):	Mississippi
Total (all 15 policies):	None

Table 5.1
Score on School Health Indices
(By Rank)

Healthy Eating		Physical Activity		Tobacco		Total Index of Innovation*	
Maximum =	5.00	Maximum =	5.00	Maximum =	5.00	Maximum =	15.00
D.C.	4.17	D.C.	4.50	Mississippi	5.00	D.C.	11.67
Louisiana	2.50	Missouri	3.50	Alabama	4.00	Alabama	9.08
W. Virginia	2.50	South Carolina	3.50	Massachusetts	4.00	Missouri	8.50
Minnesota	2.17	Alabama	3.42	Ohio	4.00	Massachusetts	8.33
Oregon	2.17	Connecticut	3.33	Utah	4.00	Mississippi	8.33
Kentucky	2.00	Delaware	3.33	California	3.00	South Carolina	8.17
Massachusetts	2.00	North Carolina	3.33	Connecticut	3.00	Connecticut	8.00
Missouri	2.00	Illinois	3.00	D.C.	3.00	Ohio	8.00
New York	2.00	Montana	3.00	Georgia	3.00	New York	7.83
Ohio	2.00	New York	2.83	Kentucky	3.00	Virginia	7.75
Tennessee	2.00	Virginia	2.75	Maine	3.00	Kentucky	7.67
Vermont	2.00	Indiana	2.67	Maryland	3.00	West Virginia	7.67
Virginia	2.00	Kentucky	2.67	Michigan	3.00	Utah	7.33
New Jersey	1.89	Nevada	2.67	Minnesota	3.00	Minnesota	6.83
Arkansas	1.83	Maryland	2.50	Missouri	3.00	Illinois	6.67
Alabama	1.67	N. Hampshire	2.50	New Jersey	3.00	Montana	6.67
Connecticut	1.67	Oklahoma	2.50	New York	3.00	Oregon	6.67
Illinois	1.67	Oregon	2.50	North Dakota	3.00	Rhode Island	6.67
Maine	1.67	Massachusetts	2.33	Oklahoma	3.00	Louisiana	6.50
Michigan	1.67	West Virginia	2.17	Rhode Island	3.00	Maryland	6.50
Mississippi	1.67	Iowa	2.00	South Carolina	3.00	Oklahoma	6.50
Montana	1.67	Louisiana	2.00	Tennessee	3.00	New Jersey	6.47
Nevada	1.67	Ohio	2.00	Virginia	3.00	Tennessee	6.33
Rhode Island	1.67	Rhode Island	2.00	Washington	3.00	Washington	6.33
South Carolina	1.67	California	1.92	West Virginia	3.00	N. Hampshire	6.17
Utah	1.67	Minnesota	1.67	Wisconsin	3.00	California	5.92
Washington	1.67	Mississippi	1.67	Vermont	3.00	Maine	5.83
Delaware	1.33	Utah	1.67	N. Hampshire	2.67	Delaware	5.67
Georgia	1.33	Washington	1.67	Florida	2.33	Indiana	5.67
Indiana	1.33	New Jersey	1.58	Alaska	2.00	Michigan	5.67

Continued on next page

Table 5.1, Continued
Score on School Health Indices
(By Rank)

Healthy Eating		Physical Activity		Tobacco		Total Index of Innovation	
Iowa	1.33	Hawaii	1.50	Arizona	2.00	Vermont	5.67
Wisconsin	1.17	Kansas	1.50	Arkansas	2.00	Iowa	5.33
California	1.00	South Dakota	1.33	Colorado	2.00	Nevada	5.33
Maryland	1.00	Tennessee	1.33	Hawaii	2.00	North Carolina	5.33
Nebraska	1.00	Maine	1.17	Illinois	2.00	Wisconsin	5.17
N. Hampshire	1.00	Arkansas	1.00	Iowa	2.00	Georgia	5.00
North Carolina	1.00	Idaho	1.00	Kansas	2.00	Arkansas	4.83
Oklahoma	1.00	Michigan	1.00	Louisiana	2.00	North Dakota	4.58
South Dakota	1.00	Texas	1.00	Montana	2.00	Hawaii	3.88
Idaho	0.67	Wisconsin	1.00	Nebraska	2.00	Texas	3.67
New Mexico	0.67	Wyoming	1.00	Oregon	2.00	Kansas	3.50
North Dakota	0.67	North Dakota	0.92	Pennsylvania	2.00	South Dakota	3.33
Texas	0.67	Georgia	0.67	Texas	2.00	Nebraska	3.00
Alaska	0.50	Vermont	0.67	Indiana	1.67	Florida	2.67
Florida	0.33	Pennsylvania	0.33	Delaware	1.00	Idaho	2.67
Hawaii	0.33	Alaska	0.00	Idaho	1.00	Pennsylvania	2.67
Pennsylvania	0.33	Arizona	0.00	Nevada	1.00	Alaska	2.50
Arizona	0.00	Colorado	0.00	New Mexico	1.00	Arizona	2.00
Colorado	0.00	Florida	0.00	North Carolina	1.00	Colorado	2.00
Kansas	0.00	Nebraska	0.00	South Dakota	1.00	Wyoming	2.00
Wyoming	0.00	New Mexico	0.00	Wyoming	1.00	New Mexico	1.67

* Differences due to rounding.

Table 5.2

**National Leaders and Laggards:
High and Low Scorers Across Four School Health Indices**

Scored in the Highest 40% Across All Four School Health Indices	Scored in the Lowest 40% Across All Four School Health Indices
Alabama* Connecticut District of Columbia* Kentucky Massachusetts Missouri New York South Carolina Virginia West Virginia	Alaska Arizona** Colorado** Hawaii Idaho Kansas Nebraska New Mexico** Pennsylvania South Dakota Texas Wyoming**
Range in scores for these entities: Healthy Eating: 4.17 – 1.67 Physical Activity: 4.50 – 2.17 Tobacco: 5.00 – 3.00 Total: 11.67 – 7.67	Range in scores for these states: Healthy Eating: 1.00 – 0.00 Physical Activity: 1.50 – 0.00 Tobacco: 2.00 – 1.00 Total: 3.83 – 1.67

* Scored in the top five entities on three of four School Health Indices.

**Scored in the lowest five states on three of four School Health Indices.

Table 5.3
Spearman (Rank) Correlations
Among School Health Indices
(N = 51)

	Healthy Eating	Physical Activity	Tobacco	Total Innovative-ness
Healthy Eating	1.00	.53*	.51*	.80*
Physical Activity		1.00	.20	.78*
Tobacco			1.000	.71*
Total Innovativeness				1.000

*Correlation is significant at $p < 0.01$ (2-tailed)

Table 5.4
Rank of States and District of Columbia
On Seven Scales of Innovativeness

	School Health Indices				Walker ¹	Savage ²	Gray ³
	Healthy Eating	Physical Activity	Tobacco	Total Innovativeness			
Alabama	21.5	4.0	3.5	2.0	30.0	44.0	28.2
Alaska	44.0	48.5	36.5	47.0	N/A	N/A	N/A
Arizona	49.5	48.5	36.5	49.0	36.0	41.0	22.8
Arkansas	15.0	38.5	36.5	37.0	32.5	29.0	30.9
California	36.0	25.0	16.5	26.0	3.00	5.00	6.10
Colorado	49.5	48.5	36.5	49.0	9.0	13.0	26.3
Connecticut	21.5	6.0	16.5	7.5	6.0	16.5	16.4
Delaware	29.5	6.0	48.0	29.5	40.0	42.0	25.6
D. C.	1.0	1.0	16.5	1.0	N/A	N/A	N/A
Florida	46.0	48.5	29.0	44.0	31.0	23.0	28.4
Georgia	29.5	43.5	16.5	36.0	37.0	45.0	31.0
Hawaii	46.0	32.0	36.5	39.0	N/A	N/A	N/A
Idaho	41.5	38.5	48.0	45.5	32.5	3.0	23.6
Illinois	21.5	8.5	36.5	16.5	13.0	13.0	25.0
Indiana	29.5	13.0	44.0	29.5	18.0	10.0	16.1
Iowa	29.5	22.5	36.5	33.0	29.0	26.0	30.0
Kansas	49.5	31.0	36.5	41.0	25.0	38.0	14.2
Kentucky	9.5	13.0	16.5	11.5	27.0	31.0	21.3
Louisiana	2.5	22.5	36.5	20.0	19.0	35.0	21.1
Maine	21.5	35.0	16.5	27.0	20.0	9.0	34.4
Maryland	36.0	16.5	16.5	20.0	16.5	16.5	15.5
Massachusetts	9.5	19.0	3.5	4.5	2.0	21.0	25.0
Michigan	21.5	38.5	16.5	29.5	5.0	13.0	16.0
Minnesota	4.5	27.5	16.5	14.0	12.0	7.0	39.1
Mississippi	21.5	27.5	1.0	4.5	48.0	46.0	32.0
Missouri	9.5	2.5	16.5	3.0	39.0	24.5	21.7
Montana	21.5	8.5	36.5	16.5	38.0	27.0	29.7
Nebraska	36.0	48.5	36.5	43.0	26.0	24.5	35.7
Nevada	21.5	13.0	48.0	33.0	47.0	48.0	24.0
N. Hampshire	36.0	16.5	28.0	25.0	16.5	33.0	22.4
New Jersey	14.0	30.0	16.5	22.0	4.0	18.0	24.9
New Mexico	41.5	48.5	48.0	51.0	41.0	15.0	25.2
New York	9.5	10.0	16.5	9.0	1.0	8.0	19.2

Table 5.4, Continued

	School Health Indices				Walker ¹	Savage ²	Gray ³
	Healthy Eating	Physical Activity	Tobacco	Total Innovativeness			
Ohio	9.5	22.5	3.5	7.5	11.0	2.0	25.7
Oklahoma	36.0	16.5	16.5	20.0	42.0	22.0	36.2
Oregon	4.5	16.5	36.5	16.5	8.0	6.0	20.9
Pennsylvania	46.0	45.0	36.5	45.5	7.0	28.0	27.1
Rhode Island	21.5	22.5	16.5	16.5	15.0	19.5	28.1
So. Carolina	21.5	2.5	16.5	6.0	45.0	47.0	24.4
South Dakota	36.0	33.5	48.0	42.0	43.0	30.0	37.9
Tennessee	9.5	33.5	16.5	23.5	34.0	11.0	23.2
Texas	41.5	38.5	36.5	40.0	44.0	43.0	23.0
Utah	21.5	27.5	3.5	13.0	22.0	4.0	17.6
Vermont	9.5	43.5	16.5	29.5	28.0	19.5	18.1
Virginia	9.5	11.0	16.5	10.0	21.0	39.0	25.5
Washington	21.5	27.5	16.5	23.5	14.0	1.0	18.0
West Virginia	2.5	20.0	16.5	11.5	35.0	37.0	25.4
Wisconsin	32.0	38.5	16.5	35.0	10.0	34.0	27.7
Wyoming	49.5	38.5	48.0	49.0	46.0	36.0	27.6

¹Rank based on Composite Innovation Score of the American States (Walker, 1969, p. 883)

²Policy Innovativeness Ranking, Later Twentieth Century (Savage, 1978, p. 216)

³Average Education Rank According to Order of Adoption of Laws (Gray, 1973, p. 1184)

Table 5.5
Spearman (Rank) Correlations
of State Score on School Health Indices with
State Score on National Rankings of
Policy Adoption by Walker, Savage and Gray
(N = 48, Excludes Alaska, Hawaii and District of Columbia)

	Walker's Innovation Score¹	Savage's 20th Century Score²	Gray's Education Score³
Healthy Eating	.221	.186	.093
Physical Activity	.033	-.109	.275
Tobacco	.310*	.173	-.010
Total Innovativeness	.207	.093	.141
Walker Score ¹	1.000	.591**	.330*
Savage Score ²		1.000	.237
Gray Education Score ³			1.000

**Correlation is significant at $p < 0.01$ (2-tailed)

* Correlation is significant at $p < 0.05$ (2-tailed)

¹Rank based on Composite Innovation Score of the American States (Walker, 1969, p. 883)

²Policy Innovativeness Ranking, Later Twentieth Century (Savage, 1978, p. 216)

³Average Education Rank According to Order of Adoption of Laws (Gray, 1973, p. 1184)

CHAPTER 6

RESULTS OF INTERNAL DETERMINANTS MODEL

The models examined in Chapters 4 and 5 were based on diffusion of innovations theory. One of the assumptions of this theory is that the rate of adoption of an innovation is accelerated by interaction between adopters of innovations and those who are potential adopters. In the policy area, this translates to an assumption that the interaction between a policymaker from a state that has adopted a policy will have a positive influence on a policymaker from a state that has not yet adopted a policy. Thus, the models are called “interaction models.” In Chapter 4 regional interaction models were explored; and in Chapter 5 a national interaction model was examined.

In contrast to interaction models, the internal determinants model presented in this chapter seeks to explain policy adoption based on certain internal characteristics of a state itself, rather than by the interactions of policymakers. In this model it is assumed that the probability of a state’s adopting a particular policy increases with compatible circumstances and characteristics relevant to the policy being considered. Both circumstances and characteristics are influential in internal determinants models. For example, a budget shortfall in a state (circumstance) may lead to consideration of adoption of a lottery but may only be adopted in states without a strong religious opposition to gambling (characteristic).

In the area of school health policy adoption, an internal determinants model was constructed based on variables identified in the literature and by consultation with federal public health experts. The results of the model follow.

Internal Determinants Model of Policy Adoption

Chapter 2 presents a detailed discussion of internal determinants models from the literature on legislative policy adoption, including the rationale for including selected variables in this study. Table 3.0 summarizes the variables and the sources from which data were obtained. Key variables include state size, wealth, culture (liberal/conservative), urbanism, and the number of school districts in a state. In addition, variables related to schools and school health were considered based on a review of the literature on school health policy. Finally, discussions with federal-level experts and practitioners yielded further suggestions. The variables included in the internal determinants model constructed for the school health policies examined are each briefly described in the following section. Throughout this dissertation, innovation is defined as adoption of school health guidelines issued by the U.S. Centers for Disease Control and Prevention (CDC) for healthy eating, physical activity and tobacco. States which adopted more policies scored higher on the School Health Indices and are considered more innovative.

State size. Larger organizations may be more innovative because they may have greater resources to use for new programs or practices. In this study, state size was measured by a state's residential population as of the year 2000. Data for the variable were obtained from the Statistical Abstract of the U.S. 2001, p. 21. A positive relationship between policy adoption and state size was expected.

State wealth. Slack resources may also provide resources for innovation. However as discussed in Chapter 2, it has also been argued that tight resources may provide incentives for creative solutions in the form of policy innovation. In this study, a positive association

was expected between state wealth and school policy adoption since the policies examined were not related to innovations intended to lower costs or to improve efficiency. Wealth was tested in different versions of the model using three alternative variables.

1. **Median income.** Median per capita income for a family of four for each state in 1998 dollars, obtained from the Statistical Abstract of the U.S. 2000, p. 426. A positive relationship was expected.
2. **Pupil/teacher ratio.** Although this variable may reflect educational as well as financial resources, in this study pupil/teacher ratio was considered a measure of state wealth. This was based on the assumption that greater state financial resources were devoted to schools in states with smaller classroom sizes. Data were obtained from Educational Statistics of the United States 2001, p. 447. A negative association was expected between pupil/teacher ratio and adoption of school health policies.
3. **Per pupil expenditure.** This variable was expressed as expenditures per pupil in average daily attendance in public and elementary schools 1998-1999, (in 1998-1999 dollars), obtained from the Digest of Education Statistics 2001, p. 193. A positive relationship was expected.

Culture. First, state liberalness was included in the model by measuring voting patterns. Secondly, reasoning that greater school resources from the federal government in a state might create an expectation that states would more readily adopt federal policies, two variables related to federal resources were also included as listed below.

1. **Popular Vote Cast Democrat.** Popular Vote Cast for the Democratic Candidate for President in the year 2000 was included as a variable in the model. These data were obtained from the Statistical Abstract of the United States 2001, p. 236. A positive association was expected between votes cast for the Democratic nominee and adoption of school health policy adoption, based on the assumption that liberalness reflected in Democratic voting would translate to support of progressive school health policies. Although 2000 Green Party Candidate Ralph Nader drew support from liberal voters, the Percent Vote Cast Democrat is used in this study because it provides a widely understood and more conservative estimate of liberal voters than a combination of Democratic Party and Green Party votes.
2. **Federal Education Revenues.** This variable was expressed as the percent of school revenues obtained from the federal government for elementary and secondary schools, 1997-1998. Data were obtained from the Digest of Education Statistics 2001, p. 180. A positive association was expected.
3. **FTEs Supported Federally.** The number of positions in a state's education agency supported by federal funding may also create an expectation that a state should be more compliant with federal policy recommendations. Full time equivalents (FTEs) were used to represent the number of positions supported by federal funds at the state education agency. Data were obtained from the Digest of Education Statistics 2001, p. 181. Again, a positive association was expected.

Urban/rural designation. Some states may be less likely to adopt policies because of a general preference for local control in school policy. Typically, rural states are expected to favor local control. In addition, the designation of states as urban or rural is commonly included in internal determinants models for legislative policy. The variable was also included in this study, expressed as the percent of state population residing in metropolitan area. Data were obtained from the Statistical Abstract of the United States 2001, p. 30. A positive association was expected.

Number of Policy Actors. Not only has organizational size been shown to be related to policy adoption, the number of people involved in policy decisions has also been shown to be influential (Pressman & Wildavsky, 1973). Chapters 4 and 5 of this dissertation address the issue of policy actors from the standpoint of examining leadership in states, either regionally or nationally, based on interaction models. For the internal determinants model, the influence of policy actors is assessed indirectly through measures of the potential number of actors by the number of school districts. A large number of policy actors and bureaucratic layers may impede progress. For the policies examined in this study it was assumed that states with a greater number of school districts would have a greater potential for a diversity of opinions as well as district-level bureaucratic participation, both of which would dampen the chances of widespread support for adoption of state-level policy. Therefore, it was expected that the number of school districts in a state would be negatively associated with policy adoption. Data were obtained from Education Statistics of the United States 2001, page 444.

Educational Achievement. Federal-level public health experts and practitioners suggested that adoption of school health policies is positively associated with participation in education as well as with educational achievement. In order to examine these ideas, two variables were alternatively tested in the models examined.

1. **High School Completion Rates** for 1997-1999, were obtained from Education Statistics of the United States 2001, p. 446;
2. **Average Score on the Scholastic Achievement Test (SAT)** was also obtained from Education Statistics of the United States 2001, p. 451. SAT score used for this study is an average of the verbal and math portions of the SAT.

Health-Related Variables. In addition to variables of theoretical importance from the standpoint of policy adoption and public administration, variables were examined that were related to health behavior. A corollary of the internal determinants models is that state policy adoption should ultimately reflect state need. Therefore indicators of poor health can serve as proxy measures of a state's need for health-promoting policies. The following variables were tested for association with healthy eating, followed by variables thought to be associated with physical activity policy and tobacco policy.

Healthy Eating Variables. Variables tested in the model related to healthy eating were as follows.

1. **Students in school lunch program.** The percent of students eligible for free or reduced price lunch, public schools, 1998-1999 was selected as a variable to represent the need of students for healthful foods. Adoption of healthy eating

policies was expected to be positively associated with this variable. Data were obtained from Education Statistics of the United States 2001, p. 445.

2. **Fruit and vegetable consumption.** According to the U.S. Food and Drug Administration, “Diets rich in fruits and vegetables may reduce the risk of some types of cancer and other chronic diseases” (FDA, 2003). The National Cancer Institute and the CDC jointly promote the consumption of at least five servings per day of vegetables and fruits (National Institutes of Health, 2001). It was expected that in states where the adult population showed lower levels of healthful practice (vegetable and fruit consumption), less support would be present for adoption of healthy eating policies for schools. Data were obtained from CDC’s Behavioral Risk Factor Surveillance System, 2000 (CDC, 2002e, p. 51). The variable is expressed the percentage of adults who reported eating fewer than five servings of fruits and vegetables per day. A negative association with policy adoption was expected.
3. **Obese adults.** Both child and adult rates of obesity have reached epidemic proportions in the United States (Mokdad, 2001). To reduce and control obesity, recommendations focus on reducing calorie consumption and increasing physical activity (calorie expenditure). High levels of obesity in a state can be interpreted as a high level of need for policies that address healthy eating in schools, potentially to address the obesity epidemic from a nutritional viewpoint. For this variable, CDC’s Behavioral Risk Factor Surveillance System 2000 (Mokdad,

2001) provided data regarding the percent of adults who were obese¹⁵ in the year 2000. This variable was also tested in the physical activity model.

Physical Activity Variable: Inactivity. It was posited that adults who are more physically active would be more likely to support policies in their state that promoted physical activity in school children. The variable for physical activity was expressed as the percent of adults who report no leisure-time physical activity, obtained from CDC's Behavioral Risk Factor Surveillance System, 2000 (CDC, 2002e, p. 45). A negative association was expected.

Tobacco variables. Two assumptions regarding tobacco were made in this study. First, state need for school health policies limiting tobacco use and supporting tobacco use cessation would be higher in states with higher rates of tobacco-related illness. Thus, it was expected that high rates of lung cancer in a state would be associated with higher rates of anti-tobacco policy adoption.

The second assumption, however, is that state need for economic security would outweigh the state need for health improvements. Thus, in states with high levels of tobacco production, low levels of anti-tobacco policies were expected. Relatedly, higher rates of smoking by adults and high school students in a state was assumed to reflect a pro-tobacco culture. Thus, states with higher levels of smoking were expected to have lower levels of anti-tobacco policy adoption. The four variables related to tobacco that were tested in the model are as follows.

¹⁵ Having a body mass index (BMI) equal to or greater than 30.0 kg/m². BMI is calculated as a person's body weight in kilograms divided by the square of height in meters.

1. **Lung cancer death rates.** The adjusted rates of death due to lung cancer for 1999 were obtained from CDC based on the ICD-10 Code C34, 1999 (CDC, 2002e, p. 19). A positive association was expected.
2. **Tobacco production .** To identify tobacco-producing states, USDA's Tobacco Situation and Outlook Yearbook 2001 was the source of a variable for cash receipts from tobacco as a percentage of cash receipts from total crops 1999 (USDA, 2001, p. 46). Sixteen states had tobacco production ranging from 0.3 percent of cash receipts in Wisconsin to 60.4 percent in Kentucky. States with no reported cash receipts were included in the analysis with a value of 0.0 percent for tobacco production. A negative relationship was expected between tobacco production and tobacco policy adoption.
3. **Adults who smoke.** The percent of adults who report current cigarette smoking was obtained from the Behavioral Risk Factor Surveillance System 2000 (CDC, 2002e, p. 39). The relationship was expected to be negative.
4. **High school smokers.** Data on the percent of high school students who reported cigarette smoking were obtained from the Youth Risk Behavior Surveillance System 1999 (CDC, 2002e, p 41). Data were available for only 34 states. Again, a negative relationship was expected.

Correlation Analyses

The first set of analyses assessed relationships between state characteristics and policy adoption. Appendix L presents a correlation matrix among all of the variables included in the internal determinants model. Appendix N presents descriptive statistics

related to adoption of each of the 15 individual policies studied. The association of scores on the School Health Indices and each variable identified above were examined by Spearman's (rank) correlation. The results are summarized in Table 6.0.

Size, Wealth and Urbanism. Although internal determinants models of legislative policy adoption frequently find that state size, wealth, and urbanism are associated with greater innovativeness in the form of policy adoption, this was not the case for school health policies related to CDC guidelines. Correlations between the School Health Indices and state population, median income, and urbanism were positive but weak. These results suggest that the “usual suspects” of variables used in internal determinants models of legislative policy are not salient to adoption of non-legislative policy.

For pupil/teacher ratio the relationship to policy adoption was negative as expected, indicating that in states with smaller classroom size, more CDC guidelines were adopted. However, healthy eating was the only index for which this variable achieved statistical significance at the $p < .05$ level ($r_s = -0.27$, $p = 0.05$)¹⁶.

State Culture. Consistent positive relationships were noted between policy adoption and the percent of popular vote cast Democrat in the 2000 presidential election. The strongest correlations were found for Healthy Eating ($r_s = 0.33$, $p = 0.02$); followed by Tobacco ($r_s = 0.24$, $p = 0.09$) and Physical Activity ($r_s = 0.22$, $p = 0.11$). Because total innovativeness is a summation of the index value of healthy eating, physical activity, and tobacco, total innovativeness also showed a strong association with Democratic voters ($r_s =$

¹⁶ r_s = Spearman's (rank) correlation.

0.29, $p = 0.04$). These results indicate that there is a consistent positive relationship between liberal attitudes among voters and adoption of exemplary school health policies. This may be due to a possible preference by Democratic voters to favor formal policy adoption as a means to address social ills.

Other cultural variables examined were the percent of education revenues received from the federal government and number of federally-supported full time positions in state education agencies. It was posited that federal resources would create pressure on a state to adopt recommended federal policies. However, correlations between these variables and scores on the School Health Indices were low with one exception: a moderate association was found between tobacco policy adoption and full-time positions ($r_s = 0.37$, $p = .01$). This association may be influenced, however, by recent tobacco lawsuits. Some states which received large tobacco litigation settlements requested federal assistance in planning and administering settlement monies. In some cases, CDC is providing ongoing technical assistance to these states by placing a federal employee in a state department of education or department of health (R. Henson, CDC Office on Smoking and Health, personal communication, December 19, 2002). The state's attention to tobacco issues may result in the adoption of progressive tobacco policies such as those recommended for school health. Thus, tobacco policy adoption may have been stimulated by tobacco litigation and may not be the result of pressure from on-site federal personnel as originally posited.

Number of Policy Actors. It was anticipated that a greater number of school district bureaucracies would make it more difficult to obtain support for a new policy. However, no association was found between the number of school districts and policy adoption

Educational Achievement. Federal practitioners suggested that states with higher education achievement would be more likely to adopt exemplary policies. However, the results show no relationship was noted between policy adoption and high school completion rate or average SAT scores.

Variables for Healthy Eating. State need for exemplary healthy eating policy was measured by the percent of students eligible for free or reduced-price lunches; the percent of adults who eat fewer than the recommended amount of vegetables and fruit; and the percent of obese adults. Across policy areas, these variables were unrelated to policy adoption with one exception: tobacco policy adoption showed a relationship with vegetable and fruit consumption ($r_s = -0.32$, $p = 0.02$). The negative relationship indicates that in states where adults are consuming a more healthful diet, more exemplary school health tobacco policies are also being adopted. Surprisingly, however, vegetable- and fruit-laden adult diet was not associated with adoption of policies for healthy eating or physical activity.

Physical Activity Variables. The percent of adults reporting no leisure-time physical activity showed a weak correlation with physical activity policy adoption ($r_s = 0.21$, $p = 0.12$).

Tobacco Variables. Surprisingly, among the 19 variables considered, both Healthy Eating and Physical Activity showed their strongest associations with the adjusted rate of deaths due to lung cancer (Healthy Eating, $r_s = 0.41$, $p < 0.001$; Physical Activity, $r_s = 0.40$, $p < 0.001$). Unexpectedly, lung cancer death rates did not show a similarly strong relationship to tobacco policy adoption ($r_s = 0.15$, $p = 0.31$). High rates of lung cancer are found in states with high levels of tobacco production and smoking. As discussed above,

economic concerns may impede the adoption of anti-tobacco policies. Thus in states where lung cancer rates were high, it may have been more politically feasible to promote healthful interventions that do not directly impact tobacco consumption or sales-- interventions such as healthy eating and physical activity.

Tobacco production showed a positive relationship with tobacco policy adoption ($r_s = 0.26$, $p = 0.07$) however a negative association was expected. This relationship was not statistically significant at $p = 0.05$ and may have been influenced by the fact that only 16 states have tobacco production cash receipts >0 . As with the lung cancer variable, tobacco production was correlated with the School Health Index Totals (lung cancer, $r_s = 0.37$, $p = 0.01$; tobacco production, $r_s = 0.28$, $p = 0.05$). Although both lung cancer mortality rates and tobacco production are intended to reflect the level of tobacco consumption in a state and, as argued above, the need for anti-tobacco policy, the correlation between the adjusted rates of lung cancer death and the percent of tobacco production cash receipts is only 0.38 (See Appendix L). Since the policies considered in this study are anti-tobacco *consumption* rather than anti-tobacco *production*, the analyses presented in the sections below use the adjusted rate of death due to lung cancer rather than tobacco production cash receipts.

Multiple Regression Analyses

The correlation matrix included as Appendix N shows that, as expected, some variables were inter-correlated because they measure similar or related constructs. For example, median income was strongly correlated with per pupil expenditure ($r = 0.70$, $p < 0.001$) and with the number of students eligible for free or reduced price lunches ($r = 0.61$, $p < 0.001$); the number of school districts was highly correlated with population size (r

= 0.70, $p < 0.001$). To avoid multicollinearity in the models, a subset of eight key variables was examined in the regression models which follow. Among similar variables, the availability of data and higher correlations with scores on the School Health Indices were key considerations in selecting variables for this subset.

Population	Population by state
Income	Median income
Urbanism	Percent of State Population Residing in Urban Area
Democrat	Democratic Vote (percent) in 2000 Presidential Election
Education	SAT Scores
Obesity	Percent of Obese adults
Inactivity	Adults with no leisure-time physical activity
Lung Cancer	Adjusted rate of death due to lung cancer

The first regression models considered the trio of “usual suspects” in determinants models of legislative policy: population, median income, and urbanism. As shown in Table 6.1, models including these three variables showed extremely low adjusted coefficients of determination, ranging from a low of -0.02 for Tobacco to a high of 0.04 for Physical Activity. Sensitivity analysis excluding the District of Columbia as an outlier (both because of high rates of Democratic voters (85.2 percent) and because of high scores on the School Health Indices) showed similar results. Because size, wealth, and urbanism are considered key in legislative models, the results suggest that simple models that often suffice for legislative policy adoption may not be relevant for non-legislative policy adoption.

Next, a regression model was tested using all eight variables for each of the four School Health Indices. For Healthy Eating and Physical Activity, the eight-variable model was a substantial improvement over the three-variable model in terms of the amount of variability explained as can be seen by the adjusted coefficients of determination (Table 6.2).

As seen in Table 6.2, 39 percent of Healthy Eating policy adoption could be explained by an eight-variable model with significance of the model at $p < 0.01$ (Adjusted $R^2 = 0.39$, $p < 0.001$). Neither the Physical Activity nor the Tobacco models were significant at $p < 0.05$. Inclusion of the District of Columbia appears to have an important influence for Healthy Eating and Physical Activity as can be seen by comparing the results presented in Tables 6.2 and 6.3. When the District of Columbia is excluded (Table 6.3), the adjusted coefficients of determination dropped markedly for Healthy Eating and Physical Activity but remained the same for Tobacco. The model may be influenced because the District of Columbia is an outlier by virtue of its high rate of Democratic voters (88.2 percent) and because the entire District of Columbia is included in a single school district. As already discussed, the number of policy actors and institutions may impede policy adoption. Having one school district in the District of Columbia may make it easier to reach agreement on policies to be adopted. Indeed, the District of Columbia scored highest on the School Health Innovativeness Index. Since the District of Columbia may skew the results by virtue of its unique characteristics and circumstances, models including only the 50 states are more likely to best represent state policy adoption and are used in the analyses as described below.

In addition, in future studies it may be more appropriate to assess policy adoption in the District of Columbia at a school district, rather than state, level.

Table 6.3 shows that when the 50 states are examined (District of Columbia excluded), the eight-variable model explains 17 percent of the variability in Total Innovativeness (Adjusted $R^2 = 0.17$, $p = 0.04$). Two variables were statistically significant at $p < 0.05$ for Healthy Eating: Democrat ($\beta = 0.40$, $p = 0.04$) and Lung Cancer ($\beta = 0.46$, $p = 0.03$). Furthermore, in the Physical Activity model, Lung Cancer was also statistically significant at $p < 0.05$ ($\beta = 0.49$, $p = 0.04$).

Various subgroups of these eight variables were then examined in additional regression models. Table 6.4 presents a summary of the adjusted regression coefficients of selected models including sensitivity analyses that exclude the District of Columbia. As shown in Table 6.4, the most notable result is that when the District of Columbia is excluded ($N = 50$ states), a model with just two variables (Democrat and Lung Cancer), could account for 23 percent of the variability in Healthy Eating policy adoption (Adjusted $R^2 = 0.23$, $p < 0.001$), an improvement both in parsimony as well as in the variability explained by the model compared to both the three- and eight-variable models. Similar improvements were seen in Physical Activity, although to a lesser extent.¹⁷ Because Total Innovativeness is the sum of scores from Healthy Eating, Physical Activity and Tobacco, it is not surprising that the models for total innovativeness resembled the models of best fit for Healthy Eating and

¹⁷ As discussed in Chapter 5, Spearman (rank) correlations between Healthy Eating and Physical Activity = 0.57, $p < 0.001$; Physical Activity and Tobacco = 0.20, $p = 0.15$; and Healthy Eating and Tobacco = 0.51, $p = 0.01$).

Physical Activity. Tobacco, however, continued to be puzzling as none of the many models tested proved useful in identifying state determinants potentially related to policy adoption.

Table 6.5 summarizes the results of two-, three-, and eight-variable models for the 50 states, excluding the District of Columbia. The overall results indicate that the model of best fit in these analyses was a two-variable model. However even in the best model only a maximum of 23 percent of the variability in policy adoption was explained (Healthy Eating) with even lower adjusted coefficients of determination for Physical Activity and Tobacco policy. Based on these results, none of the models can be considered particularly useful.

However, the results raise the question of whether there are important differences among substantive policy areas because of the similar patterns noted between Healthy Eating and Physical Activity and their differences with Tobacco policy adoption. While all three policy areas promote healthful behavior, healthy eating and physical activity do not occupy a controversial and highly politicized spotlight as does tobacco. In addition, many legislative policies have been enacted to control tobacco production, sale, and use. Thus one could speculate that tobacco policy adoption, even for non-legislative policy, may still follow legislative policy patterns. Notwithstanding this possibility, the difference between tobacco and the other two policy areas may be an artifact of the design of this study. As noted in Chapter 3, questions for Healthy Eating and Physical Activity were intentionally selected because of corresponding content. For example, the Healthy Eating Index includes a policy recommending that food not be used as reward or punishment; similarly, it is recommended that Physical Activity not be used as reward or punishment. Tobacco policy

is different: no parallel policy exists for using *cigarettes* for reward or punishment.

However, some policies spanned all three substantive areas such as a requirement that a curriculum be implemented in healthy eating, lifetime physical activity, and tobacco use prevention. Thus, although the results suggest a potential difference in policy adoption patterns among substantive areas, these data do not allow such a conclusion to be made.

Chapter Summary

Of 19 variables examined as potential internal determinants, almost none of the variables were related to school health policy adoption. Notably, very weak associations were found between policy adoption and state size, wealth, and urbanism—the three variables typically considered in studies of legislative policy adoption. For healthy eating and physical activity, the percent of Democratic voters in the 2000 presidential election and the adjusted rates of death due to lung cancer were consistently associated with higher levels of policy adoption. Models including only these two variables explained 23 percent of the variability in healthy eating policy adoption among the 50 United States, and 15 percent of the variability in physical activity policy.

Like healthy eating and physical activity, tobacco policy adoption showed virtually no relationship with the “usual suspects” of determinants (population, wealth or urbanism.) In contrast, tobacco also failed to show an expected relationship with Democratic voting or with health-related variables such as lung cancer death rates, smoking, or tobacco production.

Although the amount of variability explained by Healthy Eating and Physical Activity models was modest, the similarities between the results in these two policy areas

and their difference with tobacco are notable. The results suggest that further investigation is warranted on the question of whether policy adoption patterns vary by virtue of the substantive areas in a policy even within somewhat narrow area of school health.

The next chapter presents a synthesis of the results presented in Chapters 4, 5, and 6 for the three frameworks examined in this study.

Table 6.0
Spearman's (Rank) Correlation Analysis of School Health Policy Adoption
With Internal Determinants Model Variables
(N = 51, Including 50 United States and District of Columbia)

	Healthy Eating	Physical Activity	Tobacco	Total
Population by State	0.11 ^a (0.46)	0.07 (0.62)	0.25 (0.07)	0.17 (0.25)
Median Income	0.05 (0.75)	0.17 (0.24)	0.18 (0.20)	0.17 (0.24)
Percent of State Population Residing in Urban Area	0.12 (0.41)	0.22 (0.12)	0.21 (0.14)	0.24 (0.09)
Per Pupil Expenditure	0.23 (0.11)	0.16 (0.27)	0.14 (0.34)	0.19 (0.18)
Pupil/teacher Ratio ^b	-0.27* (0.05)	-0.16 (0.28)	-0.23 (0.11)	-0.25 (0.08)
Percent of Popular Vote Cast Democrat in Presidential Election 2000	0.33* (0.02)	0.22 (0.11)	0.24 (0.09)	0.29* (0.04)
Percent of Education Revenues Received from Federal Government	-0.08 (0.56)	-0.12 (0.40)	-0.10 (0.49)	-0.09 (0.52)
Number of Federally-Supported FTEs at State Education Agency	0.18 (0.22)	0.09 (0.54)	0.37** (0.01)	0.28 (0.06)
Number of School Districts	0.05 (0.75)	-0.12 (0.39)	0.15 (0.31)	0.01 (0.94)
Average High School Completion Rate	0.04 (0.81)	-0.07 (0.63)	0.17 (0.24)	0.03 (0.85)
SAT Verbal and Math Score Average	0.09 (0.53)	-0.10 (0.48)	0.06 (0.70)	-0.02 (0.90)
Percent of Students Eligible for Free or Reduced Price Lunch	0.08 (0.61)	0.14 (0.38)	-0.03 (0.84)	0.11 (0.49)
Adults Who Eat Fewer Than Five Servings of Vegetables/Fruits per Day ^b	-0.18 (0.20)	-0.07 (0.62)	-0.32* (0.02)	-0.22 (0.13)
Percent of Obese Adults	0.24 (0.09)	0.08 (0.60)	0.15 (0.31)	0.18 (0.20)
Adults Reporting No Leisure-Time Physical Activity ^b	0.19 (0.19)	0.21 (0.12)	0.13 (0.33)	0.24 (0.09)
Adjusted Rate of Deaths Due to Lung Cancer	0.41** (0.00)	0.40** (0.00)	0.15 (0.31)	0.37** (0.01)
Tobacco Production ^{b, c}	0.21 (0.14)	0.26 (0.07)	0.26 (0.07)	0.28* (0.05)
Percent of Adults who Smoke ^b	0.13 (0.37)	0.12 (0.41)	-0.07 (0.63)	0.02 (0.88)
Percent of High School Smokers ^b	-0.04 (0.81)	-0.20 (0.25)	-0.13 (0.46)	-0.22 (0.21)

^a Values represent Spearman (rank) correlation coefficient. P-values are in parentheses. With a sample size of 51, a correlation of 0.27 is significant at the 0.05 level.

^b A negative relationship is expected.

^c Only 16 states have tobacco production cash receipts > 0.

* Significant at p<0.05

**Significant at p<0.01

Table 6.1

**Internal Determinants of State Wealth, Median Income and Urbanism
Regressed on School Health Policy Adoption
(N = 51, Includes 50 United States and the District of Columbia)**

	School Health Indices			
	Healthy Eating	Physical Activity	Tobacco	Total
Adjusted R ²	0.01	0.04	-0.02	0.03
Intercept	1.37	1.23	1.02	2.40
F	1.20	1.68	0.72	1.49
P value	0.32	0.19	0.55	0.23
	Standardized Coefficients (Significance Level in Parentheses)			
Population	-0.26 (0.15)	-0.21 (0.22)	0.11 (0.53)	-0.16 (0.37)
Income	-0.13 (0.50)	-0.01 (0.95)	0.13 (0.52)	0.00 (1.00)
Urbanism	0.38 (0.10)	0.37 (0.09)	0.43 (0.85)	0.34 (0.12)

Table 6.2

**Internal Determinants of State Wealth, Median Income and Urbanism
Regressed on School Health Policy Adoption
(N = 51)**

	School Health Indices			
	Healthy Eating	Physical Activity	Tobacco	Total
Adjusted R ²	0.39	0.14	0.01	0.27
Intercept	-4.98	3.73	3.23	6.70
F	5.03	2.01	1.05	3.29
P value	0.00**	0.07	0.41	0.01**
Standardized Coefficients (Significance Level in Parentheses)				
Population	-0.14 (0.33)	-0.14 (0.43)	0.09 (0.64)	-0.09 (0.60)
Income	-0.06 (0.71)	0.07 (0.73)	0.31 (0.16)	0.14 (0.45)
Urbanism	0.05 (0.82)	0.20 (0.39)	-0.06 (0.85)	0.10 (0.64)
Democrat	0.56** (0.00)	0.24 (0.18)	0.15 (0.45)	0.40* (0.02)
Education	0.20 (0.16)	0.11 (0.51)	0.10 (0.56)	0.17 (0.27)
Obesity	0.23 (0.14)	-0.00 (0.98)	0.31 (0.13)	0.21 (0.22)
Inactivity	-0.23 (0.15)	-0.04 (0.86)	0.09 (0.65)	-0.06 (0.72)
Lung Cancer	0.35 (0.06)	0.38 (0.08)	-0.03 (0.90)	0.31 (0.12)

*Significant at p<.05

**Significant at p<0.01

Table 6.3

**Linear Regression Analysis of School Health Policy Adoption
With Eight Internal Determinants
(N = 50; District of Columbia is Excluded)**

	School Health Indices			
	Healthy Eating	Physical Activity	Tobacco	Total
Adjusted R ²	0.22	0.09	0.00	0.17
Intercept	-4.66	-4.20	3.29	6.68
F	2.75	1.61	1.01	2.23
P value	0.02*	0.15	0.44	0.04*
	Standardized Coefficients (Significance Level in Parentheses)			
Population	-0.08 (0.65)	-0.04 (0.85)	0.07 (0.74)	-0.02 (0.93)
Income	-0.01 (0.98)	0.17 (0.43)	0.29 (0.21)	0.22 (0.29)
Urbanism	0.02 (0.94)	0.17 (0.49)	-0.04 (0.88)	0.08 (0.74)
Democrat	0.40* (0.04)	-0.01 (0.98)	0.17 (0.43)	0.21 (0.28)
Education	0.23 (0.16)	0.11 (0.52)	0.10 (0.56)	0.18 (0.27)
Obesity	0.18 (0.35)	-0.12 (0.54)	0.33 (0.13)	0.14 (0.46)
Inactivity	-0.20 (0.28)	-0.05 (0.82)	0.08 (0.72)	-0.01 (0.96)
Lung Cancer	0.46* (0.03)	0.49* (0.04)	-0.04 (0.85)	0.39 (0.08)

*Significant at p<.05

Table 6.4
Selected Results of Multiple Regression Analyses of
Internal Determinants Model for School Health Policy Adoption

	School Health Indices			
	Healthy Eating	Physical Activity	Tobacco	Total
Model 1: N = 51				
Adjusted R ²	0.35	0.13	0.07	0.28
F (P-value)	14.67 (0.00)	4.87 (0.01)	2.85 (0.07)	10.74 (0.00)
Variables:				
Democrat ^a	0.56 (0.00)	0.41 (0.00)	0.24 (0.08)	0.51 (0.00)
Obese	0.34 (0.01)	0.13 (0.33)	0.25 (0.08)	0.29 (0.02)
Model 2: N=50 ^b				
Adjusted R ²	0.19	0.04	0.07	0.16
F (P-value)	6.69 (0.00)	1.96 (0.15)	2.95 (0.06)	5.76 (0.01)
Variables:				
Democrat	0.40 (0.00)	0.28 (0.06)	0.26 (0.07)	0.40 (0.00)
Obese	0.35 (0.01)	0.11 (0.45)	0.27 (0.06)	0.29 (0.03)
Model 3: N=51				
Adjusted R ²	0.33	0.21	0.01	0.28
F (P-value)	13.24 (0.00)	7.52 (0.00)	1.36 (0.27)	10.93 (0.00)
Variables:				
Democrat	0.48 (0.00)	0.35 (0.01)	0.20 (0.16)	0.44 (0.00)
Lung Cancer	0.30 (0.01)	0.30 (0.02)	0.09 (0.53)	0.30 (0.02)
Model 4: N =50				
Adjusted R ²	0.23	0.15	0.01	0.20
F (P-value)	8.49 (0.00)	5.20 (0.01)	1.23 (0.30)	7.27 (0.00)
Variables:				
Democrat	0.26 (0.05)	0.19 (0.16)	0.19 (0.19)	0.27 (0.04)
Lung Cancer	0.40 (0.00)	0.35 (0.01)	0.09 (0.56)	0.36 (0.01)
Model 5: N=51				
Adjusted R ²	0.25	0.14	0.03	0.22
F (P-value)	9.13 (0.00)	5.16 (0.01)	1.63 (0.21)	8.22 (0.00)
Variables:				
Democrat	0.52 (0.00)	0.39 (0.01)	0.21 (0.14)	0.38 (0.00)
Inactivity	0.10 (0.40)	0.16 (0.23)	0.13 (0.34)	0.17 (0.17)
Model 6: N=50				
Adjusted R ²	0.11	0.07	0.02	0.13
F, (P-value)	3.96 (0.03)	2.87 (0.07)	1.47 (0.24)	4.71 (0.01)
Variables:				
Democrat	0.31 (0.03)	0.23 (0.10)	0.19 (0.19)	0.31 (0.03)
Inactivity	0.19 (0.17)	0.21 (0.14)	0.13 (0.38)	0.23 (0.09)

^a Results of variables reported as standardized coefficients (β) with p-value in parentheses.

^b When N=50, analysis excludes District of Columbia.

Table 6.5
School Health Policy Adoption
Comparison of Regression Models with Two, Three and Eight Variables
(N = 50 United States)

Models:	“Usual Suspects” ^a	Eight Variables ^b	<u>Two-Variables, Democrat and</u>		
			Obesity	Inactivity	Lung Cancer
Healthy Eating Index:					
Adjusted R ²	0.01	0.22	0.19	0.11	0.23
F	1.20	2.75	6.69	3.96	8.49
p-value	0.32	0.02	0.00	0.03	0.00
Physical Activity Index:					
Adjusted R ² :	0.04	0.09	0.04	0.07	0.15
F	1.68	1.61	1.96	2.87	5.20
p-value	0.19	0.15	0.15	0.07	0.01
Tobacco Index:					
Adjusted R ² :	-0.02	0.00	0.07	0.02	0.01
F	0.72	1.01	2.95	1.47	1.23
p-value	0.55	0.44	0.06	0.24	0.30
Total Innovation Index:					
Adjusted R ² :	0.03	0.17	0.16	0.13	0.20
F	1.49	2.23	5.76	4.71	7.27
p-value	0.23	0.04	0.01	0.01	0.00

^a Variables: Population, Income, Urbanism

^b Variables: Population, Income, Urbanism, Democrat, Education, Obesity, Inactivity, Lung Cancer

CHAPTER 7

LIMITATIONS, SUMMARY, AND SYNTHESIS OF RESULTS

Two main research questions guided this investigation:

1. What model best explains diffusion of guidelines issued by the U. S. Centers for Disease Control and Prevention (CDC) for policies on healthy eating, physical activity, and tobacco?
2. What differences exist in CDC school health policy adoption across different substantive policy areas?

After study limitations are addressed, study findings are summarized and implications discussed.

Study Limitations

Although the study design that included the use of CDC's School Health Policies and Programs Study (SHPPS) data, a short time frame, and a narrow focus provided many advantages, limitations arose by virtue of these same design features. An advantage of SHPPS is that it provides a single data source based on questions rigorously developed and tested; however the study results rest on one key data source and the assumption that SHPPS data are complete and correct.

The selection of a subset of policies queried in SHPPS that was used to create the School Health Indices for this study may have biased the results. As discussed in Chapter 3, the CDC guidelines were matched with SHPPS questions that explicitly asked if a formal policy had been adopted that corresponded with the CDC guideline. Although SHPPS covered many policy areas, not all questions were related to CDC guidelines. Thus, only a small subset of SHPPS

data was analyzed, making it certain that an incomplete picture of policy adoption was examined. A further study limitation arises from the use of an index to represent policy adoption.

Although the short time frame for this study allowed a sharp focus on early adoption of policies, this excluded the possibility of a long-range perspective. Another study limitation was the lack of time series data to mark when a policy was adopted. Thus, the study assessed only the number of policies adopted by states within a specified time period and did not quantify speed of policy adoption. In addition, the number of prior-adopting states could not be measured.

By design, the study examined only school health policies that were associated with CDC guidelines. Although the sharp focus was useful in gaining a deeper understanding of this policy area, the study is limited by its inclusion only of school health policies at the state level related to healthy eating, physical activity and tobacco.

The study is limited by data that is self-reported both for SHPPS and for two important secondary data sources. Although all 50 states and the District of Columbia responded to SHPPS questionnaires, more than one individual may have been responsible in a single state for completing the state-level SHPPS questionnaires. To address this issue, reliability and validity studies have been conducted to verify the accuracy of SHPPS data including the use of follow-up telephone interviews to verify answers to questionnaires (Brener, Kann & Smith, 2003a). Secondary data sources included the Behavioral Risk Factor Surveillance System and the Youth Risk Behavior Surveillance System which contain self-reported data such as fruit and vegetable consumption; physical activity; and smoking. Some self-reported health behavior data have been

shown to be consistently misreported. For example, calculations of body mass index (based on height and weight) are biased because height is over-reported and weight is under-report (Rowland, 1990). However, there is no reason to believe that biases inherent in self-reported data used in this study would differ across states.

As with all studies of policy adoption, an important question arises regarding whether policy adoption translates to policy implementation. State-level SHPPS data used for this study do not address policy implementation. As discussed in Chapter 3, the sampling techniques used for SHPPS did not allow this study to address the question of vertical diffusion of policies (from states to districts to schools or vice versa). Fortunately for future studies, however, SHPPS questionnaires were also administered to a nationally representative sample of school districts and schools including questions that explicitly address implementation of policies.

Synthesis of Findings

Three separate models were tested. Two models based on the diffusion of innovations theory were examined first: a regional model and a national model. These models are based on the assumption that interaction among policymakers is important in spreading policy ideas and promoting the adoption of new policies. A corollary to this is the assumption that certain states act as pioneers or leaders, often being first in the nation or among states within a region to adopt a new policy. The results of the national model are presented in Chapter 5, and the results of the regional model are presented in Chapter 4.

Further insights were gleaned from the third model, an internal determinants model which links state characteristics or circumstances to policy adoption. State needs are assumed to be important predictors of policy adoption; however even among states with similar needs,

internal determinants models are based upon the assumption that characteristics of a state determine which of those states will adopt a policy. Internal determinants models are widely used in political science to study legislative policy adoption. The results of internal determinants models are presented in Chapter 6.

The next sections summarize key findings for all three models and synthesize the results of Chapters 4, 5, and 6. A further discussion of the implications of the study findings and their application to public administration is contained in Chapter 8.

None of the models provided a complete explanation of policy adoption. Recent reviews of the literature on theoretical models of policy adoption discussed in Chapter 2 indicate that although some models may hold promise, the phenomenon of policy adoption has eluded simple explanation; and to a great degree, it eludes most complex explanations as well. Thus it is not surprising that in the case of school health policy, the results fail to offer strong support in favor of any one of the three models examined. Notably, for the internal determinants models, despite the examination of 19 potentially relevant variables, no more than 23 percent of the variability in policy adoption was explained by any of the models (see Chapter 6). Two variables dominated the internal determinants' models: state policy adoption was related to (1) a state's adjusted rate of lung cancer death and (2) the percent of votes in the state cast Democrat in the 2000 presidential election.

Despite somewhat inconclusive findings, the models were useful and yielded insights into policy adoption for school health. Of additional value was the synergy of the three different model perspectives in understanding guidelines adoption.

National leaders and laggards were apparent. Analyses showed that for school health guidelines, the number of policies adopted ranged widely among states. This was true for each of the three substantive policy areas (healthy eating, physical activity and tobacco) and for the three areas combined. The scores for Total Innovativeness varied by about 7-fold (ranging from a high of 11.67 for the District of Columbia to a low of 1.67 for New Mexico). Within each of the three substantive policy areas, at least one entity had adopted all five of the policies examined. On the laggard side, four states scored zero in the Healthy Eating Index; six states scored zero in the Physical Activity Index; and seven states scored 1.0 for the Tobacco Index. These findings confirm that issuance of CDC guidelines is met neither with universal acceptance nor universal rejection.

In further assessing national leadership and laggardness, the results show that states tended toward consistent patterns of policy adoption or non-adoption. Healthy Eating policy adoption was correlated with Physical Activity policy adoption at $r_s = 0.53$ ($p < 0.001$)¹⁸ and with Tobacco at $r_s = 0.51$ ($p < 0.001$). However, physical activity policy and tobacco policy adoption showed a markedly lower correlation at $r_s = 0.20$ ($p = 0.15$).

Importantly, leader and laggard states found for school health policy were different from those found by Walker (1969), Savage (1978) and Gray (1973) in their analyses of legislative policy adoption. The District of Columbia and Alabama emerged as consistent national leaders; states that had consistently low scores were Arizona, Colorado, New Mexico and Wyoming. In addition the patterns of policy adoption and non-adoption also differed between legislative and

¹⁸ Spearman's (rank) correlation.

non-legislative policy as can be seen in the correlation analyses presented in Chapter 5. The results of this study support the conclusion of Walker and Savage that there may be consistent patterns of leadership and laggardness nationally; however the results also support the conclusion that differences exist between legislative policy adoption patterns and patterns for non-legislative policy at a national level.

Leaders and laggards were apparent within geographic regions. At a regional level, analyses also supported the assertion that states consistently tend toward policy adoption or non-adoption across policy areas. Regional analysis further indicated that this tendency appears to be associated with location in a geographic region. Of states which consistently scored within the top 40 percent across all four School Health Indices, 60 percent were southern states, 30 percent were states in the northeast, 10 percent were midwestern, and none were located in the west (based on U.S. Census Regions). On the laggard side, of the states which consistently scored in the lowest 40 percent of the national rankings for policy adoption, 58 percent were in the west, 25 percent in the midwest, 12 percent in the northeast, and 12 percent in the south.

An advantage to regional analyses is that leadership and laggardness can further be assessed by comparing a state only to its geographic neighbors--neighbors which may generally tend toward adoption or non-adoption when considered at a national level. Regional analysis of CDC guideline adoption showed that when states were grouped by U.S. Census Region, regional leaders and laggards emerged. Scores for Total Innovativeness ranged by as much as 9.0 points (maximum = 15 points) in the South. However, despite a range of points within each geographic region, a few states were consistent leaders and laggards in policy adoption. Three different regional grouping schemes were examined. Across the three grouping schemes, Massachusetts

emerged as a regional leader while regional laggard states were Florida, New Mexico and Pennsylvania. This finding supports Walker's (1969) assertion that policy adoption patterns may have regional patterns.

An additional finding of this study, however, is that in general the same leader and laggard states among CDC policy adopters were found no matter whether the states were grouped by standard U.S. Census groupings or by the "leagues" or affinity groups suggested by Walker (1969). A distinct and important advantage of the U.S. Census groupings is their wide acceptance and use.

Patterns differ for legislative and non-legislative policy. Among the hypotheses tested was whether adoption of guidelines would follow the same patterns as those reported in the literature for legislative policy adoption. The results indicate that the patterns of adoption of school health guidelines examined did not resemble patterns of legislative policy. Furthermore, the unique pattern of adoption for non-legislative policy prevailed across all three theoretical frameworks examined.

School Health Index scores were compared to rankings of states for innovation in legislative policy as reported in studies conducted by Walker (1969) who promoted a regional interaction model of policy adoption, Savage (1978) who promoted a national interaction model, and Gray (1973) who examined both a national model and an internal determinants model. The correlation among scores on the school health indices and scores from the Walker, Savage and Gray models were markedly low and unstable (both positive and negative associations were shown). Notably, correlation of state rankings among the Walker, Savage, and Gray legislative models were consistently positive and much higher. Thus, while patterns of legislative policy

adoption were consistent among studies of different legislative policies by different researchers, the pattern for non-legislative school health policy was markedly different.

Relevant variables differ for legislative and non-legislative policy. Additional evidence is presented in Chapter 6 that also points to the conclusion that legislative and non-legislative policy adoption patterns differ. Correlation and regression analyses were used to examine the internal determinants hypothesized to be related to guidelines adoption. The “usual suspects” of size, wealth, and urbanism often shown to be important variables in legislative policy adoption showed virtually no relationship to adoption of non-legislative school health policies. Correlation analysis with 19 variables and policy adoption for healthy eating, physical activity, and tobacco showed inconsistent patterns and low correlations. In addition, policy adoption showed little or no relationship with education-related variables such as funding, educational attainment, and pupil/teacher ratio. This evidence suggests that by and large, the variables used to study legislative policy adoption were irrelevant to this study of non-legislative policy adoption. Instead, analysis of the school health guidelines showed consistent evidence that non-legislative policy determinants are different from those relevant to legislative policy.

Strength of scientific evidence may be an important variable. Among the three policy areas, tobacco policy adoption was at higher levels overall than healthy eating and physical activity policies. (Healthy Eating, mean = 1.4; Physical Activity, mean = 1.8; Tobacco, mean = 2.5). The CDC tobacco guidelines were the first to be issued (1994), followed by the healthy eating guidelines in 1996 and the physical activity guidelines in 1997. Of course, the difference in the level of policy adoption may be related to the length of time that guidelines have been in the field. However, healthy eating and physical activity policy adoption showed similar patterns

in terms of the explanatory variables associated with policy adoption while tobacco policy differed markedly. As more fully discussed in Chapter 8, the strength of scientific evidence underlying each policy area is suggested as a potential variable that may be influential.

New variables are needed. Ironically, future internal determinants models may find lessons from the interaction-based diffusion of innovations theory. This theory holds that early adopters of innovations tend to be more highly educated, wealthier and more cosmopolite. The overlap with the variables typically used in internal determinants models (state size, wealth and urbanism) is striking. However, the diffusion of innovations theory makes a distinction between innovations which provide immediate, observable benefit and innovations related to the prevention of events that may never have happened even lacking the intervention. School health guidelines fall into a category of “prevention interventions” that can be promoted by making the benefits observable at an earlier point in time.

Based on the diffusion of innovations theory, observable elements promote adoption of an innovation. In preventive health interventions, observable elements can be added intentionally such as by adding step-wise goals to a smoking cessation program. In the case of school health policy, observability has two facets that, although not intentionally added, increase the observable evidence that a policy will be successful. First, as noted by Walker, policy adoption may follow a “spreading ink blot” pattern where one or a few pioneer states adopt a policy that is then emulated by other states. The successful adoption of a policy in one state provides an observable occasion for the next state, making it easier to learn from the experiences of pioneering states. However, some policy ideas diffuse from local government. Thus in future studies it may be important to measure not only the number of prior-adopting states but to also

measure other observable examples of success of a recommended intervention such as adoption of a policy at a school level. Secondly, as noted above, observable evidence of success of a policy can also be derived from the scientific reports of the effectiveness or success of a particular strategy or intervention. Thus future studies should consider the inclusion of a variable to measure the strength of objective evidence that supports a policy.

Disaggregation of policies may help clarify relevant variables. The study findings also suggest that lumping together policies across topic areas to seek across-the-board determinants may obscure key determinants that are policy-specific. None of the typical variables used in internal determinants models sufficiently explained the variation in policy adoption across all three school health policies examined. Despite this finding, however, models for adoption of policies for Healthy Eating and Physical Activity showed similarities. First, the highest correlations for levels of policy adoption among policy areas were between Healthy Eating and Physical Activity. Second, as presented in Chapter 6, patterns of internal determinants models were very similar for these two policy areas where the percent Democrat and the adjusted rate of lung cancer were statistically significant.

In spite of these results, however, the two variables relevant to healthy eating and physical activity may be obscuring important phenomena. For example, the lung cancer death rates associated with physical activity and healthy eating policy had no association with adoption of tobacco policy where lung cancer was expected to be a factor. Furthermore, among the states with the highest levels of policy adoption (scoring in the highest 40 percent on the School Health Indices collectively), 70 percent are tobacco producers while in the lowest 40 percent group, only one state (Pennsylvania) produces tobacco. Surprisingly, however, the level of tobacco

production was not strongly associated with policy adoption or non-adoption for tobacco nor for physical activity or healthy eating policies.

Based on these results, the data suggest that although internal determinants models may continue to be useful in the study of policy adoption, the components of these models may require substantial overhaul to accommodate the uniqueness of a substantive area of the policy. In addition, the results suggest the importance of disaggregation of policies even beyond groupings such as “education policy” or “welfare policies” used by Gray (1973) since there were observable differences in “school health policy” between the components of healthy eating, physical activity, and tobacco.

Chapter Conclusion

Overall, the three models based on diffusion of innovations theory and internal determinants served as useful frameworks although none of the models alone provided a framework sufficient for understanding differences in school health policy adoption. Both regional and national leaders and laggards were apparent, with notable trends toward consistency in policy adoption and non-adoption among states. States in the south adopted more policies across policy areas; states in the west adopted the fewest. Further, although the study examined differences across substantive policy areas, the most striking finding was that factors relevant to school health policy adoption differed from those relevant to legislative policy. Based on the results, an overhaul is recommended of legislative policy adoption models when used for the study of non-legislative policy. Candidates for new variables include (a) the strength of objective evidence and (b) a measure of observable examples of policy adoption from all levels

of government, not just prior-adopting states. In addition, disaggregation of policies in future studies of policy adoption may help to clarify variables relevant to particular substantive areas.

CHAPTER 8

DISCUSSION

This research began by framing guidelines issued by a federal agency as one of many “tools of government” (Salamon, 2002) used by bureaucrats to affect public policy through non-legislative action. Research findings presented in Chapters 4 through 7 note differences in legislative and non-legislative policy adoption patterns. This chapter elaborates the point and suggests that differences in policy adoption patterns in legislative and non-legislative policy may reflect inherent differences between politics and administration. Further, since non-legislative guidelines are often explicitly science-based, the strength of scientific evidence supporting a policy is suggested as an important variable for future studies of policy adoption, especially for non-legislative policy.

Development of policy tool taxonomies discussed in Chapter 2 have banished the notion that public purposes are being served by a “one size fits all” policy approach. Rather, innovative policy tools have been developed to explicitly address different needs and contemporary purposes. Various policy tool taxonomies classify policy tools by their attributes, the purpose for which they are intended, or their underlying assumptions about what managers believe about how government works. Although progress has been made in classifying non-legislative policy tools, less attention has been given to understanding how each tool functions in its administrative setting.

The patterns of adoption of school health guidelines found in this study did not resemble patterns of legislative policy adoption found in the literature. These findings are consistent with

the argument that different non-legislative tools of government have emerged because they provide new and different strategies to achieve modern policy goals. Further, the findings raise the question of the appropriateness of using models developed for the study of legislation as templates for the study of other tools of government. As was the case for this dissertation, arguments can be mounted in support of testing traditional legislative policy models for non-legislative policy tools. However, evidence from this research challenges the assumption that existing theories and approaches to the study of policy apply equally to legislation and non-legislative policy tools. Future studies on policy adoption must face the reality that policy adoption patterns may be as varied as policy tools themselves.

In any case, the evidence that legislative and non-legislative policy adoption follows different patterns begs the question of whether these differences are related to inherent differences in politics and administration. The “politics-administration dichotomy” (Chandler and Plano, 1982) was suggested by Woodrow Wilson in his 1887 essay which promoted the view that public administration should be kept separate from partisan politics. Max Weber’s 1918 classic justification of the separation of politics and administration was based on his assertion that the unique attributes of a politician are exactly opposite from those of a civil servant: administrators are neutral, competent, and career-long civil servants; politicians are impassioned, often transient representatives of partisanism. Although this view was widely held until shortly before World War II, Paul H. Appleby argued against the politics-administration dichotomy and maintained that public administrators’ involvement in politics acts as a check on the arbitrary exercise of bureaucratic power. Appleby showed how politics and administration are interwoven

in modern bureaucracy, with bureaucrats participating in the development of legislative policy and politicians exerting influence on administration.

In fact, politics and administration may more closely resemble a continuum than a dichotomy, with fluctuations in the degree to which policy relies on neutral, competent civil servants versus partisan politics. In the case of guidelines issued by agency bureaucrats, although both political pressure and bureaucratic expertise may influence policy content, the classic administrative neutral competence may be a stronger factor than political pressure. An important feature of guidelines is that they are crafted by agency bureaucrats who have expertise in the substantive topic of a guideline. In addition, the target audience for recommendations issued in guidelines is frequently other bureaucrats at various intergovernmental levels. Furthermore, delegation of policy creation to an agency level may be an attempt to remove policy from the political arena, relying instead on the decision of substantive experts residing in agencies. Appleby demonstrated that as a consequence of political pressure on the bureaucracy, issues tend to be pushed to the highest levels of the organization for decision, often losing important nuances. However, in the case of school health guidelines, the nuances of policy options are closely and systematically examined by panels of scientific experts, bureaucrats from national, state and local governments, educators, parents, and other members of the general public. Thus, in the case of school health, issuance of federal guidelines may lean heavily toward administration in the classic sense. If this is true, then the differences noted in the research results between legislative policy and non-legislative policy may represent underlying differences between opposite ends of a politics-administration continuum.

Do Politics and Administration Defer to Science?

Donald K. Price asserted that objective research and discussion among professional groups within bureaucracy have the potential to influence policy even beyond political processes (Price, D. K. (1954), *Government and science*. New York: New York University Press, as cited in Rourke, 1984). Noting Price's remarks, Rourke (1984) adds that bureaucracy itself provides a setting in which experts "can get together and work on policy problems" (p. 151). Rourke points out that reform efforts in public administration have often been toward the use of quantitative data as well as new management techniques that "greatly enhance the capacity of administrators to base their decisions upon more solid ground than speculation and hunch" (p. 171).

In examining issues of Constitutional authority, House (1993) suggests that the influence of capitalism in American society has gradually undermined traditional institutions such as family, church, and government. House concludes that there is an absence of authority in bureaucracy. In this "authority vacuum," House says, "science emerges as a basis for making and justifying public and personal decisions" (House, 1993, p. 17). He further states that the need for legitimation is especially acute in government; thus, governments have increasingly turned to appeals of scientific authority.

As noted in Chapter 2, topics addressed through guidelines may range from routine administration to highly technical procedures. Depending on the topic and intent of a guideline, there may also be differences in the way a guideline is formulated. For example, guidelines to standardize procedures and promote consistency in tax code interpretation may be based on the judgment of individual bureaucrats. However, for health guidelines, recommendations are often based on consensus among a group of physicians and scientists. Therefore, unlike some

administrative guidelines, health guidelines can be expected to be highly influenced by the strength of scientific evidence that underlies the guideline.

The diffusion of innovations theory further supports the thesis that the strength of scientific evidence promotes adoption of innovations such as new policies. According to this theory, observability of an innovation promotes its adoption by allowing potential adopters to weigh the risks and advantages to an innovation. For policy innovation, adoption of a policy by a pioneering state provides an opportunity to observe the policy itself, resulting in policy emulation. Another kind of observation that may promote policy adoption is demonstration through scientific research that an intervention will succeed.

Although the plan for this research did not include an analysis of adoption of specific policies that comprised the School Health Indices, such an analysis proved useful. The results of this analysis (Appendix N) show that states more often adopted school health guidelines that were supported by clear and abundant scientific research. For tobacco, policy adoption rates were highest for no-smoking policies for students, no-smoking policies for staff, and a requirement to teach tobacco prevention. Fewer states adopted policies related to prohibitions on wearing tobacco logos and offering tobacco cessation support for students. Scientific evidence is clear and strong that smoking causes lung cancer. Although tobacco logos promote cigarette smoking, the link to cancer is far more distal for tobacco logos than for smoking.

Similarly, for healthy eating and physical activity policies examined, the highest adoption levels were noted for policies requiring that nutrition and lifetime physical activity be taught, and that staff be qualified to teach the respective topics. Curricula that have been shown to be effective in promoting healthy eating and physical activity among school children are readily

available. In contrast, although adequate time to eat and recess periods in elementary school may be associated with higher levels of healthy behavior in children, there is no evidence to suggest that adoption of such a policy directly result in measurable health gains especially in the short term.

For those bureaucrats who are also scientists, the strength of scientific evidence underlying a recommendation should be highly influential in the acceptance or rejection of the recommended practice: simply put, scientists are supposed to be influenced by scientific findings. In agencies which conduct scientific research, organizational culture may promote science-based decision-making. However even among non-scientists, scientific evidence may also guide the action of government administrators. Guidelines that promote practices or policies as “highly recommended” because of strong scientific evidence may be translated by bureaucrats to “high priority” policy action areas. Using recommendations based on the strength of scientific evidence as a basis for action provides public administrators a convenient and defensible strategy for selecting among a myriad of policy options.

Most often, public health guidelines explicitly state the scientific basis for each recommendation, often including an assessment of the strength of scientific evidence. For example, the U.S. Preventive Services Task Force Guidelines for Community Preventive Services developed largely through the work of the U. S. Centers for Disease Control and Prevention (CDC), has a standard rating system for guidelines ranging from “strongly recommended” to “insufficient evidence” to support widespread adoption of community-based health interventions (Hopkins, Husten, Fielding, Rosenquist, and Westphal, 2001). In the current

public health culture, emphasis is placed on selecting interventions which with demonstrated effectiveness. This emphasis may also impact the selection of policies as well as interventions.

Not only does a preponderance of scientific evidence influence policy in the process of creation of guidelines, scientific evidence may influence policy adoption through judicial channels. For example, when an increasing body of scientific evidence showed the harmful health effects of second hand tobacco smoke, policy action was ignited for smoke-free workplaces. Media coverage increased especially from lawsuits that drew attention to the issue. Ultimately, when lawsuits were decided in favor of plaintiffs who suffered ill health effects, both legislative and non-legislative smoke-free policies proliferated.

Are Liberals More Hopeful or More Fond of Formal Policy?

The findings of the internal determinants model examined in this research lend support to the idea that liberal-minded citizens may be more apt than conservatives to support government interventions based on science in order to address social problems. For the school health policies examined, among the 19 variables included in the internal determinants model, the strongest correlation was found between the number of policies adopted and the percent of a state's population which voted for the Democratic presidential candidate in the 2000 election. The belief that science can be used to address problems was a foundation for the Great Society Programs of the Democratic Johnson Administration in the 1960s. Weiss summarizes the origins of these programs:

There was much hoopla about the rationality that social science would bring to the untidy world of government. It would provide hard data for planning...and give cause-and-effect theories for policymaking, so that statesmen would know which variables to alter in order to effect the desired outcomes. (Weiss, 1977, p. 4)

Democratic partisanship is often associated not only with a liberal attitude but, as Weiss suggests, it may also be associated with a proclivity for science-based intervention.

In addition to liberal mindedness, other personality characteristics may influence support for new policy strategies. For example, Everett Rogers in Diffusion of Innovations (1995) notes certain personality variables associated with early adoption of an innovation:

Earlier adopters have a more favorable attitude toward change than later adopters...Earlier adopters have a more favorable attitude toward science than later adopters...Earlier adopters are less fatalistic than later adopters... (Rogers, 1995, p. 273).

The results of the school health policies analyses show that states with a higher percentage of Democratic voters were earlier adopters of the policy innovations recommended by CDC. Policy studies typically include a variable related to political partisanship; however the questions that arise from this study invite further investigation to examine partisanism more deeply. Although voting patterns offer some insight into citizen behavior, voter behavior almost certainly arises from more nuanced differences than partisan association. As argued above, diffusion of innovations theory offers guidance on potential variables that can be disentangled from such blunt measures as “Democrat” and “Republican” or even “liberal” and “conservative.”

Is Science the Bedrock for All Policy Adoption?

The findings in this study also have implications for theoretical models of policy adoption. As one example, the assertion that the strength of scientific evidence is an important variable in policy adoption challenges the “policy streams” model advocated by Kingdon (1995). In his seminal work on adoption of legislative policies, Kingdon (1995) asserted that a “policy window” opens when an opportunity arises for policy adoption. Kingdon argues that attention

directed toward a policy issue waxes and wanes. When attention is focused on a particular policy issue, the chances of a legislative policy being adopted increases. He says, however, “Once the window opens, it does not stay open long” (Kingdon, 1995, p. 169). Kingdon’s model, however, fails to account for policies that gain momentum because of mounting scientific evidence. In fact, mounting scientific evidence may arouse issue advocates, strengthen the case of policy entrepreneurs, and draw attention to a public issue. Thus, scientific evidence may indeed form the bedrock for some of the “policy streams” in Kingdon’s model.

How Does This Apply to Practice?

As a public administration practitioner at the CDC, I bring my own experiences and, to the extent that I cannot suppress them, my own biases. It is my belief that public administration research must link to practice, especially when data are derived from real-world public administration. For this study, public health practitioners were involved from the outset of the study albeit informally. Colleagues throughout CDC, including many with work experience in state health departments, were informally consulted on the choice of study topic. They urged a focus on public health guidelines in order to understand better the impact of their own work. Experts in CDC’s Division of Adolescent and School Health provided consultation on the SHPPS data set as well as many insights into school health policy and practices at the state, district and local levels. As the study progressed, colleagues in nutrition, physical activity, tobacco, school health, chronic disease, and health policy suggested potential variables. When preliminary analyses were complete, these colleagues volunteered to provide informal feedback on preliminary study results in order to suggest further analyses. In every case, these

practitioners were keenly interested in public administration research and eager to understand and apply the results of this investigation.

Although a formal assessment of public health practitioners' reactions to this study was not included in the protocol for this research, as discussed in Chapter 3, the informal feedback received from colleagues suggest additional areas for future studies. If, as this study suggests, policy adoption is related to the strength of scientific evidence, an area for future study is understanding how practitioners perceive evidence-based information and apply it to their work. CDC has taken the step of assigning an explicit rating system to characterize the strength of scientific evidence that underlies agency recommendations. Absent this CDC interpretation, how do practitioners obtain strength-of-evidence data, make judgments about it, and apply it to their work? Are there differences when scientific results overturn current beliefs, rather than merely fill information gaps?

Although colleagues were keenly interested and eager to understand the study results, research is warranted to understand how practitioners interpret data if presented in different formats, especially if information on the strength of evidence is not featured prominently. This raises the question of what responsibility public administration researchers hold for providing practitioners with relevant, clear, and understandable data. As often noted in discussions of research-versus-practice in public administration, a gap may exist between the skills of researchers and practitioners in interpreting data such as statistical tables. Many times, this gap is the basis for arguments in favor of changing master's level practitioner-oriented public administration programs to include more research courses. Until this gap disappears however, there is a strong potential for research results to go unused in practice. Researchers in public

administration must consider themselves not only scholars, but public servants. As such, they must remain cognizant that practitioners constitute an important audience.

The next and final chapter presents a summary of conclusions and a list of potential areas for future research.

CHAPTER 9

CONCLUSION

Guidelines constitute an important example of a non-legislative policy tool of government widely used in contemporary public administration. Although this study examined a small set of school health guidelines for healthy eating, physical activity and tobacco promulgated by the U. S. Centers for Disease Control and Prevention, the study results have implications both for school health as well as for public administration theory.

Summary of Conclusions

First, the study demonstrated the illusive nature of policy adoption studies. Despite the use of three widely-used models, at most about 23 percent of the variability in policy adoption could be explained by the models. Additional refinements in policy adoption models are needed, especially for emerging tools of government.

Second, the study results suggested that among the 50 United States and the District of Columbia, there are consistent leaders and laggards both at a national level as well as within geographic regions. Policy adoption levels were highest in southern states and lowest in the west.

Third, results show that leader and laggard states are different for legislative and non-legislative policy. In addition, variables important to the study of legislative policy appeared largely irrelevant to the study of non-legislative policy. Based on these results, it is suggested that differences among tools of government extend beyond their operational features but may also show differences in adoption patterns.

Fourth, disaggregation of policies yields important information that may be overlooked in studies that assess policies as a group that span many different substantive areas. Narrowly focused studies capture important nuances relevant to policy models that cannot be captured in large, aggregate studies. Case studies and other qualitative approaches are needed to expand the base of scientific evidence for policy adoption.

Fifth, the strength of scientific evidence appeared to be related to policy adoption levels across policy areas. These findings suggest that the strength of scientific evidence underlying a policy may be a key variable in policy adoption studies.

Sixth, the relationship between the percent of Democratic voters in a state and higher levels of policy adoption raises the question of whether liberal-minded citizens are generally more likely to favor formal policy adoption over local control. In addition to measures such as political partisanship, other citizen personality characteristics should be examined in order to develop a more nuanced understanding of the adoption of innovations such as new policies.

Recommendations for Future Studies

Organizing research around the framework of tools of government proved useful and informative. Study results showed differences between legislative and non-legislative policy adoption. To the extent that policy adoption theories have been built on empirical evidence of legislative policy, this study suggests that there is a crack in the foundation. Fertile areas for future research include studies to more closely examine differences in adoption of legislative and non-legislative policies. Further, studies should also investigate potential differences among non-legislative policy tools just as distinctions have been made in types of legislation.

The study findings also suggest the continuing importance of using different models synergistically to understand public administration phenomena. The three models used in this study offered the benefit of different perspectives as well as the convergence of evidence within the study to support conclusions. Although public administration researchers will undoubtedly continue to promote the advantages of their preferred models, more can be learned by future studies which used a mixed-methods approach. Future studies should incorporate a mixed-method approach including rigorous qualitative methods investigations. Such methods which are currently under-utilized in public administration and offer the potential to explore untapped explanations of variability in policy behavior. With the current lack of consensus in the field with regard to models of policy adoption, fresh approaches can only serve to broaden and strengthen the base of empirical evidence from which a lasting theory can be derived.

Although “large n” studies are popular in public administration research, academic pressure to draw generalizable conclusions necessarily sacrifices more highly nuanced understanding of public administration that can be gleaned from studies with a narrow focus and great depth. Therefore intensive studies are needed to uncover important variables that may be obscured when policies are studied in the aggregate, especially across unrelated policy areas.

Finally, the results suggest that a promising area of future research includes pursuit of the thesis that the strength of scientific evidence drives policy adoption by its influence on policy options, policy actors, and political support. For the last 60 years, scientific research has been promoted as a way to understand important social questions and address the ills of society. If the results of scientific research are indeed influencing public decision-making, we owe thanks to

bureaucrats who translate scientific findings into government policy for the goal of social betterment.

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APPENDIX A

GUIDELINES FOR SCHOOL HEALTH PROGRAMS

TO PREVENT TOBACCO USE AND ADDICTION



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*Recommendations
and
Reports*

MORBIDITY AND MORTALITY WEEKLY REPORT

Guidelines for School Health Programs to Prevent Tobacco Use and Addiction

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control
and Prevention (CDC)
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Guidelines for School Health Programs to Prevent Tobacco Use and Addiction

Summary

Tobacco use is the leading cause of preventable death in the United States. The majority of daily smokers (82%) began smoking before 18 years of age, and more than 3,000 young persons begin smoking each day. School programs designed to prevent tobacco use could become one of the most effective strategies available to reduce tobacco use in the United States. The following guidelines summarize school-based strategies most likely to be effective in preventing tobacco use among youth. They were developed by CDC in collaboration with experts from 29 national, federal, and voluntary agencies and with other leading authorities in the field of tobacco-use prevention to help school personnel implement effective tobacco-use prevention programs. These guidelines are based on an in-depth review of research, theory, and current practice in the area of school-based tobacco-use prevention. The guidelines recommend that all schools a) develop and enforce a school policy on tobacco use, b) provide instruction about the short- and long-term negative physiologic and social consequences of tobacco use, social influences on tobacco use, peer norms regarding tobacco use, and refusal skills, c) provide tobacco-use prevention education in kindergarten through 12th grade, d) provide program-specific training for teachers, e) involve parents or families in support of school-based programs to prevent tobacco use, f) support cessation efforts among students and all school staff who use tobacco, and g) assess the tobacco-use prevention program at regular intervals.

INTRODUCTION

Tobacco use is the single most preventable cause of death in the United States (1). Illnesses caused by tobacco use increase demands on the U.S. health-care system; lost productivity amounts to billions of dollars annually (2–3).

Because four out of every five persons who use tobacco begin before they reach adulthood (1), tobacco-prevention activities should focus on school-age children and adolescents. Evidence suggests that school health programs can be an effective means of preventing tobacco use among youth (4–7). The guidelines in this report have been developed to help school personnel plan, implement, and assess educational programs and school policies to prevent tobacco use and the unnecessary addiction, disease, and death tobacco use causes. Although these guidelines address school programs for kindergarten through 12th grade, persons working with youth in other settings also may find the guidelines useful.

The guidelines are based on a synthesis of results of research, theory, and current practice in tobacco-use prevention. To develop these guidelines, CDC staff convened meetings of experts from the fields of tobacco-use prevention and education, reviewed published research, and considered the conclusions of the National Cancer Institute Expert Advisory Panel on School-Based Smoking Prevention Programs (4)

and the findings of the 1994 Surgeon General's Report, *Preventing Tobacco Use Among Young People* (8).

CDC developed these guidelines in consultation with experts representing the following organizations:

- American Academy of Pediatrics
- American Association of School Administrators
- American Cancer Society
- American Federation of Teachers
- American Heart Association
- American Lung Association
- American Medical Association
- Association of State and Territorial Directors of Public Health Education
- Association of State and Territorial Health Officials
- Council of Chief State School Officers
- Health Resources and Services Administration
- Indian Health Service
- National Association of School Nurses
- National Association of Secondary School Principals
- National Association of State Boards of Education
- National Cancer Institute
- National Center for Nursing Research
- National Congress of Parents and Teachers
- National Education Association
- National Heart, Lung, and Blood Institute
- National Institute of Child Health and Human Development
- National School Boards Association
- National School Health Education Coalition
- Office of Disease Prevention and Health Promotion
- Office of Minority Health
- Substance Abuse and Mental Health Services Administration
- The Society of State Directors of Health, Physical Education, and Recreation
- U.S. Department of Education
- Western Consortium for Public Health

BACKGROUND

School-based programs to prevent tobacco use can make a substantial contribution to the health of the next generation. In this report, the term "tobacco use" refers to the use of any nicotine-containing tobacco product, such as cigarettes, cigars, and smokeless tobacco. These products often contain additional substances (e.g., benzo(a)pyrene, vinyl chloride, polonium 210) that cause cancer in animals and humans (1). Recent estimates suggest that cigarette smoking annually causes more than 400,000 premature deaths and 5 million years of potential life lost (2). The estimated direct and indirect costs associated with smoking in the United States in 1990 totalled \$68 billion (3).

In 1964, the Surgeon General's first report on smoking and health documented that cigarette smoking causes chronic bronchitis and lung and laryngeal cancer in men (9).

Subsequent reports from the Surgeon General's office have documented that smoking causes coronary heart disease (10), atherosclerotic peripheral vascular disease (1), cerebrovascular disease (1), chronic obstructive pulmonary disease (including emphysema) (11), intrauterine growth retardation (1), lung and laryngeal cancers in women (12), oral cancer (13), esophageal cancer (13), and cancer of the urinary bladder (14). Cigarette smoking also contributes to cancers of the pancreas, kidney, and cervix (1,14). Further, low birth weight and approximately 10% of infant mortality have been attributed to tobacco use by pregnant mothers (1). The 1994 Surgeon General's report on smoking and health describes numerous adverse health conditions caused by tobacco use among adolescents, including reductions in the rate of lung growth and in the level of maximum lung function, increases in the number and severity of respiratory illnesses, and unfavorable effects on blood lipid levels (which may accelerate development of cardiovascular diseases) (8).

Breathing environmental tobacco smoke—including sidestream and exhaled smoke from cigarettes, cigars, and pipes—also causes serious health problems (15–16). For example, exposure to environmental tobacco smoke increases the risk for lung cancer and respiratory infections among nonsmokers and may inhibit the development of optimal lung function among children of smokers (16). Exposure to environmental tobacco smoke also may increase the risk for heart disease among nonsmokers (17–18). The Environmental Protection Agency recently classified environmental tobacco smoke as a Group A carcinogen, a category that includes asbestos, benzene, and arsenic (19).

Use of smokeless tobacco, including chewing tobacco and snuff, also can be harmful to health. A report of the Advisory Committee to the Surgeon General indicated that using smokeless tobacco causes oral cancer and leukoplakia (20). Early signs of these diseases, particularly periodontal degeneration and soft tissue lesions, are found among young people who use smokeless tobacco (8).

Tobacco use is addictive and is responsible for more than one of every five deaths in the United States. However, many children and adolescents do not understand the nature of tobacco addiction and are unaware of, or underestimate, the important health consequences of tobacco use (1). On average, more than 3,000 young persons, most of them children and teenagers, begin smoking each day in the United States (21). Approximately 82% of adults ages 30–39 years who ever smoked daily tried their first cigarette before 18 years of age (8). National surveys indicate that 70% of high school students have tried cigarette smoking and that more than one-fourth (28%) reported having smoked cigarettes during the past 30 days (22).

THE NEED FOR SCHOOL HEALTH PROGRAMS TO PREVENT TOBACCO USE AND ADDICTION

The challenge to provide effective tobacco-use prevention programs to all young persons is an ethical imperative. Schools are ideal settings in which to provide such programs to all children and adolescents. School-based tobacco prevention education programs that focus on skills training approaches have proven effective in reducing the onset of smoking, according to numerous independent studies. A summary of findings from these studies demonstrates positive outcomes across programs that vary in format, scope, and delivery method (8).

To be most effective, school-based programs must target young persons before they initiate tobacco use or drop out of school. In 1992, 18% of surveyed U.S. high school seniors reported smoking their first cigarette in elementary school, and 30% started in grades seven to nine (23). Among persons age 17–18 years surveyed in 1989, substantially more high school dropouts (43%) than high school attendees or graduates (17%) had smoked cigarettes during the week preceding the survey (24).

Because considerable numbers of students begin using tobacco at or after age 15, tobacco-prevention education must be continued throughout high school. Among high school seniors surveyed in 1991 who had ever smoked a whole cigarette, 37% initiated smoking at age 15 or older (grades 10–12).

School-based programs offer an opportunity to prevent the initiation of tobacco use and therefore help persons avoid the difficulties of trying to stop after they are addicted to nicotine. The majority of current smokers (83%) wish they had never started smoking, and nearly one-third of all smokers quit for at least a day each year (25). Most smokers (93%) who try to quit resume regular smoking within 1 year (21,26). Of those persons who successfully quit smoking for 1 year or longer, one-third eventually relapse (14).

By experimenting with tobacco, young persons place themselves at risk for nicotine addiction. Persons who start smoking early have more difficulty quitting, are more likely to become heavy smokers, and are more likely to develop a smoking-related disease (1,27). Between 1975 and 1985, approximately 75% of persons who had smoked daily during high school were daily smokers 7–9 years later; however, only 5% of those persons had predicted as high school students that they would “definitely” smoke 5 years later (23). Smoking is addictive; three out of four teenagers who smoke have made at least one serious, yet unsuccessful, effort to quit (28). The 1994 Surgeon General’s report on smoking and health concludes that the probability of becoming addicted to nicotine after any exposure is higher than that for other addictive substances (e.g., heroin, cocaine, or alcohol). Further, nicotine addiction in young people follows fundamentally the same process as in adults, resulting in withdrawal symptoms and failed attempts to quit (8). Thus, cessation programs are needed to help the young persons who already use tobacco (4).

School-based programs to prevent tobacco use should be provided for students of all ethnic/racial groups. In high school, more white (31%) and Hispanic (25%) students than black students (13%) are current smokers (29). Although ages and rates of initiation vary by race and ethnicity, tobacco use is a problem for all ethnic/racial groups. Given the diversity of cultures represented in many schools, it is important to tailor prevention programs for particular ethnic/racial subgroups of students. However, programs should be sensitive to, and representative of, a student population that is multicultural, multiethnic, and socio-economically diverse.

Effective school-based programs to prevent tobacco use are equally important for both male and female students. From 1975 to 1987, daily smoking rates among 12th-grade females were as high or higher than males. Since 1988, smoking rates for males and females have been nearly identical (23). However, rates of smokeless tobacco use differ by sex: in 1991, 19% of male high school students and only 1% of females reported use during the past 30 days (22). Given the growing popularity of smokeless tobacco use, particularly among males (30), and given the prevalent misconception

that smokeless tobacco is safe (23), school-based programs to prevent tobacco use must pointedly discourage the use of smokeless tobacco.

Despite gains made in the 1970s, progress in reducing smoking prevalence among adolescents slowed dramatically in the 1980s. For example, the percentage of seniors who report that they smoked on one or more days during the past month has remained unchanged since 1980—at approximately 29% (23). Further, despite negative publicity and restrictive legislation regarding tobacco use, the proportion of high school seniors who perceive that cigarette users are at great risk for physical or other harm from smoking a pack a day or more has increased only minimally—from 64% in 1980 to 69% in 1992 (23). Thus, efforts to prevent the initiation of tobacco use among children and adolescents must be intensified.

School-based programs to prevent tobacco use also can contribute to preventing the use of illicit drugs, such as marijuana and cocaine, especially if such programs are also designed to prevent the use of these substances (31). Tobacco is one of the most commonly available and widely used drugs, and its use results in the most widespread drug dependency. Use of other drugs, such as marijuana and cocaine, is often preceded by the use of tobacco or alcohol. Although most young persons who use tobacco do not use illicit drugs, when further drug involvement does occur, it is typically sequential—from use of tobacco or alcohol to use of marijuana, and from marijuana to other illicit drugs or prescription psychoactive drugs (32). This sequence may reflect, in part, the widespread availability, acceptability, and use of tobacco and alcohol, as well as common underlying causes of drug use, such as risk-seeking patterns of behavior and deficits in communication and refusal skills. Recent reports on preventing drug abuse suggest that approaches effective in preventing tobacco use can also help prevent the use of alcohol and other drugs (33–35).

PURPOSES OF SCHOOL HEALTH PROGRAMS TO PREVENT TOBACCO USE AND ADDICTION

School-based health programs should enable and encourage children and adolescents who have not experimented with tobacco to continue to abstain from any use. For young persons who have experimented with tobacco use, or who are regular tobacco users, school health programs should enable and encourage them to immediately stop all use. For those young persons who are unable to stop using tobacco, school programs should help them seek additional assistance to successfully quit the use of tobacco.

NATIONAL HEALTH OBJECTIVES, NATIONAL EDUCATION GOALS, AND THE YOUTH RISK BEHAVIOR SURVEILLANCE SYSTEM

CDC's *Guidelines for School Health Programs to Prevent Tobacco Use and Addiction* were designed in part to help attain published national health objectives and education goals. In September 1990, 300 national health objectives were released by the Secretary of the Department of Health and Human Services as part of *Healthy People 2000: National Health Promotion and Disease Prevention Objectives* (36). The

objectives were designed to guide health promotion and disease prevention policy and programs at the federal, state, and local levels throughout the 1990s. School-based programs to prevent tobacco use can help accomplish the following objectives from *Healthy People 2000* (37):

- 3.4 Reduce cigarette smoking to a prevalence of no more than 15% among people aged 20 and older. (Baseline: 29% in 1987)
- 3.5 Reduce the initiation of cigarette smoking by children and youth so that no more than 15% have become regular cigarette smokers by age 20. (Baseline: 30% in 1987)
- 3.7 Increase smoking cessation during pregnancy so that at least 60% of women who are cigarette smokers at the time they become pregnant quit smoking early in pregnancy and maintain abstinence for the remainder of their pregnancy. (Baseline: 39% in 1985)
- 3.8 Reduce to no more than 20% the proportion of children aged 6 and younger who are regularly exposed to tobacco smoke at home (Baseline: 39% in 1986)
- 3.9 Reduce smokeless tobacco use by males aged 12 through 24 to a prevalence of no more than 4%. (Baseline: 6.6% for age 12–17 in 1988)
- 3.10 Establish tobacco-free environments and include tobacco use prevention in the curricula of all elementary, middle, and secondary schools, preferably as part of quality [comprehensive] school health education. (Baseline: 17% of school districts were smoke-free, and 75%–81% of school districts offered antismoking education in 1988)
- 3.11 Increase to at least 75% the proportion of worksites [such as schools] with a formal smoking policy that prohibits or severely restricts smoking at the workplace. (Baseline: 54% of medium and large companies in 1987)
- 3.12 Enact in 50 states comprehensive laws on clean indoor air that prohibit or strictly limit smoking in the workplace and enclosed public places [such as schools]. (Baseline: 13 states in 1988)

School-based programs to prevent tobacco use can also help accomplish one of the six National Education Goals (38): By the year 2000, every school in America will be free of drugs and violence and will offer a disciplined environment conducive to learning (Goal 6).

In 1990, CDC established the Youth Risk Behavior Surveillance System to help monitor progress toward attaining national health and education objectives by periodically measuring the prevalence of six categories of health risk behaviors usually established during youth that contribute to the leading causes of death and disease (39); tobacco use is one of the six categories. CDC conducts a biennial Youth Risk Behavior Survey (YRBS) of a national probability sample of high school students and also enables interested state and local education agencies to conduct the YRBS with comparable probability samples of high school students in those states and cities (22). The specific tobacco-use behaviors monitored by the YRBS include (40):

- ever tried cigarette smoking
- age when first smoked a whole cigarette
- ever smoked cigarettes regularly (one cigarette every day for 30 days)

- age when first smoked regularly
- number of days during past month that cigarettes were smoked
- number of cigarettes smoked per day during past month
- number of days during past month that cigarettes were smoked on school property
- ever tried to quit smoking cigarettes during past six months
- any use of chewing tobacco or snuff during past month
- any use of chewing tobacco or snuff during past month on school property.

States and large cities are encouraged to use the YRBS periodically to monitor the comparative prevalence of tobacco use among school students in their jurisdictions, and school officials are encouraged to implement programs specifically designed to reduce these behaviors. These national, state, and local data are being used to monitor progress in reducing tobacco use among youth and to monitor relevant national health objectives and education goals.

RECOMMENDATIONS FOR SCHOOL HEALTH PROGRAMS TO PREVENT TOBACCO USE AND ADDICTION

The seven recommendations below summarize strategies that are effective in preventing tobacco use among youth. To ensure the greatest impact, schools should implement all seven recommendations.

1. Develop and enforce a school policy on tobacco use.
2. Provide instruction about the short- and long-term negative physiologic and social consequences of tobacco use, social influences on tobacco use, peer norms regarding tobacco use, and refusal skills.
3. Provide tobacco-use prevention education in kindergarten through 12th grade; this instruction should be especially intensive in junior high or middle school and should be reinforced in high school.
4. Provide program-specific training for teachers.
5. Involve parents or families in support of school-based programs to prevent tobacco use.
6. Support cessation efforts among students and all school staff who use tobacco.
7. Assess the tobacco-use prevention program at regular intervals.

Discussion of Recommendations

Recommendation 1: Develop and enforce a school policy on tobacco use.

A school policy on tobacco use must be consistent with state and local laws and should include the following elements (41):

- An explanation of the rationale for preventing tobacco use (i.e., tobacco is the leading cause of death, disease, and disability)
- Prohibitions against tobacco use by students, all school staff, parents, and visitors on school property, in school vehicles, and at school-sponsored functions away from school property

- Prohibitions against tobacco advertising in school buildings, at school functions, and in school publications
- A requirement that all students receive instruction on avoiding tobacco use
- Provisions for students and all school staff to have access to programs to help them quit using tobacco
- Procedures for communicating the policy to students, all school staff, parents or families, visitors, and the community
- Provisions for enforcing the policy

To ensure broad support for school policies on tobacco use, representatives of relevant groups, such as students, parents, school staff and their unions, and school board members, should participate in developing and implementing the policy. Examples of policies have been published (41), and additional samples can be obtained from state and local boards of education.

Clearly articulated school policies, applied fairly and consistently, can help students decide not to use tobacco (42). Policies that prohibit tobacco use on school property, require prevention education, and provide access to cessation programs rather than solely instituting punitive measures are most effective in reducing tobacco use among students (43).

A tobacco-free school environment can provide health, social, and economic benefits for students, staff, the school, and the district (41). These benefits include decreased fires and discipline problems related to student smoking, improved compliance with local and state smoking ordinances, and easier upkeep and maintenance of school facilities and grounds.

Recommendation 2: Provide instruction about the short- and long-term negative physiologic and social consequences of tobacco use, social influences on tobacco use, peer norms regarding tobacco use, and refusal skills.

Some tobacco-use prevention programs have been limited to providing only factual information about the harmful effects of tobacco use. Other programs have attempted to induce fear in young persons about the consequences of use (44). However, these strategies alone do not prevent tobacco use, may stimulate curiosity about tobacco use, and may prompt some students to believe that the health hazards of tobacco use are exaggerated (45–47).

Successful programs to prevent tobacco use address multiple psychosocial factors related to tobacco use among children and adolescents (48–51). These factors include:

- **Immediate and long-term undesirable physiologic, cosmetic, and social consequences of tobacco use.** Programs should help students understand that tobacco use can result in decreased stamina, stained teeth, foul-smelling breath and clothes, exacerbation of asthma, and ostracism by nonsmoking peers.
- **Social norms regarding tobacco use.** Programs should use a variety of educational techniques to decrease the social acceptability of tobacco use, highlight existing antitobacco norms, and help students understand that most adolescents do not smoke.

- **Reasons that adolescents say they smoke.** Programs should help students understand that some adolescents smoke because they believe it will help them be accepted by peers, appear mature, or cope with stress. Programs should help students develop other more positive means to attain such goals.
- **Social influences that promote tobacco use.** Programs should help students develop skills in recognizing and refuting tobacco-promotion messages from the media, adults, and peers.
- **Behavioral skills for resisting social influences that promote tobacco use.** Programs should help students develop refusal skills through direct instruction, modeling, rehearsal, and reinforcement, and should coach them to help others develop these skills.
- **General personal and social skills.** Programs should help students develop necessary assertiveness, communication, goal-setting, and problem-solving skills that may enable them to avoid both tobacco use and other health risk behaviors.

School-based programs should systematically address these psychosocial factors at developmentally appropriate ages. Particular instructional concepts should be provided for students in early elementary school, later elementary school, junior high or middle school, and senior high school (Table 1). Local school districts and schools should review these concepts in accordance with student needs and educational policies to determine in which grades students should receive particular instruction.

Recommendation 3: Provide tobacco-use prevention education in kindergarten through 12th grade. This instruction should be especially intensive in junior high or middle school and should be reinforced in high school.

Education to prevent tobacco use should be provided to students in each grade, from kindergarten through 12th grade (4). Because tobacco use often begins in grades six through eight, more intensive instructional programs should be provided for these grade levels (4–5). Particularly important is the year of entry into junior high or middle school when new students are exposed to older students who use tobacco at higher rates. Thereafter, annual prevention education should be provided. Without continued reinforcement throughout high school, successes in preventing tobacco use dissipate over time (52,53). Studies indicate that increases in the intensity and duration of education to prevent tobacco use result in concomitant increases in effectiveness (54–56).

Most evidence demonstrating the effectiveness of school-based prevention of tobacco use is derived from studies of schools in which classroom curricula focused exclusively on tobacco use. Other evidence suggests that tobacco-use prevention also can be effective when appropriately embedded within broader curricula for preventing drug and alcohol use (57) or within comprehensive curricula for school health education (31). The effectiveness of school-based efforts to prevent tobacco use appears to be enhanced by the addition of targeted communitywide programs that address the role of families, community organizations, tobacco-related policies, anti-tobacco advertising, and other elements of adolescents' social environment (8).

Because tobacco use is one of several interrelated health risk behaviors addressed by schools, CDC recommends that tobacco-use-prevention programs be integrated as

TABLE 1. Instructional concepts (kindergarten through grade twelve)

Early Elementary School	Later Elementary School
<p>KNOWLEDGE: Students will learn that</p> <ul style="list-style-type: none"> • A drug is a chemical that changes how the body works. • All forms of tobacco contain a drug called nicotine. • Tobacco use includes cigarettes and smokeless tobacco. • Tobacco use is harmful to health. • Stopping tobacco use has short-term and long-term benefits. • Many persons who use tobacco have trouble stopping. • Tobacco smoke in the air is dangerous to anyone who breathes it. • Many fires are caused by persons who smoke. • Some advertisements try to persuade persons to use tobacco. • Most young persons and adults do not use tobacco. • persons who choose to use tobacco are not bad persons. 	<p>KNOWLEDGE: Students will learn that</p> <ul style="list-style-type: none"> • Stopping tobacco use has short- and long-term benefits* • Environmental tobacco smoke is dangerous to health.* • Most young persons and adults do not use tobacco* • Nicotine, contained in all forms of tobacco, is an addictive drug. • Tobacco use has short-term and long-term physiologic and cosmetic consequences. • Personal feelings, family, peers, and the media influence decisions about tobacco use. • Tobacco advertising is often directed toward young persons • Young persons can resist pressure to use tobacco. • Laws, rules, and policies regulate the sale and use of tobacco.
<p>ATTITUDES: Students will demonstrate</p> <ul style="list-style-type: none"> • A personal commitment not to use tobacco. • Pride about choosing not to use tobacco. 	<p>ATTITUDES: Students will demonstrate</p> <ul style="list-style-type: none"> • A personal commitment not to use tobacco* • Pride about choosing not to use tobacco* • Support for others' decisions not to use tobacco • Responsibility for personal health.

* These concepts reinforce content introduced during earlier grades.

TABLE 1. Instructional concepts (kindergarten through grade twelve), continued

SKILLS: Students will be able to	SKILLS: Students will be able to
<ul style="list-style-type: none"> • Communicate knowledge and personal attitudes about tobacco use. • Encourage other persons not to use tobacco. 	<ul style="list-style-type: none"> • Communicate knowledge and personal attitudes about tobacco use.* • Encourage other persons not to use tobacco.* • Demonstrate skills to resist tobacco use. • State the benefits of a smoke-free environment. • Develop counterarguments to tobacco advertisements and other promotional materials • Support persons who are trying to stop using tobacco.
Middle School/ Junior High School	Senior High School
KNOWLEDGE: Students will learn that	KNOWLEDGE: Students will learn that
<ul style="list-style-type: none"> • Most young persons and adults do not smoke.* • Laws, rules, and policies regulate the sale and use of tobacco.* • Tobacco manufacturers use various strategies to direct advertisements toward young persons, such as “image” advertising.* • Tobacco use has short- and long-term physiologic, cosmetic, social, and economic consequences.* • Cigarette smoking and smokeless tobacco use have direct health consequences.* • Maintaining a tobacco-free environment has health benefits. • Tobacco use is an unhealthy way to manage stress or weight. • Community organizations have information about tobacco use and can help persons stop using tobacco. • Smoking cessation programs can be successful. • Tobacco contains other harmful substances in addition to nicotine. 	<ul style="list-style-type: none"> • Most young persons and adults do not smoke.* • Tobacco use has short- and long-term physiologic, cosmetic, social, and economic consequences.* • Cigarette smoking and smokeless tobacco use have direct health consequences.* • Community organizations have information about tobacco use and can help persons stop using tobacco.* • Smoking cessation programs can be successful.* • Tobacco use is an unhealthy way to manage stress or weight.* • Tobacco use during pregnancy has harmful effects on the fetus. • Schools and community organizations can promote a smoke-free environment. • Many persons find it hard to stop using tobacco, despite knowledge about the health hazards of tobacco use.

* These concepts reinforce content introduced during earlier grades.

TABLE 1. Instructional concepts (kindergarten through grade twelve), continued

ATTITUDES: Students will demonstrate	ATTITUDES: Students will demonstrate
<ul style="list-style-type: none"> • A personal commitment not to use tobacco.* • Pride about choosing not to use tobacco.* • Responsibility for personal health.* • Support for others' decisions not to use tobacco.* • Confidence in personal ability to resist tobacco use. 	<ul style="list-style-type: none"> • A personal commitment not to use tobacco.* • Pride about choosing not to use tobacco.* • Responsibility for personal health.* • Support for others' decisions not to use tobacco.* • Confidence in personal ability to resist tobacco use.* • Willingness to use school and community resources for information about, and help with, resisting or quitting tobacco use.
SKILLS: Students will be able to	SKILLS: Students will be able to
<ul style="list-style-type: none"> • Encourage other persons not to use tobacco.* • Support persons who are trying to stop using tobacco.* • Communicate knowledge and personal attitudes about tobacco use.* • Demonstrate skills to resist tobacco use.* • Identify and counter strategies used in tobacco advertisements and other promotional materials.* • Develop methods for coping with tobacco use by parents and with other difficult personal situations, such as peer pressure to use tobacco. • Request a smoke-free environment. 	<ul style="list-style-type: none"> • Encourage other persons not to use tobacco.* • Support persons who are trying to stop using tobacco.* • Communicate knowledge and personal attitudes about tobacco use.* • Demonstrate skills to resist tobacco use.* • Identify and counter strategies used in tobacco advertisements and other promotional materials.* • Develop methods for coping with tobacco use by parents and with other difficult personal situations, such as peer pressure to use tobacco.* • Use school and community resources for information about and help with, resisting or quitting tobacco use. • Initiate school and community action to support a smoke-free environment.

* These concepts reinforce content introduced during earlier grades.

part of comprehensive school health education within the broader school health program (58).

Recommendation 4: Provide program-specific training for teachers.

Adequate curriculum implementation and overall program effectiveness are enhanced when teachers are trained to deliver the program as planned (59,60). Teachers should be trained to recognize the importance of carefully and completely implementing the selected program. Teachers also should become familiar with the underlying theory and conceptual framework of the program as well as with the content of these guidelines. The training should include a review of the program content and a modeling of program activities by skilled trainers. Teachers should be given opportunity to practice implementing program activities. Studies indicate that in-person training and review of curriculum-specific activities contribute to greater compliance with prescribed program components (4,5,61,62).

Some programs may elect to include peer leaders as part of the instructional strategy. By modeling social skills (63) and leading role rehearsals (64), peer leaders can help counteract social pressures on youth to use tobacco. These students must receive training to ensure accurate presentation of skills and information. Although peer-leader programs can offer an important adjunct to teacher-led instruction, such programs require additional time and effort to initiate and maintain.

Recommendation 5: Involve parents or families in support of school-based programs to prevent tobacco use.

Parents or families can play an important role in providing social and environmental support for nonsmoking. Schools can capitalize on this influence by involving parents or families in program planning, in soliciting community support for programs, and in reinforcing educational messages at home. Homework assignments involving parents or families increase the likelihood that smoking is discussed at home and motivate adult smokers to consider cessation (65).

Recommendation 6: Support cessation efforts among students and all school staff who use tobacco.

Potential practices to help children and adolescents quit using tobacco include self-help, peer support, and community cessation programs. In practice, however, these alternatives are rarely available within a school system or community. Although the options are often limited, schools must support student efforts to quit using tobacco, especially when tobacco use is disallowed by school policy.

Effective cessation programs for adolescents focus on immediate consequences of tobacco use, have specific attainable goals, and use contracts that include rewards. These programs provide social support and teach avoidance, stress management, and refusal skills (66-69). Further, students need opportunities to practice skills and strategies that will help them remain nonusers (66,67,70).

Cessation programs with these characteristics may already be available in the community through the local health department or voluntary health agency (e.g., American Cancer Society, American Heart Association, American Lung Association). Schools should identify available resources in the community and provide referral and follow-up services to students. If cessation programs for youth are not available, such

programs might be jointly sponsored by the school and the local health department, voluntary health agency, other community health providers, or interested organizations (e.g., churches).

More is known about successful cessation strategies for adults. School staff members are more likely than students to find existing cessation options in the community. Most adults who quit tobacco use do so without formal assistance. Nevertheless, cessation programs that include a combination of behavioral approaches (e.g., group support, individual counseling, skills training, family interventions, and interventions that can be supplemented with pharmacologic treatments) have demonstrated effectiveness (71). For all school staff, health promotion activities and employee assistance programs that include cessation programs might help reduce burnout, lower staff absenteeism, decrease health insurance premiums, and increase commitment to overall school health goals (41).

Recommendation 7: Assess the tobacco-use prevention program at regular intervals.

Local school boards and administrators can use the following evaluation questions to assess whether their programs are consistent with CDC's *Guidelines for School Health Programs to Prevent Tobacco Use and Addiction*. Personnel in federal, state, and local education and health agencies also can use these questions to a) assess whether schools in their jurisdiction are providing effective education to prevent tobacco use and b) identify schools that would benefit from additional training, resources, or technical assistance. The following questions can serve as a guide for assessing program effectiveness:

1. Do schools have a comprehensive policy on tobacco use, and is it implemented and enforced as written?
2. Does the tobacco education program foster the necessary knowledge, attitudes, and skills to prevent tobacco use?
3. Is education to prevent tobacco use provided, as planned, in kindergarten through 12th grade, with special emphasis during junior high or middle school?
4. Is in-service training provided, as planned, for educators responsible for implementing tobacco-use prevention?
5. Are parents or families, teachers, students, school health personnel, school administrators, and appropriate community representatives involved in planning, implementing, and assessing programs and policies to prevent tobacco use?
6. Does the tobacco-use prevention program encourage and support cessation efforts by students and all school staff who use tobacco?

CONCLUSION

In 1964, the first Surgeon General's report on smoking and health warned that tobacco use causes serious health problems. Thirty years later, in 1994, the Surgeon General reports that tobacco use still presents a key threat to the well-being of children. School health programs to prevent tobacco use could become one of the most effective national strategies to reduce the burden of physical, emotional, and monetary expense incurred by tobacco use.

To achieve maximum effectiveness, school health programs to prevent tobacco use must be carefully planned and systematically implemented. Research and experience acquired since the first Surgeon General's report on smoking and health have helped in understanding how to produce school policies on tobacco use and how to plan school-based programs to prevent tobacco use so that they are most effective. Carefully planned school programs can be effective in reducing tobacco use among students if school and community leaders make the commitment to implement and sustain such programs.

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APPENDIX B

GUIDELINES FOR SCHOOL HEALTH PROGRAMS

TO PROMOTE LIFELONG HEALTHY EATING



June 14, 1996 / Vol. 45 / No. RR-9



*Recommendations
and
Reports*

MORBIDITY AND MORTALITY WEEKLY REPORT

Guidelines for School Health Programs to Promote Lifelong Healthy Eating

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Public Health Service

Centers for Disease Control
and Prevention (CDC)
Atlanta, Georgia 30333



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American Association of Family and Consumer Sciences	National Association of School Nurses
American Association of School Administrators	National Association of Secondary School Principals
American Cancer Society	National Association of State Boards of Education
American Dietetic Association	National Association of State NET Coordinators
American Heart Association	National Cancer Institute (USDHHS)
American Public Health Association	National Congress of Parents and Teachers
American School Food Service Association	National Education Association
American School Health Association	National Food Service Management Institute
Association for the Advancement of Health Education	National Heart, Lung, and Blood Institute (USDHHS)
Association of State and Territorial Directors of Health Promotion and Public Health Education	National School Boards Association
Association of State and Territorial Health Officials	National School Health Education Coalition
Association of State and Territorial Public Health Nutrition Directors	Office of Disease Prevention and Health Promotion (USDHHS)
Council of Chief State School Officers	Society for Nutrition Education
Health Resources and Services Administration (U.S. Department of Health and Human Services [USDHHS])	Society of State Directors of Health, Physical Education, and Recreation
Indian Health Service (USDHHS)	U.S. Department of Agriculture
Maternal and Child Health Interorganizational Nutrition Group	U.S. Department of Education

Guidelines for School Health Programs to Promote Lifelong Healthy Eating

Summary

Healthy eating patterns in childhood and adolescence promote optimal childhood health, growth, and intellectual development; prevent immediate health problems, such as iron deficiency anemia, obesity, eating disorders, and dental caries; and may prevent long-term health problems, such as coronary heart disease, cancer, and stroke. School health programs can help children and adolescents attain full educational potential and good health by providing them with the skills, social support, and environmental reinforcement they need to adopt long-term, healthy eating behaviors.

This report summarizes strategies most likely to be effective in promoting healthy eating among school-age youths and provides nutrition education guidelines for a comprehensive school health program. These guidelines are based on a review of research, theory, and current practice, and they were developed by CDC in collaboration with experts from universities and from national, federal, and voluntary agencies.

The guidelines include recommendations on seven aspects of a school-based program to promote healthy eating: school policy on nutrition, a sequential, coordinated curriculum, appropriate instruction for students, integration of school food service and nutrition education, staff training, family and community involvement, and program evaluation.

INTRODUCTION

School-based programs can play an important role in promoting lifelong healthy eating. Because dietary factors "contribute substantially to the burden of preventable illness and premature death in the United States," the national health promotion and disease prevention objectives encourage schools to provide nutrition education from preschool through 12th grade (1). The U.S. Department of Agriculture's (USDA) Nutrition Education and Training (NET) Program urges "nutrition education [to] be a major educational component of all child nutrition programs and offered in all schools, child care facilities, and summer sites" by the year 2000 (2). Because diet influences the potential for learning as well as health, an objective of the first national education goal is that children "receive the nutrition and health care needed to arrive at school with healthy minds and bodies" (3).

The recommendations in this report are intended to help personnel and policymakers at the school, district, state, and national levels meet the national health objectives and education goals by implementing school-based nutrition education policies and programs. This report may also be useful to students, to parents, and to personnel in local and state health departments, community-based health and nutrition programs, pediatric clinics, and training institutions for teachers and public health professionals. These recommendations complement CDC guidelines for school health programs to

prevent the spread of acquired immunodeficiency syndrome (AIDS) (4), to prevent tobacco use and addiction (5), and to promote physical activity (6).

In this report, *nutrition education* refers to a broad range of activities that promote healthy eating behaviors. The nutrition education guidelines focus largely on classroom instruction, but they are relevant to all components of a comprehensive school health program—health education; a healthy environment; health services; counseling, psychological, and social services; integrated school and community efforts; physical education; nutrition services; and school-based health promotion for faculty and staff (7). Although the meals served by school food service programs are an important part of a school health program, this report does not provide specific recommendations related to purchasing and preparing food for school meals. Detailed information on this topic is available from many other publications (8–19) and information sources (see Appendix A). These guidelines also do not address the specific nutrition education and counseling needs of pregnant adolescents (20,21) or young persons with special needs (22–28).

These guidelines are based on a synthesis of research, theory, and current practice and are consistent with the principles of the national health education standards (29), the opportunity-to-learn standards for health education (29), the position papers of leading voluntary organizations involved in child nutrition (30), and the national action plan to improve the American diet (31). To develop these guidelines, CDC convened meetings of experts in nutrition education, reviewed published research, considered the recommendations of national policy documents (1,32–35), and consulted with experts from national, federal, and voluntary organizations.

EFFECTS OF DIET ON THE HEALTH, GROWTH, AND INTELLECTUAL DEVELOPMENT OF YOUNG PERSONS

School-based nutrition education can improve dietary practices that affect young persons' health, growth, and intellectual development. Immediate effects of unhealthy eating patterns include undernutrition, iron deficiency anemia, and overweight and obesity.

Undernutrition

Even moderate undernutrition can have lasting effects on children's cognitive development and school performance (36). Chronically undernourished children attain lower scores on standardized achievement tests, especially tests of language ability (37). When children are hungry or undernourished, they have difficulty resisting infection and therefore are more likely than other children to become sick, to miss school, and to fall behind in class (36,37); they are irritable and have difficulty concentrating, which can interfere with learning (38); and they have low energy, which can limit their physical activity (38). Some reports have estimated that millions of children in the United States experience hunger over the course of a year (39), but no scientific consensus currently exists on how to define or measure hunger (1).

Skipping breakfast can adversely affect children's performance in problem-solving tasks (40–42). A study of low-income elementary school students indicated that those who participated in the School Breakfast Program had greater improvements in stand-

ardized test scores and reduced rates of absence and tardiness than did children who qualified for the program but did not participate (43). Twelve percent of students reported skipping breakfast the day before one national survey was taken (44); 40% of 8th- and 10th-grade students in another study reported having eaten breakfast on ≤ 2 days the week before the survey (45). Strategies to encourage adequate nutrition among young persons include the following:

- Promote participation in USDA food assistance programs (e.g., the School Breakfast Program and School Lunch Program, the Summer Food Service Program, and the Child and Adult Care Food Program).
- Advise parents and guardians about community-based food supplementation programs (e.g., food stamps; local food pantries; and the Special Supplemental Nutrition Program for Women, Infants, and Children [WIC]).
- Educate students and their families about the importance of eating breakfast.

Iron Deficiency Anemia

Iron deficiency anemia is the most common cause of anemia in the United States (33). Iron deficiency hampers the body's ability to produce hemoglobin, which is needed to carry oxygen in the blood. This deficiency can increase fatigue, shorten attention span, decrease work capacity, reduce resistance to infection, and impair intellectual performance (33,46). Among school-age youths, female adolescents are at greatest risk for iron deficiency. Approximately 1% of elementary school-age children and 2%–4% of adolescent girls ages 12–19 years show evidence of iron deficiency anemia (47). To prevent iron deficiency, children and adolescents should eat adequate amounts of foods high in iron and in vitamin C, which helps the body absorb iron efficiently (33).

Overweight and Obesity*

Overweight and obesity are increasing among children and adolescents in the United States (48–52). The prevalence of overweight among youths ages 6–17 years in the United States has more than doubled in the past 30 years; most of the increase has occurred since the late 1970s (52). Approximately 4.7 million, or 11%, of youths ages 6–17 years are seriously overweight (52). Obesity in young persons is related to elevated blood cholesterol levels (53–56) and high blood pressure (57–59), and some very obese youths suffer from immediate health problems (e.g., respiratory disorders, orthopedic conditions, and hyperinsulinemia) (60). Being overweight during childhood and adolescence has been associated with increased adult mortality (61,62). Furthermore, obese children and adolescents are often excluded from peer groups and discriminated against by adults, experience psychological stress, and have a poor

*Obesity refers to an excess of total body fat. Body fat content is usually estimated by one of two techniques, measuring skinfold thickness or computing the ratio of body weight to height. Researchers who use weight-to-height ratios tend to use the term "overweight" instead of "obesity." Although weight-to-height ratios correlate highly with body fat, they do not distinguish between body fat and lean body tissue: excess fat tissue is generally assumed to account for the additional weight, but excess weight can also include lean body mass or a large body frame (33).

body image and low self-esteem (63,64). Increased physical activity and appropriate caloric intake are recommended for preventing and reducing obesity (35). CDC's guidelines for school and community health programs to promote physical activity among youths address strategies for increasing physical activity among young persons (6).

Unsafe Weight-Loss Methods

Many young persons in the United States practice unsafe weight-loss methods. Deliberately restricting food intake over long periods can lead to poor growth and delayed sexual development (65). Data from one study indicated that the rate of smoking initiation is higher for adolescent girls who diet or who are concerned about their weight than for nondieters or girls having few weight concerns (66), and another study indicated that many white female high school students who smoke report using smoking to control their appetite and weight (67). Harmful weight loss practices have been reported among girls as young as 9 years old (68,69). Young persons involved in certain competitive sports and dancing are particularly at risk for unsafe weight control practices (70). A national survey of 8th- and 10th-grade students found that 32% skipped meals, 22% fasted, 7% used diet pills, 5% induced vomiting after meals, and 3% used laxatives to lose weight (45). Children and adolescents should learn about the dangers of unsafe weight-loss methods and about safe ways to maintain a healthy weight. The emphasis of society in the United States on thinness should be challenged, and young persons need to develop a healthy body image (71).

Eating Disorders

Eating disorders (e.g., anorexia nervosa and bulimia nervosa) are psychological disorders characterized by severe disturbances in eating behavior. Anorexia nervosa is characterized by a refusal to maintain a minimally normal body weight, and bulimia nervosa is characterized by repeated episodes of binge eating followed by compensatory behaviors such as self-induced vomiting (72). Eating disorders often start in adolescence, and >90% of cases occur among females (72). Anorexia nervosa and bulimia nervosa affect as many as 3% of adolescent and young adult females, and the incidence of anorexia nervosa appears to have increased in recent decades (72). Compared with adolescents who have normal eating patterns, adolescents who have eating disorders tend to have lower self-esteem; a negative body image; and feelings of inadequacy, anxiety, social dysfunction, depression, and moodiness (73). Eating disorders can cause many severe complications, and mortality rates for these disorders are among the highest for any psychiatric disorder (74). Persons who have eating disorders should receive immediate medical and psychological treatment.

Dental Caries

Dental caries is perhaps the most prevalent of all diseases (1). It affects 50.1% of youths ages 5–17 years and 84.4% of youths age 17 years (75). More than 50 million hours of school time are lost annually because of dental problems or dental visits (76). Dental caries is a progressive disease, which, if left untreated, can result in acute infections, pain, costly treatment, and tooth loss. A strong link exists between sugar

consumption and dental caries (33). To prevent dental caries, children and adolescents should drink fluoridated water, use fluoridated toothpaste, brush and floss their teeth regularly, have dental sealants applied to the pits and fissures of their teeth, and consume sugars in moderation (1).

EFFECTS OF CHILDHOOD EATING PATTERNS ON CHRONIC DISEASE RISKS OF ADULTS

Nutrition education also should focus on preventing children and adolescents from developing chronic diseases during adulthood. Some of the physiological processes that lead to diet-related chronic disease begin in childhood. For example, autopsy studies have demonstrated that early indicators of atherosclerosis (the hardening of the arteries that is the most common cause of coronary heart disease [CHD]) begin in youth (77–83) and are related to blood cholesterol levels in young persons (79,81–83). Unhealthy eating practices that contribute to chronic disease are established early in life; young persons having unhealthy eating habits tend to maintain these habits as they age (84). Thus, it is efficacious to teach persons healthy eating patterns when they are young; high-risk eating behaviors and physiological risk factors are difficult to change once they are established during youth.

Diet-related risk factors for cardiovascular disease (e.g., high blood cholesterol level, high blood pressure, and overweight) are common in youths in the United States (34,52,85–90). Compared with their peers, children and adolescents who have high blood cholesterol (34,91–96), have high blood pressure (97,98), or are obese (91,99–103) are more likely to have these risk factors during adulthood. Poor diet and inadequate physical activity together account for at least 300,000 deaths in the United States annually and are second only to tobacco use as the most prominent identifiable contributor to premature death (104). Interventions that promote healthy eating and physical activity behaviors during childhood and adolescence may not only prevent some of the leading causes of illness and death but also decrease direct health-care costs and improve quality of life.

Diet is a known risk factor for the development of the nation's three leading causes of death: CHD, cancer, and stroke (33). Other health problems of adulthood associated with diet are diabetes, high blood pressure, overweight, and osteoporosis.

Coronary Heart Disease

CHD kills more persons in the United States than any other disease does (1). Diet-related risk factors for CHD include high blood cholesterol, high blood pressure, and obesity. These risk factors can be reduced by consuming less fat (particularly saturated fat) and cholesterol and by increasing physical activity (105).

Cancer

One out of every five deaths in the United States is attributable to cancer (106). Dietary factors have been associated with several types of cancer, including colon, breast, and prostate (33). All cancer deaths in the United States might be reduced as much as 35% through dietary changes (107,108). The risk for some types of cancer may be reduced by maintaining a healthy weight; limiting consumption of fat, alcohol,

and salt-cured, salt-pickled, or smoked foods; and eating more foods that protect the body against cancer (fruits, vegetables, whole grain cereals, and other high-fiber foods) (109). The National Cancer Institute advises eating at least five servings of fruits and vegetables each day (110).

Stroke

Cerebrovascular disease, or stroke, is the third leading cause of death in the United States and a major cause of illness and disability (111). The most important risk factor for stroke is high blood pressure, which often can be controlled or prevented by adopting a healthy diet and maintaining a healthy weight (112). The risk for stroke can be reduced by consuming less sodium, increasing physical activity, and maintaining a healthy body weight.

Diabetes

Diabetes is the seventh leading cause of death in the United States (104). CHD is two to four times more common and stroke is two to six times more common in persons who have diabetes than in persons who do not have diabetes (113). Diabetes can lead to blindness, kidney disease, and nerve damage (113). Non-insulin-dependent diabetes mellitus, which affects approximately 90% of persons who have diabetes, is often associated with obesity (114). Maintaining a desirable body weight through physical activity and modest caloric restriction is important in preventing diabetes and controlling its complications (114).

High Blood Pressure

High blood pressure is a major cause of CHD, stroke, and kidney failure. About one in four adults in the United States has high blood pressure (115). Persons who have high blood pressure have three to four times the risk of developing CHD and as much as seven times the risk of stroke as do those who have normal blood pressure (116). Persons can reduce their risk for high blood pressure by consuming less sodium, increasing physical activity, and maintaining a healthy body weight. A diet high in potassium may help reduce the risk of high blood pressure (117).

Overweight

In the United States, about one in three adults is overweight (118), and these persons are at increased risk for CHD, some types of cancer, stroke, diabetes mellitus, high blood pressure, and gallbladder disease (33). Overall risk for premature death is increased by excess weight; the risk increases as severity of overweight increases (33). The best way to lose weight is to increase physical activity and control caloric intake, preferably by adopting a diet that is low in fat and high in vegetables, fruits, and grains (35).

Osteoporosis

Osteoporosis is a decrease in the amount of bone so severe that the bone fractures easily. About 1.3 million bone fractures, including many fatal hip fractures, occur per

year in persons ≥ 45 years of age (33). Low dietary calcium, a mineral essential for bone growth, may be associated with an increased risk for osteoporosis (33). For females especially, eating enough calcium is particularly important during childhood, adolescence, and young adulthood—when bones approach their maximum density—to reduce the risk for osteoporosis later in life (1,119–122). Regular weight-bearing exercises also can help prevent osteoporosis (33).

GUIDELINES FOR HEALTHY EATING

To prevent certain diseases and to promote good health, persons >2 years of age should follow the seven recommendations that constitute the Dietary Guidelines for Americans (35). These guidelines are developed by the USDA and USDHHS and are published every 5 years. They are based on extensive reviews of hundreds of studies conducted over many years and represent the best current advice that nutrition scientists can give. The guidelines are consistent with dietary recommendations made by major health promotion organizations, including the National Research Council (32), the National Cholesterol Education Program of the National Institutes of Health (34,105), the National Cancer Institute (109), the American Cancer Society (123), and the American Heart Association (124).

The principles contained in the Dietary Guidelines for Americans should be the primary focus of school-based nutrition education. By enabling young persons to adopt practices consistent with the guidelines, schools can help the nation meet its health objectives (1), which were designed to guide health promotion and disease prevention policy and programs at the federal, state, and local level throughout the 1990s. Objective 2.19 is to “increase to at least 75 percent the proportion of the Nation’s schools that provide nutrition education from preschool through 12th grade, preferably as part of quality school health education” (1). The six relevant dietary guidelines are (a) eat a variety of foods; (b) balance the food you eat with physical activity—maintain or improve your weight; (c) choose a diet with plenty of grain products, vegetables, and fruits; (d) choose a diet low in fat, saturated fat, and cholesterol; (e) choose a diet moderate in sugars; and (f) choose a diet moderate in salt and sodium. (The seventh recommendation concerns adults and alcoholic beverages.) Enabling children and adolescents to follow these guidelines can help the nation achieve these national health objectives for the year 2000 (1):

- 2.3** Reduce overweight to a prevalence of $\leq 20\%$ among people aged 20 and older and $\leq 15\%$ among adolescents aged 12 through 19.
- 2.5** Reduce average dietary fat intake to $\leq 30\%$ of calories and average saturated fat intake to $\leq 10\%$ of calories among people aged two and older.
- 2.6** Increase complex carbohydrates and fiber-containing foods in the diets of adults to five or more daily servings for vegetables (including legumes) and fruits and to six or more daily servings for grain products.
- 2.7** Increase to $\geq 50\%$ the proportion of overweight people aged 12 and older who have adopted sound dietary practices combined with regular physical activity to attain an appropriate body weight.
- 2.8** Increase calcium intake so $\geq 50\%$ of youth aged 12 through 24 and $\geq 50\%$ of pregnant and lactating women consume three or more servings daily of foods rich in calcium, and $\geq 50\%$ of people aged ≥ 25 consume two or more servings daily.

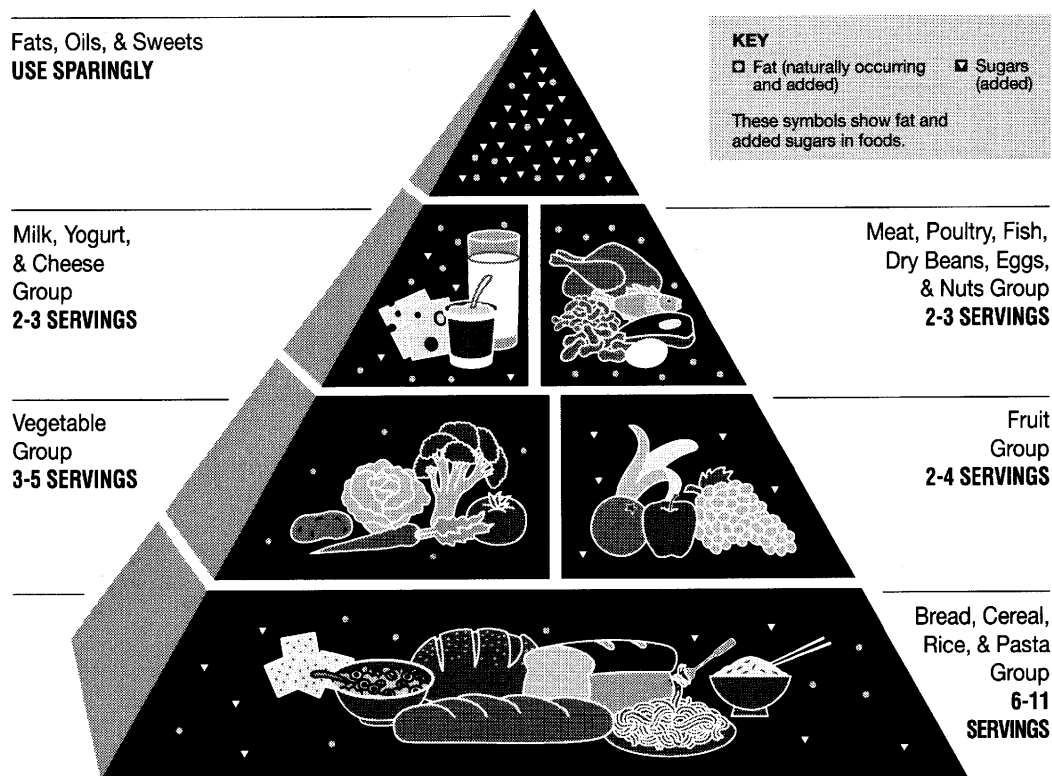
- 2.9** Decrease salt and sodium intake so that $\geq 65\%$ of home meal preparers prepare foods without adding salt, $\geq 80\%$ of people avoid using salt at the table, and $\geq 40\%$ of adults regularly purchase foods modified or lower in sodium.

The Food Guide Pyramid (Figure 1) was designed by the USDA and USDHHS to help persons follow the Dietary Guidelines for Americans. Schools can use the pyramid to illustrate the concepts of variety (eat different foods from among and within the food groups), moderation (limit the consumption of foods high in fat and added sugars), and proportionality (eat relatively greater amounts of foods from the groups that are lower in the pyramid: grains, vegetables, and fruits) (125). Other educational materials supplement the pyramid by listing low-fat choices within each food group (35).

EATING BEHAVIORS OF CHILDREN AND ADOLESCENTS IN THE UNITED STATES

Many young persons in the United States do not follow the recommendations of the Dietary Guidelines for Americans or the Food Guide Pyramid. On average, children and adolescents consume too much fat, saturated fat, and sodium and not enough fruits, vegetables, or calcium (44,126–129; CDC, unpublished data). Children and adolescents obtain 33%–35% of their calories from fat and 12%–13% from saturated fat

FIGURE 1. The Food Guide Pyramid — a guide to daily choices



Source: U.S. Department of Agriculture/U.S. Department of Health and Human Services

(above the recommended levels of 30% and 10%, respectively) (44,128,129). Only 16% of children ages 6–11 years and 15% of adolescents ages 12–19 years meet the recommendation for total fat intake; only 9% of children and 7% of adolescents meet the recommendation for saturated fat intake (130). Almost one-half of 8th- and 10th-grade students eat three or more snacks a day, and most of these snacks are high in fat, sugar, or sodium (45).

Unpublished data from CDC's 1993 Youth Risk Behavior Survey indicated that, on the day before the survey, 41% of high school students in the United States ate no vegetables and 42% ate no fruits (127) (Appendix B). An analysis of a nationally representative sample of youths ages 2–18 years indicated that, over a 3-day period, the youths ate only 3.6 servings of fruits and vegetables daily and that fried potatoes accounted for a large proportion of the vegetables consumed, 20.4% of the youths ate the recommended five or more servings of fruits and vegetables daily, 50.8% ate fewer than one serving of fruit per day, and 29.3% ate fewer than one serving per day of vegetables that were not fried (131). Adolescent females eat considerably less calcium and iron than recommended by the Food and Nutrition Board of the National Research Council (126,129).

Children and adolescents appear to be familiar with the general relationship between nutrition and health but are less aware of the relationship between specific foods and health. For example, young persons understand the importance of limiting fat, cholesterol, and sodium in one's diet, but they do not know which foods are high in fat, cholesterol, sodium, or fiber (45,132,133). One study indicated that adolescents were well-informed about good nutrition and health but did not use their knowledge to make healthy food choices (134).

THE NEED FOR SCHOOL-BASED NUTRITION EDUCATION

Young persons need nutrition education to help them develop lifelong eating patterns consistent with the Dietary Guidelines for Americans and the Food Guide Pyramid. Schools are ideal settings for nutrition education for several reasons:

- Schools can reach almost all children and adolescents.
- Schools provide opportunities to practice healthy eating. More than one-half of youths in the United States eat one of their three major meals in school, and 1 in 10 children and adolescents eats two of three main meals in school (135).
- Schools can teach students how to resist social pressures. Eating is a socially learned behavior that is influenced by social pressures. School-based programs can directly address peer pressure that discourages healthy eating and harness the power of peer pressure to reinforce healthy eating habits.
- Skilled personnel are available. After appropriate training, teachers can use their instructional skills and food service personnel can contribute their expertise to nutrition education programs.
- Evaluations suggest that school-based nutrition education can improve the eating behaviors of young persons (136–138).

School-based nutrition education is particularly important because today's children and adolescents frequently decide what to eat with little adult supervision (139). The increase in one-parent families or families having two working parents and the availability of convenience foods and fast-food restaurants inhibit parents' monitoring of their children's eating habits.

Young persons' food choices are influenced by television advertisements for low-nutritive foods. Young persons see about one food advertisement for every 5 minutes of Saturday morning children's shows (140). Most of the foods advertised during children's programming are high in fat, sugar, or sodium; practically no advertisements are for healthy foods such as fruits and vegetables (140–142). Studies have indicated that, compared with those who watch little television, children and adolescents who watch more television are more likely to have unhealthy eating habits and unhealthy conceptions about food (143), ask their parents to buy foods advertised on television (144), and eat more fat (145). Some studies of young persons have found that television watching is directly associated with obesity (146–149). Because youths in the United States spend, on average, more than 20 hours a week watching television (150)—more time over the course of the year than they are in school (141)—school-based programs should help counter the effect of television on young persons' eating habits.

Schools are a critical part of the social environment that shapes young persons' eating behaviors and can therefore play a large role in helping improve their diet. However, schools cannot achieve this goal on their own when the cultural milieu has a large influence on food-related beliefs, values, and practices (30,138). Families, food stores, restaurants, the food industry, religious institutions, community centers, government programs, and the mass media must also support the principles of the Dietary Guidelines for Americans. The USDA's Team Nutrition (see Appendix A) seeks to gain the support of many sectors of society for improving the diet of young persons by creating innovative public and private partnerships that promote healthy food choices through the media, schools, families, and community (151).

PROMOTING HEALTHY EATING THROUGH A COMPREHENSIVE SCHOOL HEALTH PROGRAM

In the school environment, classroom lessons alone might not be enough to effect lasting changes in students' eating behaviors (30); students also need access to healthy food and the support of persons around them (137). The influence of school goes beyond the classroom and includes normative messages from peers and adults regarding foods and eating patterns. Students are more likely to receive a strong, consistent message when healthy eating is promoted through a comprehensive school health program.

A comprehensive school health program empowers students with not only the knowledge, attitudes, and skills required to make positive health decisions but also the environment, motivation, services, and support necessary to develop and maintain healthy behaviors (152). A comprehensive school health program includes health education; a healthy environment; health services; counseling, psychological, and social services; integrated school and community efforts; physical education; nutrition services; and a school-based health program for faculty and staff (7). Each compo-

nent can contribute to integrated efforts that promote healthy eating. For example, classroom lessons on nutrition can be supported by

- schools providing appealing, low-fat, low-sodium foods in vending machines and at school meetings and events;
- school counselors and nurses providing guidance on health and, if necessary, referrals for nutritional problems;
- community organizations providing counseling or nutrition education campaigns;
- physical education instructors helping students understand the relationship between nutrition and physical activity;
- school food service personnel serving healthy, well-balanced meals in the cafeteria; and
- school personnel acting as role models for healthy eating (153).

The USDA is promoting health-enhancing changes in the food service component of the school health program by requiring schools to serve meals that comply with the Dietary Guidelines for Americans (154) and by providing technical support to schools through Team Nutrition (151).

RECOMMENDATIONS FOR SCHOOL HEALTH PROGRAMS PROMOTING HEALTHY EATING

Based on the available scientific literature, national nutrition policy documents, and current practice, these guidelines provide seven recommendations for ensuring a quality nutrition program within a comprehensive school health program. These recommendations address school policy on nutrition, a sequential, coordinated curriculum, appropriate and fun instruction for students, integration of school food service and nutrition education, staff training, family and community involvement, and program evaluation. Strategies that schools can use to achieve these recommendations are available (Appendix C). However, local school systems need to assess the nutrition needs and issues particular to their communities, and they need to work with key school- and community-based constituents, including students, to develop the most effective and relevant nutrition education plans for their communities. Vigorous, coordinated, and sustained support from communities, local and state education and health agencies, institutions of higher education, and national organizations also is necessary to ensure success (29).

- 1. Policy:** Adopt a coordinated school nutrition policy that promotes healthy eating through classroom lessons and a supportive school environment.
- 2. Curriculum for nutrition education:** Implement nutrition education from pre-school through secondary school as part of a sequential, comprehensive school health education curriculum designed to help students adopt healthy eating behaviors.

3. **Instruction for students:** Provide nutrition education through developmentally appropriate, culturally relevant, fun, participatory activities that involve social learning strategies.
4. **Integration of school food service and nutrition education:** Coordinate school food service with nutrition education and with other components of the comprehensive school health program to reinforce messages on healthy eating.
5. **Training for school staff:** Provide staff involved in nutrition education with adequate preservice and ongoing in-service training that focuses on teaching strategies for behavioral change.
6. **Family and community involvement:** Involve family members and the community in supporting and reinforcing nutrition education.
7. **Program evaluation:** Regularly evaluate the effectiveness of the school health program in promoting healthy eating, and change the program as appropriate to increase its effectiveness.

Recommendation 1. Policy: Adopt a coordinated school nutrition policy that promotes healthy eating through classroom lessons and a supportive school environment.

Rationale for the Policy

A coordinated school nutrition policy, particularly as part of an overall school health policy, provides the framework for implementing the other six recommendations and ensures that students receive nutrition education messages that are reinforced throughout the school environment. For example, such a policy would address nutrition education classes; school lunch and breakfast; classroom snacks and parties; use of food to reward or discipline; and food sold in vending machines, at school stores, snack bars, sporting events, and special activities, and as part of fundraising activities. The school environment can powerfully influence students' attitudes, preferences, and behaviors related to food (137). Without a coordinated nutrition policy, schools risk negating the health lessons delivered in the classroom and cafeteria by allowing actions that discourage healthy eating behaviors.

Developing the Policy

A school nutrition policy should be a brief document that incorporates input from all relevant constituents of the school community: students, teachers, coaches, staff, administrators, food service personnel, nurses, counselors, public health professionals, and parents. The policy should meet local needs and be adapted to the health concerns, food preferences, and dietary practices of different ethnic and socioeconomic groups. Technical assistance for assessing nutrition education needs is available through the state NET Program (155). Schools might consider using one or more of the following techniques to assess their particular needs:

- Interview nutrition professionals to learn more about local eating habits and to identify materials and services available for youths and adults. Schools might interview representatives from the school food service program; the state NET Program; the nutrition unit within the State Department of Health; the district or

state school health coordinator; the local WIC program and Cooperative Extension nutrition education program; the state or local chapters of the American Cancer Society, American Dietetic Association, and the American Heart Association; nutrition councils or coalitions; university research programs; organizations with special insights into the particular nutrition education needs of cultural and ethnic minorities; or businesses that offer nutrition-related services or food products.

- Interview food service staff about students' eating practices in the school cafeteria.
- Observe the school cafeteria, the teachers' lunchroom, and other areas in the school where food is available.
- Review nutrition curricula used by teachers.
- Survey teachers to determine how nutrition is taught, whether teachers use food for reward or punishment, and the level of interest of teachers in nutrition or wellness programs for themselves.
- Survey students to determine their dietary preferences and what types of healthy changes in school food they most want.

The policy plan should include means of obtaining follow-up input from all parties and means of revising the plan as needed. Student involvement is critical to the success of a nutrition policy. A nutrition advisory committee or a nutrition subcommittee of the school health advisory council having student members can develop and promulgate a coordinated school nutrition policy. Technical assistance in forming a school nutrition advisory committee is available from the American School Food Service Association (Appendix A). Successful implementation of a nutrition policy also requires the active support of school and district educational leadership.

Content of the Policy

The written policy should describe the importance of the nutrition component within the comprehensive school health program. This section can briefly describe the role of good nutrition in promoting childhood growth, health, and learning; discuss the role of child and adolescent nutrition in reducing the risk for chronic diseases of adulthood; identify the importance of establishing a school environment that supports healthy eating choices by young persons; and generate support for the policy by identifying how improvements in student nutrition can satisfy the needs of different constituents of the school community (e.g., students, teachers, and food service personnel). An optimal policy on nutrition should publicly commit the school to providing adequate time for a curriculum on nutrition, serving healthy and appealing foods at school, developing food-use guidelines for teachers, supporting healthy school meals, and establishing links with nutrition service providers.

Curriculum. Adequate time should be allocated for nutrition education throughout the preschool, primary, and secondary school years as part of a sequential, comprehensive school health education program. In addition, teachers should be adequately trained to teach nutrition and be provided with ongoing in-service training.

Healthy[†] and appealing foods. Healthy and appealing foods should be available in meals, a la carte items in the cafeteria, snack bars, and vending machines (Exhibit 1); as classroom snacks; and at special events, athletic competitions, staff meetings, and parents' association meetings. In addition, schools should discourage the sale of foods high in fat, sodium, and added sugars (e.g., candy, fried chips, and soda) on school grounds and as part of fundraising activities. Although selling low-nutritive foods may provide revenue for school programs, such sales tell students that it is acceptable to compromise health for financial reasons (158). The school thereby risks contradicting the messages on healthy eating given in class. If schools contract with food service management companies to supply meals, the contractors should be required to serve appealing, low-fat, low-sodium meals that comply with the standards of the Dietary Guidelines for Americans.

EXHIBIT 1: Sample List of Vending Machine Foods Low in Saturated Fat (34)

Canned fruit
Fresh fruit (e.g., apples and oranges)*
Fresh vegetables (e.g., carrots)
Fruit juice and vegetable juice
Low-fat crackers and cookies, such as fig bars and gingersnaps
Pretzels
Bread products (e.g., bread sticks, rolls, bagels, and pita bread)
Ready-to-eat, low-sugar cereals
Granola bars made with unsaturated fat
Low-fat (1%) or skim milk*
Low-fat or nonfat yogurt*
Snack mixes of cereal and dried fruit with a small amount of nuts and seeds[†]
Raisins and other dried fruit[†]
Peanut butter and low-fat crackers[§]

*These foods are appropriate if the vending machine is refrigerated.

[†]Some schools might not want to offer these items because these foods can contribute to dental caries.

[§]Some schools might not want to offer peanut butter; although it is low in saturated fatty acids, peanut butter is high in total fat.

[†]As defined by the U.S. Food and Drug Administration (156,157) in its food label regulations, a "healthy" food must be low in fat (≤ 3 g per serving), be low in saturated fat (≤ 1 g per serving), contain limited amounts of cholesterol (≤ 60 mg per serving for a single-item food), and contain limited amounts of salt (≤ 480 mg per serving until 1998, when the criterion for a single-item food will decrease to ≤ 360 mg per serving). In addition, single-item foods that are not raw fruits or vegetables must provide $\geq 10\%$ of the daily value of one or more of the following nutrients: vitamin A, vitamin C, iron, calcium, protein, and fiber. Criteria for products that include more than one type of food (e.g., macaroni and cheese) vary depending on the food.

Food use guidelines for teachers. Schools should discourage teachers from using food for disciplining or rewarding students. Some teachers give students low-nutritive foods, such as candy, as a reward for good behavior, and punish misbehaving students by denying a low-nutritive treat (159). These practices reinforce students' preferences for low-nutritive foods and contradict what is taught during nutrition education. Schools should recommend that both teachers and parents serve healthy party snacks and treats (160).

Support for healthy school meals. Starting with the 1996–1997 school year, schools will be required to serve meals that comply with the standards of the Dietary Guidelines for Americans (154). To encourage students to participate in school meal programs and to make healthy choices in cafeterias, schools can use marketing-style incentives and promotions (13,14,135,161); use healthy school meals as examples in class; educate parents about the value of healthy school meals; involve students and parents in planning meals; and have teachers, administrators, and parents eat in the cafeteria and speak favorably about the healthy meals available there. Students should also be given adequate time and space to eat meals in a pleasant and safe environment (162).

Links with nutrition service providers. Schools should establish links with qualified public health and nutrition professionals who can provide screening, referral, and counseling for nutritional problems (30,163); inform families about supplemental nutrition services available in the community, such as WIC (164), food stamps, local food pantries, the Summer Food Service Program, and the Child and Adult Care Food Program; and implement nutrition education and health promotion activities for school faculty, other staff, school board members, and parents. These links can help prevent and resolve nutritional problems that can impair a student's capacity to learn, demonstrate the value placed on good nutrition for the entire school community, and help adults serve as role models for school-age youths.

Recommendation 2. Curriculum for nutrition education: Implement nutrition education from preschool through secondary school as part of a sequential, comprehensive school health education curriculum designed to help students adopt healthy eating behaviors.

Nutrition Education as Part of a Comprehensive School Health Education Program

Nutrition education should be part of a comprehensive health education curriculum that focuses on understanding the relationship between personal behavior and health. This curriculum should give students the knowledge and skills they need to be "health literate," as delineated by the national health education standards (29) (Exhibit 2). The comprehensive health education approach is important to nutrition education because

EXHIBIT 2: National Health Education Standards (29)

1. Students will comprehend concepts related to health promotion and disease prevention.
2. Students will be able to access valid health information and health-promoting products and services.
3. Students will be able to practice health-enhancing behaviors and reduce health risks.
4. Students will analyze the influence of culture, media, technology, and other factors on health.
5. Students will be able to use interpersonal communication skills to enhance health.
6. Students will be able to use goal-setting and decision-making skills to enhance health.
7. Students will be able to advocate for personal, family, and community health.

- unhealthy eating behaviors may be interrelated with other health risk factors (e.g., cigarette smoking and sedentary lifestyle) (165),
- nutrition education shares many of the key goals of other health education content areas (e.g., raising the value placed on health, taking responsibility for one's health, and increasing confidence in one's ability to make health-enhancing behavioral changes), and
- state-of-the-art nutrition education uses many of the social learning behavioral change techniques used in other health education domains.

Therefore, nutrition education activities can reinforce, and be reinforced by, activities that address other health education topics as well as health in general.

Linking nutrition and physical activity is particularly important because of the rising proportion of overweight youths in the United States. Nutrition education lessons should stress the importance of combining regular physical activity with sound nutrition as part of an overall healthy lifestyle. Physical education classes, in turn, should include guidance in food selection (6).

Sequential Lessons and Adequate Time

Students who receive more lessons on nutrition have more positive behavioral changes than students who have fewer lessons (166,167). To achieve stable, positive changes in students' eating behaviors, adequate time should be allocated for nutrition education lessons. The curriculum should be sequential from preschool through secondary school; attention should be paid to scope and sequence. When designing the curriculum, schools should assess and address their students' needs and concerns. A curriculum targeted to a limited number of behaviors might make the most effective use of a scarce instructional time available for nutrition education (136).

To maximize classroom time, nutrition education can be integrated into the lesson plans of other school subjects; for example, math lessons could analyze nutrient intake or reading lessons could feature texts on nutrition (168). Little research on the integrated approach has been conducted (137), but embedding information on nutrition in other courses probably reinforces the goals of nutrition education. However, the exclusive use of an integrative approach might sacrifice key elements of an effective nutrition education program (e.g., adequate time, focusing on behaviors and skill-building, attention to scope and sequence, and adequate teacher preparation) (137). Therefore, integration into other courses can complement but should not replace sequential nutrition education lessons within a comprehensive school health education curriculum. Classroom time can be maximized also by having nutrition education lessons use skills learned in other classes (e.g., math or language arts) (169–171).

Organizations and agencies can supply information on specific nutrition education curricula and materials (Appendix A). The USDA's NET Program provides technical assistance in school-based nutrition education (2,172). The Food and Nutrition Information Center of USDA's National Agricultural Library provides information on nutrition education evaluation and resources and serves as a national depository and lending library for NET materials. Nutritionists at some organizations can also answer specific nutrition content questions (Appendix A).

Focusing on Promoting Healthy Eating Behaviors

The primary goal of nutrition education should be to help young persons adopt eating behaviors that will promote health and reduce risk for disease. Knowing how and why to eat healthily is important, but knowledge alone does not enable young persons to adopt healthy eating behaviors (137). Cognitive-focused curricula on nutrition education typically result in gains in knowledge but usually have little effect on behavior (173–178).

Behaviorally based education encourages specific healthy eating behaviors (e.g., eating less fat and sodium and eating more fruits and vegetables) (136,179); however, it does not detail the technical and scientific knowledge on which dietary recommendations are based and, therefore, might not fulfill science education requirements (180). The strategies listed in Appendix C can be used as central concepts in a behaviorally based nutrition education program.

Several programs using a behavioral approach have achieved significant ($p < 0.05$), positive changes in students' eating behaviors (167,181–190). Compared with students in control schools, students in some behaviorally based health and nutrition education programs had significant ($p < 0.05$), favorable changes in serum cholesterol levels (167,188,191), blood pressure level (167,191), and body mass index (184). Although most of the behaviorally oriented programs did not achieve all their behavioral aims—perhaps because of the limited amount of curriculum time (136)—current scientific knowledge indicates that a focus on behavior is a key determinant in the success of nutrition education programs (136–138).

Recommendation 3. Instruction for students: Provide nutrition education through developmentally appropriate, culturally relevant, fun, participatory activities that involve social learning strategies.

Developmentally Appropriate and Culturally Relevant Activities

Different educational strategies should be used for young persons at different stages of cognitive development. Regardless of the amount and quality of teaching they receive, young elementary schoolchildren might not fully understand abstract concepts (e.g., the nutrient content of foods or the classification of foods into groups) (192–194). Nutrition education for young children should focus on concrete experiences (e.g., increasing exposure to many healthy foods and building skills in choosing healthy foods) (169).

More abstract associations between nutrition and health become appropriate as children approach middle school. By this age, children can understand and act on the connection between eating behaviors and health (137,194). Nutrition education for middle and high school students should focus on helping students assess their own eating behaviors and set goals for improving their food selection (138,195). Lessons for older children should emphasize personal responsibility, decision-making skills, and resisting negative social pressures (183,185,187,189).

Nutrition education presents opportunities for young persons to learn about and experience cultural diversity related to food and eating. Students from different cultural groups have different health concerns, eating patterns, food preferences, and food-related habits and attitudes. These differences need to be considered when designing lesson plans or discussing food choices. Nutrition education can succeed only when students believe it is relevant to their lives.

Active Learning and an Emphasis on Fun

The context in which students learn about healthy eating behaviors and the feelings students associate with healthy foods are key factors in determining their receptivity to nutrition education. Students are more likely to adopt healthy eating behaviors when

- they learn about these behaviors through fun, participatory activities rather than through lectures (138,196,197);
- lessons emphasize the positive, appealing aspects of healthy eating patterns rather than the negative consequences of unhealthy eating patterns;
- the benefits of healthy eating behaviors are presented in the context of what is already important to the students; and
- the students have repeated opportunities to taste foods that are low in fat, sodium, and added sugars and high in vitamins, minerals, and fiber during their lessons.[§]

[§]When serving food, teachers must use hygienic food handling practices and consider possible food allergies and religious prohibitions; the food service director can help in this area.

Computer-based lessons on nutrition can also be effective (198), especially when teacher time is limited or when student self-assessment is appropriate. Interactive, highly entertaining, and well-designed computer programs are now available to help young persons learn healthy food selection skills and assess their own diets (199,200). Computer-based lessons allow students to move at their own pace and can capture their attention.

Social Learning Techniques

Most of the nutrition education programs that have resulted in behavioral change have used teaching strategies based on social learning theory (195,201–205). In such lessons, increasing student knowledge is only one of many objectives. Social learning instruction also emphasizes

- raising the value students place on good health and nutrition and identifying the benefits of adopting healthy eating patterns, including short-term benefits that are important to young persons (e.g., physical appearance, sense of personal control and independence, and capacity for physical activities);
- giving students repeated opportunities to taste healthy foods, including foods they have not yet tasted;
- working with parents, school personnel, public health professionals, and others to overcome barriers to healthy eating;
- using influential role models, including peers, to demonstrate healthy eating practices;
- providing incentives (e.g., verbal praise and small prizes) to reinforce messages;
- helping students develop practical skills for and self-confidence in planning meals, preparing foods, reading food labels, and making healthy food choices through observation and hands-on practice;
- enabling students to critically analyze sociocultural influences, including advertising, on food selection, to resist negative social pressures, and to develop social support for healthy eating; and
- helping students analyze their own eating patterns, set realistic goals for changes in their eating behaviors, monitor their progress in reaching those goals, and reward themselves for achieving their goals.

Nutrition education strategies include social learning techniques (Appendix C).

Recommendation 4. Integration of school food service and nutrition education: Coordinate school food service with nutrition education and with other components of the comprehensive school health program to reinforce messages on healthy eating.

The school cafeteria provides a place for students to practice healthy eating. This experience should be coordinated with classroom lessons to allow students to apply critical thinking skills taught in the classroom (2,8,9,11–15,18,169,178,206). School food service personnel can

- visit classrooms and explain how they make sure meals meet the standards of the Dietary Guidelines for Americans,
- invite classes to visit the cafeteria kitchen and learn how to prepare healthy foods,
- involve students in planning the school menu and preparing recipes,
- offer foods that reinforce classroom lessons (e.g., whole wheat rolls to reinforce a lesson on dietary fiber),
- post in the cafeteria posters and fliers on nutrition, and
- display nutrition information about available foods and give students opportunities to practice food analysis and selection skills learned in the classroom.

In addition, classroom teaching can complement the goals of the school food service. For example, teachers can help food service managers by teaching students about the importance of nutritious school meals and getting feedback from students on new menu items developed to meet the goals set by USDA's School Meals Initiatives for Healthy Children (154).

To ensure consistent nutrition messages from the school, food service personnel should work closely with those responsible for other components of the school health program. For example, the personnel can

- help develop and implement school policies that make healthful foods available;
- educate parents about the value of school meals (e.g., put health messages in monthly menus sent home to parents or make periodic presentations at parents' association meetings) (11,13);
- help schools access and assess community public health and nutrition services; and
- keep classroom teachers, physical education teachers, coaches, counselors, health-service providers, and other staff informed about the importance of healthy school meals.

Recommendation 5. Training for school staff: Provide staff involved in nutrition education with adequate preservice and ongoing in-service training that focuses on teaching strategies for behavioral change.

Training in nutrition and health education can increase the extent to which teachers implement a curriculum (207–209), which in turn affects the likelihood that students' eating behaviors will change (167,207). All elementary school teachers as well as secondary school teachers in disciplines such as home economics, family and consumer sciences, language arts, physical education, and science should receive nutrition education training. State NET Programs can provide technical assistance for training teachers in nutrition education (Appendix A).

Training should address content and teaching strategies. Because classroom teachers often need more help with innovative nutrition teaching techniques than with content (195,210), training should focus on giving teachers the skills they need to use the nonlecture, active learning methods discussed previously (195). Training programs are most effective if they

- are designed to meet the specific needs of the teachers and are based on the teachers' level of nutrition knowledge and experience with the suggested teaching strategies,
- model behavioral change techniques and give teachers practice in using them,
- involve multiple sessions spaced across time so that teachers can try out the newly learned techniques in their classrooms and report on their experiences to the training group, and
- provide posttraining sessions so that teachers can share experiences with their peers (211,212).

Teachers should understand the importance of fully implementing the selected curriculum and become familiar with its underlying theory and concepts. Training should also help teachers assess and improve their own eating practices and make them aware of the behavioral messages they give as role models (213).

Continuing education activities in nutrition education should be offered to food service personnel so this staff can reinforce classroom instruction through the school meal program and help shape the school's nutrition policy. State NET Programs and the National Food Service Management Institute provide technical assistance and training seminars for school nutrition professionals (see Appendix A). Administrative support is also critical to implementing a new program (214). Training for school administrators can help gain their support for nutrition education. Health promotion services for all school staff can positively affect their eating behaviors and their effectiveness in teaching healthy eating behaviors (180,215,216).

Recommendation 6. Family and community involvement: Involve family members and the community in supporting and reinforcing nutrition education.

The attitudes and behaviors of parents and caretakers directly influence children's and adolescents' choice of foods (217,218). Parents control most of the food choices available at home, so changing parents' eating behaviors may be one of the most effective ways to change their children's eating behaviors. Involving parents in a nutrition education curriculum at the elementary school level can enhance the eating behaviors of both the students (181,219–221) and the parents (181,219,222). Although parental involvement can enhance the effects of nutrition education programs at the elementary school level, it is not known whether involving parents at the secondary school level helps improve the students' eating behaviors. For older youths, self-assessment (185,189,198) and peer educators (187) might be more influential than parental involvement (137).

Parents are usually more receptive to activities that can be done at home than to those that require their attendance at the school (223,224). To involve parents and other family members in nutrition education, schools can

- send nutrition education materials and cafeteria menus home with students,
- ask parents to send healthy snacks to school,
- invite parents and other family members to periodically eat with their children in the cafeteria,
- invite families to attend exhibitions of student nutrition projects or health fairs (217),
- offer nutrition education workshops and screening services, and
- assign nutrition education homework that students can do with their families (e.g., reading and interpreting food labels, reading nutrition-related newsletters, and preparing healthy recipes).

Through school health advisory councils or through direct contact with community organizations, schools can engage community resources and services to respond to the nutritional needs of students (225,226). Schools can also participate in community-based nutrition education campaigns sponsored by public health agencies or voluntary organizations. Students are most likely to adopt healthy eating behaviors if they receive consistent messages through multiple channels (e.g., home, school, community, and the media) and from multiple sources (e.g., parents, peers, teachers, health professionals, and the media) (225).

Recommendation 7. Program evaluation: Regularly evaluate the effectiveness of the school health program in promoting healthy eating, and change the program as appropriate to increase its effectiveness.

Policymakers should regularly review the effectiveness of the school nutrition program. All groups affected by the program should have the opportunity to provide input. Assessment of nutrition programs and policies should include whether

- a comprehensive school nutrition policy exists and is implemented as written;
- nutrition education is provided throughout the preschool, primary, and secondary school years as part of comprehensive school health education;
- teachers deliver nutrition education through developmentally appropriate, culturally relevant, fun, participatory activities that involve social learning strategies;
- teachers and school food service personnel have undertaken joint project planning and action;
- teachers have received curriculum-specific training; and
- families and community organizations are involved in nutrition education.

Schools might also consider measuring the effects of their programs and policies on self-reported eating behaviors; key variables that influence behavior, such as knowledge, attitudes, self-confidence, and behavioral intentions; and in-school eating behaviors that are easy to assess, such as participation in school food service programs and the number of students choosing healthy alternatives in the cafeteria (e.g., salad bars or low-fat milk).

Schools can consult with the state NET Program or with evaluation specialists at universities, school districts, or the state departments of education or health to identify methods and materials for evaluating the effectiveness of their program (227,228). Valid evaluations can increase parent and community support for school programs, help schools reward teachers for exceptional work, and support grant applications for enhancing school health programs.

CONCLUSION

To ensure a healthy future for our children, school-based nutrition education programs must become a national priority. These programs should be part of comprehensive school health programs and reach students from preschool through secondary school. School leaders, community leaders, and parents must commit to implementing and sustaining nutrition education programs within the schools. Such support is crucial to promoting healthy eating behaviors.

The seven recommendations for school-based nutrition education presented in this report provide the framework for establishing such programs. By adopting these recommendations, schools can help ensure that all school-age youths attain their full educational potential and good health.

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APPENDIX A: NUTRITION EDUCATION RESOURCE LIST

Nutrition education curricula and print, audiovisual, and computer-based materials are available from government agencies, voluntary organizations, corporations, and commodity organizations. State Nutrition Education and Training Program coordinators can help schools identify the most appropriate nutrition education curricula and materials. National clearinghouses that can help schools identify a wide range of nutrition education and school food service resources are sponsored by the U.S. Department of Agriculture's Food and Nutrition Information Center and the National Food Service Management Institute; the former also serves as a lending library.

Food and Nutrition Information Center
National Agricultural Library
U.S. Department of Agriculture
10301 Baltimore Blvd., Room 304
Beltsville, MD 20705
301-504-5719

National Food Service Management
Institute
P.O. Box 188
University of Mississippi
University, MS 38677
800-321-3054

At the local and state levels, educational materials or curricula may be available from affiliates of voluntary health promotion organizations (e.g., the American Cancer Society or the American Heart Association), commodity organizations or national boards for specific food industries, county cooperative extension services, local and state health departments, school districts, state education agencies, and universities. At the national level, nutrition education materials can also be obtained from the following voluntary organizations and federal government agencies:

American Cancer Society
1599 Clifton Road, NE
Atlanta, GA 30328
800-ACS-2345 (800-227-2345)

American Dietetic Association
National Center for Nutrition
and Dietetics
216 W. Jackson Blvd., Suite 800
Chicago, IL 60606-6995
800-745-0775 ext. 5000

American Heart Association
7272 Greenville Ave.
Dallas, TX 75231-4596
800-AHA-USA1 (800-242-8721)

American School Food Service
Association
1600 Duke St., 7th Floor
Alexandria, VA 22314
800-877-8822 ext. 116

Consumer Information Center
Pueblo, CO 81009
719-948-4000 (call for catalog)

International Food Information Council
1100 Connecticut Ave., NW, Suite 430
Washington, DC 20036
202-296-6540

National Cancer Institute
Office of Cancer Communications
Building 31, Room 10A16
31 Center Drive MSC-2580
Bethesda, MD 20892-2580
800-4-CANCER (800-422-6237)

National Heart, Lung, and Blood
Institute Information Center
P.O. Box 30105
Bethesda, MD 20824-0105
301-251-1222

Team Nutrition
U.S. Department of Agriculture
3101 Park Center Drive, Room 802
Alexandria, VA 22302
703-305-1624

APPENDIX B: YOUTH RISK BEHAVIOR SURVEILLANCE SYSTEM AND SCHOOL HEALTH POLICIES AND PROGRAMS STUDY

In 1990, CDC established the Youth Risk Behavior Surveillance System to help monitor progress in attaining national health and education objectives by periodically measuring the prevalence of behaviors in six health risk categories. These behaviors, which are usually established during youth, contribute to the leading causes of death and disease in the United States. Dietary behaviors are one of the six health risk categories. CDC conducts the Youth Risk Behavior Survey (YRBS) biennially in a national probability sample of high school students and enables interested state and local education agencies to conduct the survey in comparable probability samples in states and cities (127). The specific dietary behaviors and attitudes monitored by the YRBS include consumption of fruits and vegetables, consumption of foods high in fat, perceptions of body weight, and attempted weight loss and weight-loss techniques used. The YRBS also obtains information about specific physical activity behaviors.

In 1994, CDC conducted the School Health Policies and Programs Study (SHPPS), which is a national study of school policies and programs at the school, district, and state levels that support comprehensive school health programs. The study also provides baseline data on national health and education objectives that can be attained through school health and physical education, school food service, and school health services and policies (229).

SHPPS included a mail survey of local and state education agencies' policies related to school health in grades kindergarten through 12. The survey was conducted in all states and in a nationally representative sample of districts. The study also included on-site, structured interviews with school principals, health education teachers, physical education teachers, school food service directors, school nurses, counselors, and other personnel in a nationally representative sample of middle schools and high schools. The questionnaire included the following: school nutrition education requirements for students; the content of nutrition education curricula; training and joint activities of food service staff and teachers responsible for nutrition education; school policies related to foods sold in vending machines and for fundraising; food service practices related to purchasing and preparing food; involvement of parents, staff, and students in planning food service meals; and involvement of fast-food or food service management companies in school meals.

Single copies of YRBS and SHPPS reports are available from CDC's Division of Adolescent and School Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Mailstop K-33, 4770 Buford Highway, NE, Atlanta, GA 30341-3724; telephone: (770) 488-5330.

APPENDIX C: SELECTED SCHOOL-BASED STRATEGIES TO PROMOTE HEALTHY EATING

Different, developmentally appropriate activities are listed for lower elementary school, upper elementary school, and middle and high school students (194). This list is not intended to be comprehensive. However, it does include many of the concepts critical to improving the diet and health of young persons in this country. Schools should review these educational activities in relation to their students' needs and abilities to determine which activities are appropriate at each grade level.

Interventions that promote healthy changes in eating behaviors need to target three interacting spheres of influence: (a) the environment, which influences the likelihood that healthy eating behaviors will be adopted through social norms, influential role models, cues to action, reinforcements, and opportunities for action; (b) personal characteristics (e.g., knowledge, attitudes, beliefs, values, confidence in one's ability to change eating behaviors, and expectations about the consequences of making those changes); and (c) behavioral skills and experience, which are related to selecting or preparing specific foods, dietary self-assessment, and decision-making (186, 194, 203, 204).

The strategies listed here require the involvement of teachers, administrators, food service personnel, other school staff, and parents (194). Classroom teachers play the lead role in most of these activities, but many activities would be most effective if they were reinforced by other persons; all adults in the school community can help by serving as role models. Each school or district should determine the policies it needs to guide its nutrition-related activities and who is responsible for the tasks.

For lower elementary students

Strategies to make the food environment more health-enhancing

- Make healthy foods (e.g., fruits, vegetables, and whole grains) widely available at school, and discourage the availability of foods high in fat, sodium, and added sugars.
- Involve parents in nutrition education through homework.
- Provide role models (e.g., teachers, parents, other adults, older children, and celebrities or fictional characters) for healthy eating.
- Provide cues, through posters and marketing-style incentives, that encourage students to make healthy choices about eating and physical activity.
- Use incentives, such as verbal praise or token gifts, to reinforce healthy eating and physical activity. Do not use food for reward or punishment of any behavior.

Strategies to enhance personal characteristics that will support healthy eating

- Make basic connections between food and health (e.g., "You need food to feel good and to grow").

- Teach the importance of balancing food intake and physical activity.
- Identify healthy snacks (e.g., fruits, vegetables, and low-fat milk).
- Increase students' confidence in their ability to make healthy eating choices by gradually building up their food selection and preparation skills and giving them practice.

Strategies to enhance behavioral capabilities that will support healthy eating

- Provide many healthy foods for students to taste in an enjoyable social context.
- Let students prepare simple snacks.
- Have students try unfamiliar and culturally diverse foods that are low in fat, sodium, and added sugars.

For upper elementary students

Strategies to make the food environment more health-enhancing

- Make healthy foods (e.g., fruits, vegetables, and whole grains) widely available at school, and discourage the availability of foods high in fat, sodium, and added sugars.
- Involve parents in nutrition education through homework.
- Provide role models (e.g., teachers, parents, other adults, adolescents, and celebrities or fictional characters) for healthy eating.
- Through class discussions and small-group exercises, provide social support for making healthy changes in eating and physical activity.
- Provide cues, through posters and marketing-style incentives that students design, that encourage students to make healthy choices about eating and physical activity.
- Use incentives, such as verbal praise or token gifts, to reinforce healthy eating and physical activity. Do not use food as a reward or punishment of any behavior.

Strategies to enhance personal characteristics that will support healthy eating

- Explain the effects that diet and physical activity have on future health as well as on immediate concerns (e.g., current health, physical appearance, obesity, sense of well-being, and capacity for physical activity).
- Teach the principles of the Dietary Guidelines for Americans and the Food Guide Pyramid. Instill pride in choosing to eat meals and snacks that comply with these principles.

- Help students identify foods high and low in fat, saturated fat, cholesterol, sodium, added sugars, and fiber.
- Teach the importance of balancing food intake and physical activity.
- Teach the importance of eating adequate amounts of fruits, vegetables, and whole grains.
- Help students increase the value they place on health and their sense of control over food selection and preparation.
- Increase students' confidence in their ability to make healthy eating choices by gradually building up their food selection and preparation skills and giving them practice.
- Have students analyze food preferences and factors that trigger eating behaviors.

Strategies to enhance behavioral capabilities that will support healthy eating

- Provide opportunities for students to taste many healthy foods in an enjoyable social context.
- Let students prepare healthy snacks or simple meals.
- Encourage students to try unfamiliar and culturally diverse foods that are low in fat, sodium, and added sugars and that are high in fiber.
- Have students select healthy foods from a fast-food restaurant menu.
- Teach students how to recognize the fat, sodium, and fiber contents of foods by reading nutrition labels.
- Help students record and assess their food intake.
- Teach students how to use the Food Guide Pyramid to assess their diet for variety, moderation, and proportionality.
- Have students set simple goals for changes in eating and physical activity, and devise strategies for implementing these changes and monitoring progress in reaching their goals.
- When appropriate, let students practice (through role plays) encouraging parents to make healthy choices about eating and physical activity at home.
- Have students examine media and social influences on eating and physical activity; teach students how to respond to these pressures.

For middle and high school students

Strategies to make the food environment more health-enhancing

- Make healthy foods (e.g., fruits, vegetables, and whole grains) widely available at school, and discourage the availability of foods high in fat, sodium, and added sugars.
- Provide role models (e.g., teachers, parents, other adults, and celebrities) for healthy eating.
- Use peers as role models, and use peer-led nutrition education activities.
- Through class discussions and small-group exercises, provide social support for making healthy changes in eating and physical activity.
- Provide cues, through posters and marketing-style incentives that students design, that encourage students to make healthy choices about eating and physical activity.

Strategies to enhance personal characteristics that will support healthy eating

- Explain the effects that diet and physical activity have on future health as well as on immediate concerns (e.g., current health, physical appearance, obesity, eating disorders, sense of well-being, and capacity for physical activity).
- Have students identify reasons to adopt healthy eating and physical activity patterns.
- Teach the principles of the Dietary Guidelines for Americans. Instill in the students pride in choosing to eat meals and snacks that comply with these principles.
- Teach students how to identify foods high and low in fat, saturated fat, cholesterol, sodium, and added sugars.
- Teach students how to identify foods that are excellent sources of fiber, complex carbohydrates, calcium, iron, vitamin A, vitamin C, and folate.
- Teach the importance of balancing food intake and physical activity.
- Teach the effects of unsafe weight-loss methods and the characteristics of a safe weight-loss program.
- Help students increase the value they place on health and their sense of control over food selection and preparation.
- Increase students' confidence in their ability to eat healthily by gradually building up their skills and giving them practice.
- Help students examine what motivates persons to adopt particular eating habits. Have students keep a food diary noting what cues their own eating behavior (e.g., mood, hunger, stress, or other persons).

Strategies to enhance behavioral capabilities that will support healthy eating

- Let students plan and prepare healthy meals.
- Have students select healthy foods from restaurant and cafeteria menus.
- Teach students how to use nutrition labels to make healthy food choices.
- Teach students ways to modify recipes and prepare foods to reduce fat and sodium content and to increase fiber content.
- Help students identify incentives and reinforcements for their current eating and physical activity behaviors.
- Have students examine media and social inducements to adopt unhealthy eating and physical activity patterns, teach them how to respond to these pressures, and let them use their new knowledge to identify their own resistance strategies.
- Have students analyze environmental barriers to healthy eating and physical activity; explore strategies for overcoming these barriers.
- When appropriate, give students practice in encouraging parents to make healthy choices about eating and physical activity at home.
- Teach students to record their food intake, then have them assess and compare their diets with the standards set forth in the Dietary Guidelines for Americans and the Food Guide Pyramid. Have them assess and compare their intake of key nutrients (e.g., calcium and iron) with the intake recommended by the Public Health Service.
- Have students set goals for healthy changes in eating and physical activity, identify barriers and incentives, and assess alternative strategies for reaching their goals and decide which to follow. Show students how to monitor their progress, revise their goals if necessary, and reward themselves for successfully attaining their goals.
- Teach students how to evaluate nutrition claims from advertisements and nutrition-related news stories.

MMWR

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APPENDIX C

GUIDELINES FOR SCHOOL HEALTH PROGRAMS

TO PROMOTE LIFELONG PHYSICAL ACTIVITY AMONG YOUNG PEOPLE



June 14, 1996 / Vol. 45 / No. RR-9



*Recommendations
and
Reports*

MORBIDITY AND MORTALITY WEEKLY REPORT

Guidelines for School Health Programs to Promote Lifelong Healthy Eating

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Public Health Service

Centers for Disease Control
and Prevention (CDC)
Atlanta, Georgia 30333



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American Association of School Administrators	National Association of Secondary School Principals
American Cancer Society	National Association of State Boards of Education
American Dietetic Association	National Association of State NET Coordinators
American Heart Association	National Cancer Institute (USDHHS)
American Public Health Association	National Congress of Parents and Teachers
American School Food Service Association	National Education Association
American School Health Association	National Food Service Management Institute
Association for the Advancement of Health Education	National Heart, Lung, and Blood Institute (USDHHS)
Association of State and Territorial Directors of Health Promotion and Public Health Education	National School Boards Association
Association of State and Territorial Health Officials	National School Health Education Coalition
Association of State and Territorial Public Health Nutrition Directors	Office of Disease Prevention and Health Promotion (USDHHS)
Council of Chief State School Officers	Society for Nutrition Education
Health Resources and Services Administration (U.S. Department of Health and Human Services [USDHHS])	Society of State Directors of Health, Physical Education, and Recreation
Indian Health Service (USDHHS)	U.S. Department of Agriculture
Maternal and Child Health Interorganizational Nutrition Group	U.S. Department of Education

Guidelines for School Health Programs to Promote Lifelong Healthy Eating

Summary

Healthy eating patterns in childhood and adolescence promote optimal childhood health, growth, and intellectual development; prevent immediate health problems, such as iron deficiency anemia, obesity, eating disorders, and dental caries; and may prevent long-term health problems, such as coronary heart disease, cancer, and stroke. School health programs can help children and adolescents attain full educational potential and good health by providing them with the skills, social support, and environmental reinforcement they need to adopt long-term, healthy eating behaviors.

This report summarizes strategies most likely to be effective in promoting healthy eating among school-age youths and provides nutrition education guidelines for a comprehensive school health program. These guidelines are based on a review of research, theory, and current practice, and they were developed by CDC in collaboration with experts from universities and from national, federal, and voluntary agencies.

The guidelines include recommendations on seven aspects of a school-based program to promote healthy eating: school policy on nutrition, a sequential, coordinated curriculum, appropriate instruction for students, integration of school food service and nutrition education, staff training, family and community involvement, and program evaluation.

INTRODUCTION

School-based programs can play an important role in promoting lifelong healthy eating. Because dietary factors "contribute substantially to the burden of preventable illness and premature death in the United States," the national health promotion and disease prevention objectives encourage schools to provide nutrition education from preschool through 12th grade (1). The U.S. Department of Agriculture's (USDA) Nutrition Education and Training (NET) Program urges "nutrition education [to] be a major educational component of all child nutrition programs and offered in all schools, child care facilities, and summer sites" by the year 2000 (2). Because diet influences the potential for learning as well as health, an objective of the first national education goal is that children "receive the nutrition and health care needed to arrive at school with healthy minds and bodies" (3).

The recommendations in this report are intended to help personnel and policymakers at the school, district, state, and national levels meet the national health objectives and education goals by implementing school-based nutrition education policies and programs. This report may also be useful to students, to parents, and to personnel in local and state health departments, community-based health and nutrition programs, pediatric clinics, and training institutions for teachers and public health professionals. These recommendations complement CDC guidelines for school health programs to

prevent the spread of acquired immunodeficiency syndrome (AIDS) (4), to prevent tobacco use and addiction (5), and to promote physical activity (6).

In this report, *nutrition education* refers to a broad range of activities that promote healthy eating behaviors. The nutrition education guidelines focus largely on classroom instruction, but they are relevant to all components of a comprehensive school health program—health education; a healthy environment; health services; counseling, psychological, and social services; integrated school and community efforts; physical education; nutrition services; and school-based health promotion for faculty and staff (7). Although the meals served by school food service programs are an important part of a school health program, this report does not provide specific recommendations related to purchasing and preparing food for school meals. Detailed information on this topic is available from many other publications (8–19) and information sources (see Appendix A). These guidelines also do not address the specific nutrition education and counseling needs of pregnant adolescents (20,21) or young persons with special needs (22–28).

These guidelines are based on a synthesis of research, theory, and current practice and are consistent with the principles of the national health education standards (29), the opportunity-to-learn standards for health education (29), the position papers of leading voluntary organizations involved in child nutrition (30), and the national action plan to improve the American diet (31). To develop these guidelines, CDC convened meetings of experts in nutrition education, reviewed published research, considered the recommendations of national policy documents (1,32–35), and consulted with experts from national, federal, and voluntary organizations.

EFFECTS OF DIET ON THE HEALTH, GROWTH, AND INTELLECTUAL DEVELOPMENT OF YOUNG PERSONS

School-based nutrition education can improve dietary practices that affect young persons' health, growth, and intellectual development. Immediate effects of unhealthy eating patterns include undernutrition, iron deficiency anemia, and overweight and obesity.

Undernutrition

Even moderate undernutrition can have lasting effects on children's cognitive development and school performance (36). Chronically undernourished children attain lower scores on standardized achievement tests, especially tests of language ability (37). When children are hungry or undernourished, they have difficulty resisting infection and therefore are more likely than other children to become sick, to miss school, and to fall behind in class (36,37); they are irritable and have difficulty concentrating, which can interfere with learning (38); and they have low energy, which can limit their physical activity (38). Some reports have estimated that millions of children in the United States experience hunger over the course of a year (39), but no scientific consensus currently exists on how to define or measure hunger (1).

Skipping breakfast can adversely affect children's performance in problem-solving tasks (40–42). A study of low-income elementary school students indicated that those who participated in the School Breakfast Program had greater improvements in stand-

ardized test scores and reduced rates of absence and tardiness than did children who qualified for the program but did not participate (43). Twelve percent of students reported skipping breakfast the day before one national survey was taken (44); 40% of 8th- and 10th-grade students in another study reported having eaten breakfast on ≤ 2 days the week before the survey (45). Strategies to encourage adequate nutrition among young persons include the following:

- Promote participation in USDA food assistance programs (e.g., the School Breakfast Program and School Lunch Program, the Summer Food Service Program, and the Child and Adult Care Food Program).
- Advise parents and guardians about community-based food supplementation programs (e.g., food stamps; local food pantries; and the Special Supplemental Nutrition Program for Women, Infants, and Children [WIC]).
- Educate students and their families about the importance of eating breakfast.

Iron Deficiency Anemia

Iron deficiency anemia is the most common cause of anemia in the United States (33). Iron deficiency hampers the body's ability to produce hemoglobin, which is needed to carry oxygen in the blood. This deficiency can increase fatigue, shorten attention span, decrease work capacity, reduce resistance to infection, and impair intellectual performance (33,46). Among school-age youths, female adolescents are at greatest risk for iron deficiency. Approximately 1% of elementary school-age children and 2%–4% of adolescent girls ages 12–19 years show evidence of iron deficiency anemia (47). To prevent iron deficiency, children and adolescents should eat adequate amounts of foods high in iron and in vitamin C, which helps the body absorb iron efficiently (33).

Overweight and Obesity*

Overweight and obesity are increasing among children and adolescents in the United States (48–52). The prevalence of overweight among youths ages 6–17 years in the United States has more than doubled in the past 30 years; most of the increase has occurred since the late 1970s (52). Approximately 4.7 million, or 11%, of youths ages 6–17 years are seriously overweight (52). Obesity in young persons is related to elevated blood cholesterol levels (53–56) and high blood pressure (57–59), and some very obese youths suffer from immediate health problems (e.g., respiratory disorders, orthopedic conditions, and hyperinsulinemia) (60). Being overweight during childhood and adolescence has been associated with increased adult mortality (61,62). Furthermore, obese children and adolescents are often excluded from peer groups and discriminated against by adults, experience psychological stress, and have a poor

*Obesity refers to an excess of total body fat. Body fat content is usually estimated by one of two techniques, measuring skinfold thickness or computing the ratio of body weight to height. Researchers who use weight-to-height ratios tend to use the term "overweight" instead of "obesity." Although weight-to-height ratios correlate highly with body fat, they do not distinguish between body fat and lean body tissue: excess fat tissue is generally assumed to account for the additional weight, but excess weight can also include lean body mass or a large body frame (33).

body image and low self-esteem (63,64). Increased physical activity and appropriate caloric intake are recommended for preventing and reducing obesity (35). CDC's guidelines for school and community health programs to promote physical activity among youths address strategies for increasing physical activity among young persons (6).

Unsafe Weight-Loss Methods

Many young persons in the United States practice unsafe weight-loss methods. Deliberately restricting food intake over long periods can lead to poor growth and delayed sexual development (65). Data from one study indicated that the rate of smoking initiation is higher for adolescent girls who diet or who are concerned about their weight than for nondieters or girls having few weight concerns (66), and another study indicated that many white female high school students who smoke report using smoking to control their appetite and weight (67). Harmful weight loss practices have been reported among girls as young as 9 years old (68,69). Young persons involved in certain competitive sports and dancing are particularly at risk for unsafe weight control practices (70). A national survey of 8th- and 10th-grade students found that 32% skipped meals, 22% fasted, 7% used diet pills, 5% induced vomiting after meals, and 3% used laxatives to lose weight (45). Children and adolescents should learn about the dangers of unsafe weight-loss methods and about safe ways to maintain a healthy weight. The emphasis of society in the United States on thinness should be challenged, and young persons need to develop a healthy body image (71).

Eating Disorders

Eating disorders (e.g., anorexia nervosa and bulimia nervosa) are psychological disorders characterized by severe disturbances in eating behavior. Anorexia nervosa is characterized by a refusal to maintain a minimally normal body weight, and bulimia nervosa is characterized by repeated episodes of binge eating followed by compensatory behaviors such as self-induced vomiting (72). Eating disorders often start in adolescence, and >90% of cases occur among females (72). Anorexia nervosa and bulimia nervosa affect as many as 3% of adolescent and young adult females, and the incidence of anorexia nervosa appears to have increased in recent decades (72). Compared with adolescents who have normal eating patterns, adolescents who have eating disorders tend to have lower self-esteem; a negative body image; and feelings of inadequacy, anxiety, social dysfunction, depression, and moodiness (73). Eating disorders can cause many severe complications, and mortality rates for these disorders are among the highest for any psychiatric disorder (74). Persons who have eating disorders should receive immediate medical and psychological treatment.

Dental Caries

Dental caries is perhaps the most prevalent of all diseases (1). It affects 50.1% of youths ages 5–17 years and 84.4% of youths age 17 years (75). More than 50 million hours of school time are lost annually because of dental problems or dental visits (76). Dental caries is a progressive disease, which, if left untreated, can result in acute infections, pain, costly treatment, and tooth loss. A strong link exists between sugar

consumption and dental caries (33). To prevent dental caries, children and adolescents should drink fluoridated water, use fluoridated toothpaste, brush and floss their teeth regularly, have dental sealants applied to the pits and fissures of their teeth, and consume sugars in moderation (1).

EFFECTS OF CHILDHOOD EATING PATTERNS ON CHRONIC DISEASE RISKS OF ADULTS

Nutrition education also should focus on preventing children and adolescents from developing chronic diseases during adulthood. Some of the physiological processes that lead to diet-related chronic disease begin in childhood. For example, autopsy studies have demonstrated that early indicators of atherosclerosis (the hardening of the arteries that is the most common cause of coronary heart disease [CHD]) begin in youth (77–83) and are related to blood cholesterol levels in young persons (79,81–83). Unhealthy eating practices that contribute to chronic disease are established early in life; young persons having unhealthy eating habits tend to maintain these habits as they age (84). Thus, it is efficacious to teach persons healthy eating patterns when they are young; high-risk eating behaviors and physiological risk factors are difficult to change once they are established during youth.

Diet-related risk factors for cardiovascular disease (e.g., high blood cholesterol level, high blood pressure, and overweight) are common in youths in the United States (34,52,85–90). Compared with their peers, children and adolescents who have high blood cholesterol (34,91–96), have high blood pressure (97,98), or are obese (91,99–103) are more likely to have these risk factors during adulthood. Poor diet and inadequate physical activity together account for at least 300,000 deaths in the United States annually and are second only to tobacco use as the most prominent identifiable contributor to premature death (104). Interventions that promote healthy eating and physical activity behaviors during childhood and adolescence may not only prevent some of the leading causes of illness and death but also decrease direct health-care costs and improve quality of life.

Diet is a known risk factor for the development of the nation's three leading causes of death: CHD, cancer, and stroke (33). Other health problems of adulthood associated with diet are diabetes, high blood pressure, overweight, and osteoporosis.

Coronary Heart Disease

CHD kills more persons in the United States than any other disease does (1). Diet-related risk factors for CHD include high blood cholesterol, high blood pressure, and obesity. These risk factors can be reduced by consuming less fat (particularly saturated fat) and cholesterol and by increasing physical activity (105).

Cancer

One out of every five deaths in the United States is attributable to cancer (106). Dietary factors have been associated with several types of cancer, including colon, breast, and prostate (33). All cancer deaths in the United States might be reduced as much as 35% through dietary changes (107,108). The risk for some types of cancer may be reduced by maintaining a healthy weight; limiting consumption of fat, alcohol,

and salt-cured, salt-pickled, or smoked foods; and eating more foods that protect the body against cancer (fruits, vegetables, whole grain cereals, and other high-fiber foods) (109). The National Cancer Institute advises eating at least five servings of fruits and vegetables each day (110).

Stroke

Cerebrovascular disease, or stroke, is the third leading cause of death in the United States and a major cause of illness and disability (111). The most important risk factor for stroke is high blood pressure, which often can be controlled or prevented by adopting a healthy diet and maintaining a healthy weight (112). The risk for stroke can be reduced by consuming less sodium, increasing physical activity, and maintaining a healthy body weight.

Diabetes

Diabetes is the seventh leading cause of death in the United States (104). CHD is two to four times more common and stroke is two to six times more common in persons who have diabetes than in persons who do not have diabetes (113). Diabetes can lead to blindness, kidney disease, and nerve damage (113). Non-insulin-dependent diabetes mellitus, which affects approximately 90% of persons who have diabetes, is often associated with obesity (114). Maintaining a desirable body weight through physical activity and modest caloric restriction is important in preventing diabetes and controlling its complications (114).

High Blood Pressure

High blood pressure is a major cause of CHD, stroke, and kidney failure. About one in four adults in the United States has high blood pressure (115). Persons who have high blood pressure have three to four times the risk of developing CHD and as much as seven times the risk of stroke as do those who have normal blood pressure (116). Persons can reduce their risk for high blood pressure by consuming less sodium, increasing physical activity, and maintaining a healthy body weight. A diet high in potassium may help reduce the risk of high blood pressure (117).

Overweight

In the United States, about one in three adults is overweight (118), and these persons are at increased risk for CHD, some types of cancer, stroke, diabetes mellitus, high blood pressure, and gallbladder disease (33). Overall risk for premature death is increased by excess weight; the risk increases as severity of overweight increases (33). The best way to lose weight is to increase physical activity and control caloric intake, preferably by adopting a diet that is low in fat and high in vegetables, fruits, and grains (35).

Osteoporosis

Osteoporosis is a decrease in the amount of bone so severe that the bone fractures easily. About 1.3 million bone fractures, including many fatal hip fractures, occur per

year in persons ≥ 45 years of age (33). Low dietary calcium, a mineral essential for bone growth, may be associated with an increased risk for osteoporosis (33). For females especially, eating enough calcium is particularly important during childhood, adolescence, and young adulthood—when bones approach their maximum density—to reduce the risk for osteoporosis later in life (1,119–122). Regular weight-bearing exercises also can help prevent osteoporosis (33).

GUIDELINES FOR HEALTHY EATING

To prevent certain diseases and to promote good health, persons >2 years of age should follow the seven recommendations that constitute the Dietary Guidelines for Americans (35). These guidelines are developed by the USDA and USDHHS and are published every 5 years. They are based on extensive reviews of hundreds of studies conducted over many years and represent the best current advice that nutrition scientists can give. The guidelines are consistent with dietary recommendations made by major health promotion organizations, including the National Research Council (32), the National Cholesterol Education Program of the National Institutes of Health (34,105), the National Cancer Institute (109), the American Cancer Society (123), and the American Heart Association (124).

The principles contained in the Dietary Guidelines for Americans should be the primary focus of school-based nutrition education. By enabling young persons to adopt practices consistent with the guidelines, schools can help the nation meet its health objectives (1), which were designed to guide health promotion and disease prevention policy and programs at the federal, state, and local level throughout the 1990s. Objective 2.19 is to “increase to at least 75 percent the proportion of the Nation’s schools that provide nutrition education from preschool through 12th grade, preferably as part of quality school health education” (1). The six relevant dietary guidelines are (a) eat a variety of foods; (b) balance the food you eat with physical activity—maintain or improve your weight; (c) choose a diet with plenty of grain products, vegetables, and fruits; (d) choose a diet low in fat, saturated fat, and cholesterol; (e) choose a diet moderate in sugars; and (f) choose a diet moderate in salt and sodium. (The seventh recommendation concerns adults and alcoholic beverages.) Enabling children and adolescents to follow these guidelines can help the nation achieve these national health objectives for the year 2000 (1):

- 2.3** Reduce overweight to a prevalence of $\leq 20\%$ among people aged 20 and older and $\leq 15\%$ among adolescents aged 12 through 19.
- 2.5** Reduce average dietary fat intake to $\leq 30\%$ of calories and average saturated fat intake to $\leq 10\%$ of calories among people aged two and older.
- 2.6** Increase complex carbohydrates and fiber-containing foods in the diets of adults to five or more daily servings for vegetables (including legumes) and fruits and to six or more daily servings for grain products.
- 2.7** Increase to $\geq 50\%$ the proportion of overweight people aged 12 and older who have adopted sound dietary practices combined with regular physical activity to attain an appropriate body weight.
- 2.8** Increase calcium intake so $\geq 50\%$ of youth aged 12 through 24 and $\geq 50\%$ of pregnant and lactating women consume three or more servings daily of foods rich in calcium, and $\geq 50\%$ of people aged ≥ 25 consume two or more servings daily.

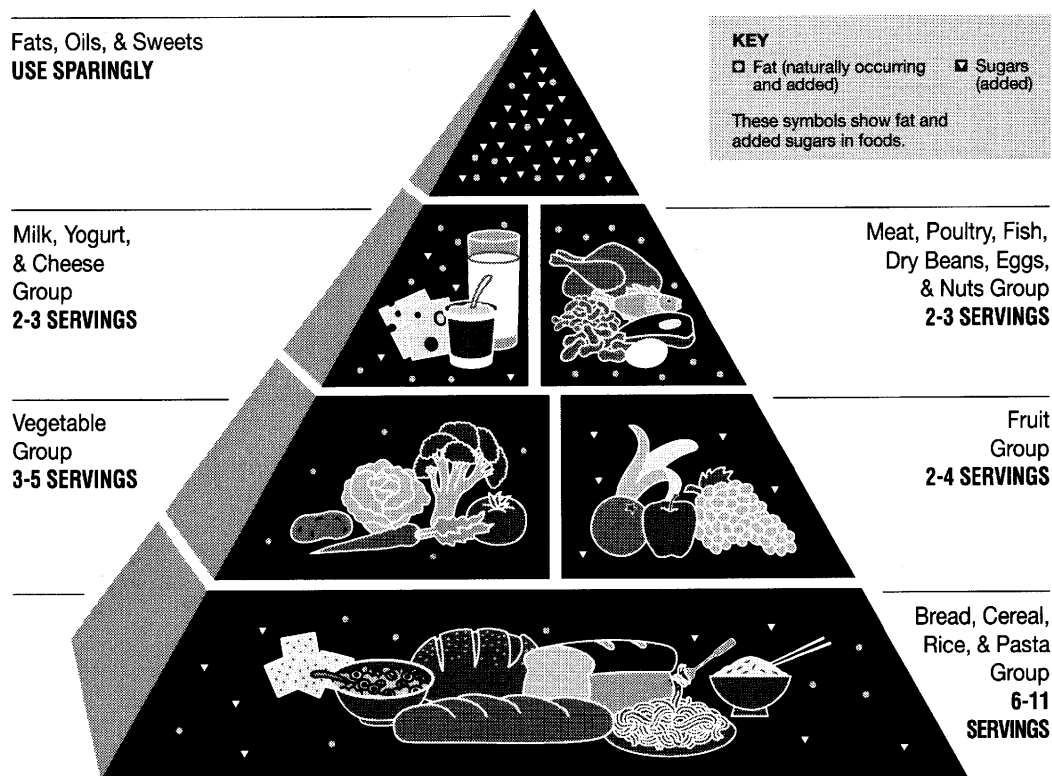
- 2.9** Decrease salt and sodium intake so that $\geq 65\%$ of home meal preparers prepare foods without adding salt, $\geq 80\%$ of people avoid using salt at the table, and $\geq 40\%$ of adults regularly purchase foods modified or lower in sodium.

The Food Guide Pyramid (Figure 1) was designed by the USDA and USDHHS to help persons follow the Dietary Guidelines for Americans. Schools can use the pyramid to illustrate the concepts of variety (eat different foods from among and within the food groups), moderation (limit the consumption of foods high in fat and added sugars), and proportionality (eat relatively greater amounts of foods from the groups that are lower in the pyramid: grains, vegetables, and fruits) (125). Other educational materials supplement the pyramid by listing low-fat choices within each food group (35).

EATING BEHAVIORS OF CHILDREN AND ADOLESCENTS IN THE UNITED STATES

Many young persons in the United States do not follow the recommendations of the Dietary Guidelines for Americans or the Food Guide Pyramid. On average, children and adolescents consume too much fat, saturated fat, and sodium and not enough fruits, vegetables, or calcium (44,126–129; CDC, unpublished data). Children and adolescents obtain 33%–35% of their calories from fat and 12%–13% from saturated fat

FIGURE 1. The Food Guide Pyramid — a guide to daily choices



Source: U.S. Department of Agriculture/U.S. Department of Health and Human Services

(above the recommended levels of 30% and 10%, respectively) (44,128,129). Only 16% of children ages 6–11 years and 15% of adolescents ages 12–19 years meet the recommendation for total fat intake; only 9% of children and 7% of adolescents meet the recommendation for saturated fat intake (130). Almost one-half of 8th- and 10th-grade students eat three or more snacks a day, and most of these snacks are high in fat, sugar, or sodium (45).

Unpublished data from CDC's 1993 Youth Risk Behavior Survey indicated that, on the day before the survey, 41% of high school students in the United States ate no vegetables and 42% ate no fruits (127) (Appendix B). An analysis of a nationally representative sample of youths ages 2–18 years indicated that, over a 3-day period, the youths ate only 3.6 servings of fruits and vegetables daily and that fried potatoes accounted for a large proportion of the vegetables consumed, 20.4% of the youths ate the recommended five or more servings of fruits and vegetables daily, 50.8% ate fewer than one serving of fruit per day, and 29.3% ate fewer than one serving per day of vegetables that were not fried (131). Adolescent females eat considerably less calcium and iron than recommended by the Food and Nutrition Board of the National Research Council (126,129).

Children and adolescents appear to be familiar with the general relationship between nutrition and health but are less aware of the relationship between specific foods and health. For example, young persons understand the importance of limiting fat, cholesterol, and sodium in one's diet, but they do not know which foods are high in fat, cholesterol, sodium, or fiber (45,132,133). One study indicated that adolescents were well-informed about good nutrition and health but did not use their knowledge to make healthy food choices (134).

THE NEED FOR SCHOOL-BASED NUTRITION EDUCATION

Young persons need nutrition education to help them develop lifelong eating patterns consistent with the Dietary Guidelines for Americans and the Food Guide Pyramid. Schools are ideal settings for nutrition education for several reasons:

- Schools can reach almost all children and adolescents.
- Schools provide opportunities to practice healthy eating. More than one-half of youths in the United States eat one of their three major meals in school, and 1 in 10 children and adolescents eats two of three main meals in school (135).
- Schools can teach students how to resist social pressures. Eating is a socially learned behavior that is influenced by social pressures. School-based programs can directly address peer pressure that discourages healthy eating and harness the power of peer pressure to reinforce healthy eating habits.
- Skilled personnel are available. After appropriate training, teachers can use their instructional skills and food service personnel can contribute their expertise to nutrition education programs.
- Evaluations suggest that school-based nutrition education can improve the eating behaviors of young persons (136–138).

School-based nutrition education is particularly important because today's children and adolescents frequently decide what to eat with little adult supervision (139). The increase in one-parent families or families having two working parents and the availability of convenience foods and fast-food restaurants inhibit parents' monitoring of their children's eating habits.

Young persons' food choices are influenced by television advertisements for low-nutritive foods. Young persons see about one food advertisement for every 5 minutes of Saturday morning children's shows (140). Most of the foods advertised during children's programming are high in fat, sugar, or sodium; practically no advertisements are for healthy foods such as fruits and vegetables (140–142). Studies have indicated that, compared with those who watch little television, children and adolescents who watch more television are more likely to have unhealthy eating habits and unhealthy conceptions about food (143), ask their parents to buy foods advertised on television (144), and eat more fat (145). Some studies of young persons have found that television watching is directly associated with obesity (146–149). Because youths in the United States spend, on average, more than 20 hours a week watching television (150)—more time over the course of the year than they are in school (141)—school-based programs should help counter the effect of television on young persons' eating habits.

Schools are a critical part of the social environment that shapes young persons' eating behaviors and can therefore play a large role in helping improve their diet. However, schools cannot achieve this goal on their own when the cultural milieu has a large influence on food-related beliefs, values, and practices (30,138). Families, food stores, restaurants, the food industry, religious institutions, community centers, government programs, and the mass media must also support the principles of the Dietary Guidelines for Americans. The USDA's Team Nutrition (see Appendix A) seeks to gain the support of many sectors of society for improving the diet of young persons by creating innovative public and private partnerships that promote healthy food choices through the media, schools, families, and community (151).

PROMOTING HEALTHY EATING THROUGH A COMPREHENSIVE SCHOOL HEALTH PROGRAM

In the school environment, classroom lessons alone might not be enough to effect lasting changes in students' eating behaviors (30); students also need access to healthy food and the support of persons around them (137). The influence of school goes beyond the classroom and includes normative messages from peers and adults regarding foods and eating patterns. Students are more likely to receive a strong, consistent message when healthy eating is promoted through a comprehensive school health program.

A comprehensive school health program empowers students with not only the knowledge, attitudes, and skills required to make positive health decisions but also the environment, motivation, services, and support necessary to develop and maintain healthy behaviors (152). A comprehensive school health program includes health education; a healthy environment; health services; counseling, psychological, and social services; integrated school and community efforts; physical education; nutrition services; and a school-based health program for faculty and staff (7). Each compo-

nent can contribute to integrated efforts that promote healthy eating. For example, classroom lessons on nutrition can be supported by

- schools providing appealing, low-fat, low-sodium foods in vending machines and at school meetings and events;
- school counselors and nurses providing guidance on health and, if necessary, referrals for nutritional problems;
- community organizations providing counseling or nutrition education campaigns;
- physical education instructors helping students understand the relationship between nutrition and physical activity;
- school food service personnel serving healthy, well-balanced meals in the cafeteria; and
- school personnel acting as role models for healthy eating (153).

The USDA is promoting health-enhancing changes in the food service component of the school health program by requiring schools to serve meals that comply with the Dietary Guidelines for Americans (154) and by providing technical support to schools through Team Nutrition (151).

RECOMMENDATIONS FOR SCHOOL HEALTH PROGRAMS PROMOTING HEALTHY EATING

Based on the available scientific literature, national nutrition policy documents, and current practice, these guidelines provide seven recommendations for ensuring a quality nutrition program within a comprehensive school health program. These recommendations address school policy on nutrition, a sequential, coordinated curriculum, appropriate and fun instruction for students, integration of school food service and nutrition education, staff training, family and community involvement, and program evaluation. Strategies that schools can use to achieve these recommendations are available (Appendix C). However, local school systems need to assess the nutrition needs and issues particular to their communities, and they need to work with key school- and community-based constituents, including students, to develop the most effective and relevant nutrition education plans for their communities. Vigorous, coordinated, and sustained support from communities, local and state education and health agencies, institutions of higher education, and national organizations also is necessary to ensure success (29).

- 1. Policy:** Adopt a coordinated school nutrition policy that promotes healthy eating through classroom lessons and a supportive school environment.
- 2. Curriculum for nutrition education:** Implement nutrition education from pre-school through secondary school as part of a sequential, comprehensive school health education curriculum designed to help students adopt healthy eating behaviors.

3. **Instruction for students:** Provide nutrition education through developmentally appropriate, culturally relevant, fun, participatory activities that involve social learning strategies.
4. **Integration of school food service and nutrition education:** Coordinate school food service with nutrition education and with other components of the comprehensive school health program to reinforce messages on healthy eating.
5. **Training for school staff:** Provide staff involved in nutrition education with adequate preservice and ongoing in-service training that focuses on teaching strategies for behavioral change.
6. **Family and community involvement:** Involve family members and the community in supporting and reinforcing nutrition education.
7. **Program evaluation:** Regularly evaluate the effectiveness of the school health program in promoting healthy eating, and change the program as appropriate to increase its effectiveness.

Recommendation 1. Policy: Adopt a coordinated school nutrition policy that promotes healthy eating through classroom lessons and a supportive school environment.

Rationale for the Policy

A coordinated school nutrition policy, particularly as part of an overall school health policy, provides the framework for implementing the other six recommendations and ensures that students receive nutrition education messages that are reinforced throughout the school environment. For example, such a policy would address nutrition education classes; school lunch and breakfast; classroom snacks and parties; use of food to reward or discipline; and food sold in vending machines, at school stores, snack bars, sporting events, and special activities, and as part of fundraising activities. The school environment can powerfully influence students' attitudes, preferences, and behaviors related to food (137). Without a coordinated nutrition policy, schools risk negating the health lessons delivered in the classroom and cafeteria by allowing actions that discourage healthy eating behaviors.

Developing the Policy

A school nutrition policy should be a brief document that incorporates input from all relevant constituents of the school community: students, teachers, coaches, staff, administrators, food service personnel, nurses, counselors, public health professionals, and parents. The policy should meet local needs and be adapted to the health concerns, food preferences, and dietary practices of different ethnic and socioeconomic groups. Technical assistance for assessing nutrition education needs is available through the state NET Program (155). Schools might consider using one or more of the following techniques to assess their particular needs:

- Interview nutrition professionals to learn more about local eating habits and to identify materials and services available for youths and adults. Schools might interview representatives from the school food service program; the state NET Program; the nutrition unit within the State Department of Health; the district or

state school health coordinator; the local WIC program and Cooperative Extension nutrition education program; the state or local chapters of the American Cancer Society, American Dietetic Association, and the American Heart Association; nutrition councils or coalitions; university research programs; organizations with special insights into the particular nutrition education needs of cultural and ethnic minorities; or businesses that offer nutrition-related services or food products.

- Interview food service staff about students' eating practices in the school cafeteria.
- Observe the school cafeteria, the teachers' lunchroom, and other areas in the school where food is available.
- Review nutrition curricula used by teachers.
- Survey teachers to determine how nutrition is taught, whether teachers use food for reward or punishment, and the level of interest of teachers in nutrition or wellness programs for themselves.
- Survey students to determine their dietary preferences and what types of healthy changes in school food they most want.

The policy plan should include means of obtaining follow-up input from all parties and means of revising the plan as needed. Student involvement is critical to the success of a nutrition policy. A nutrition advisory committee or a nutrition subcommittee of the school health advisory council having student members can develop and promulgate a coordinated school nutrition policy. Technical assistance in forming a school nutrition advisory committee is available from the American School Food Service Association (Appendix A). Successful implementation of a nutrition policy also requires the active support of school and district educational leadership.

Content of the Policy

The written policy should describe the importance of the nutrition component within the comprehensive school health program. This section can briefly describe the role of good nutrition in promoting childhood growth, health, and learning; discuss the role of child and adolescent nutrition in reducing the risk for chronic diseases of adulthood; identify the importance of establishing a school environment that supports healthy eating choices by young persons; and generate support for the policy by identifying how improvements in student nutrition can satisfy the needs of different constituents of the school community (e.g., students, teachers, and food service personnel). An optimal policy on nutrition should publicly commit the school to providing adequate time for a curriculum on nutrition, serving healthy and appealing foods at school, developing food-use guidelines for teachers, supporting healthy school meals, and establishing links with nutrition service providers.

Curriculum. Adequate time should be allocated for nutrition education throughout the preschool, primary, and secondary school years as part of a sequential, comprehensive school health education program. In addition, teachers should be adequately trained to teach nutrition and be provided with ongoing in-service training.

Healthy[†] and appealing foods. Healthy and appealing foods should be available in meals, a la carte items in the cafeteria, snack bars, and vending machines (Exhibit 1); as classroom snacks; and at special events, athletic competitions, staff meetings, and parents' association meetings. In addition, schools should discourage the sale of foods high in fat, sodium, and added sugars (e.g., candy, fried chips, and soda) on school grounds and as part of fundraising activities. Although selling low-nutritive foods may provide revenue for school programs, such sales tell students that it is acceptable to compromise health for financial reasons (158). The school thereby risks contradicting the messages on healthy eating given in class. If schools contract with food service management companies to supply meals, the contractors should be required to serve appealing, low-fat, low-sodium meals that comply with the standards of the Dietary Guidelines for Americans.

EXHIBIT 1: Sample List of Vending Machine Foods Low in Saturated Fat (34)

Canned fruit
Fresh fruit (e.g., apples and oranges)*
Fresh vegetables (e.g., carrots)
Fruit juice and vegetable juice
Low-fat crackers and cookies, such as fig bars and gingersnaps
Pretzels
Bread products (e.g., bread sticks, rolls, bagels, and pita bread)
Ready-to-eat, low-sugar cereals
Granola bars made with unsaturated fat
Low-fat (1%) or skim milk*
Low-fat or nonfat yogurt*
Snack mixes of cereal and dried fruit with a small amount of nuts and seeds[†]
Raisins and other dried fruit[†]
Peanut butter and low-fat crackers[§]

*These foods are appropriate if the vending machine is refrigerated.

[†]Some schools might not want to offer these items because these foods can contribute to dental caries.

[§]Some schools might not want to offer peanut butter; although it is low in saturated fatty acids, peanut butter is high in total fat.

[†]As defined by the U.S. Food and Drug Administration (156,157) in its food label regulations, a "healthy" food must be low in fat (≤ 3 g per serving), be low in saturated fat (≤ 1 g per serving), contain limited amounts of cholesterol (≤ 60 mg per serving for a single-item food), and contain limited amounts of salt (≤ 480 mg per serving until 1998, when the criterion for a single-item food will decrease to ≤ 360 mg per serving). In addition, single-item foods that are not raw fruits or vegetables must provide $\geq 10\%$ of the daily value of one or more of the following nutrients: vitamin A, vitamin C, iron, calcium, protein, and fiber. Criteria for products that include more than one type of food (e.g., macaroni and cheese) vary depending on the food.

Food use guidelines for teachers. Schools should discourage teachers from using food for disciplining or rewarding students. Some teachers give students low-nutritive foods, such as candy, as a reward for good behavior, and punish misbehaving students by denying a low-nutritive treat (159). These practices reinforce students' preferences for low-nutritive foods and contradict what is taught during nutrition education. Schools should recommend that both teachers and parents serve healthy party snacks and treats (160).

Support for healthy school meals. Starting with the 1996–1997 school year, schools will be required to serve meals that comply with the standards of the Dietary Guidelines for Americans (154). To encourage students to participate in school meal programs and to make healthy choices in cafeterias, schools can use marketing-style incentives and promotions (13,14,135,161); use healthy school meals as examples in class; educate parents about the value of healthy school meals; involve students and parents in planning meals; and have teachers, administrators, and parents eat in the cafeteria and speak favorably about the healthy meals available there. Students should also be given adequate time and space to eat meals in a pleasant and safe environment (162).

Links with nutrition service providers. Schools should establish links with qualified public health and nutrition professionals who can provide screening, referral, and counseling for nutritional problems (30,163); inform families about supplemental nutrition services available in the community, such as WIC (164), food stamps, local food pantries, the Summer Food Service Program, and the Child and Adult Care Food Program; and implement nutrition education and health promotion activities for school faculty, other staff, school board members, and parents. These links can help prevent and resolve nutritional problems that can impair a student's capacity to learn, demonstrate the value placed on good nutrition for the entire school community, and help adults serve as role models for school-age youths.

Recommendation 2. Curriculum for nutrition education: Implement nutrition education from preschool through secondary school as part of a sequential, comprehensive school health education curriculum designed to help students adopt healthy eating behaviors.

Nutrition Education as Part of a Comprehensive School Health Education Program

Nutrition education should be part of a comprehensive health education curriculum that focuses on understanding the relationship between personal behavior and health. This curriculum should give students the knowledge and skills they need to be "health literate," as delineated by the national health education standards (29) (Exhibit 2). The comprehensive health education approach is important to nutrition education because

EXHIBIT 2: National Health Education Standards (29)

1. Students will comprehend concepts related to health promotion and disease prevention.
2. Students will be able to access valid health information and health-promoting products and services.
3. Students will be able to practice health-enhancing behaviors and reduce health risks.
4. Students will analyze the influence of culture, media, technology, and other factors on health.
5. Students will be able to use interpersonal communication skills to enhance health.
6. Students will be able to use goal-setting and decision-making skills to enhance health.
7. Students will be able to advocate for personal, family, and community health.

- unhealthy eating behaviors may be interrelated with other health risk factors (e.g., cigarette smoking and sedentary lifestyle) (165),
- nutrition education shares many of the key goals of other health education content areas (e.g., raising the value placed on health, taking responsibility for one's health, and increasing confidence in one's ability to make health-enhancing behavioral changes), and
- state-of-the-art nutrition education uses many of the social learning behavioral change techniques used in other health education domains.

Therefore, nutrition education activities can reinforce, and be reinforced by, activities that address other health education topics as well as health in general.

Linking nutrition and physical activity is particularly important because of the rising proportion of overweight youths in the United States. Nutrition education lessons should stress the importance of combining regular physical activity with sound nutrition as part of an overall healthy lifestyle. Physical education classes, in turn, should include guidance in food selection (6).

Sequential Lessons and Adequate Time

Students who receive more lessons on nutrition have more positive behavioral changes than students who have fewer lessons (166,167). To achieve stable, positive changes in students' eating behaviors, adequate time should be allocated for nutrition education lessons. The curriculum should be sequential from preschool through secondary school; attention should be paid to scope and sequence. When designing the curriculum, schools should assess and address their students' needs and concerns. A curriculum targeted to a limited number of behaviors might make the most effective use of a scarce instructional time available for nutrition education (136).

To maximize classroom time, nutrition education can be integrated into the lesson plans of other school subjects; for example, math lessons could analyze nutrient intake or reading lessons could feature texts on nutrition (168). Little research on the integrated approach has been conducted (137), but embedding information on nutrition in other courses probably reinforces the goals of nutrition education. However, the exclusive use of an integrative approach might sacrifice key elements of an effective nutrition education program (e.g., adequate time, focusing on behaviors and skill-building, attention to scope and sequence, and adequate teacher preparation) (137). Therefore, integration into other courses can complement but should not replace sequential nutrition education lessons within a comprehensive school health education curriculum. Classroom time can be maximized also by having nutrition education lessons use skills learned in other classes (e.g., math or language arts) (169–171).

Organizations and agencies can supply information on specific nutrition education curricula and materials (Appendix A). The USDA's NET Program provides technical assistance in school-based nutrition education (2,172). The Food and Nutrition Information Center of USDA's National Agricultural Library provides information on nutrition education evaluation and resources and serves as a national depository and lending library for NET materials. Nutritionists at some organizations can also answer specific nutrition content questions (Appendix A).

Focusing on Promoting Healthy Eating Behaviors

The primary goal of nutrition education should be to help young persons adopt eating behaviors that will promote health and reduce risk for disease. Knowing how and why to eat healthily is important, but knowledge alone does not enable young persons to adopt healthy eating behaviors (137). Cognitive-focused curricula on nutrition education typically result in gains in knowledge but usually have little effect on behavior (173–178).

Behaviorally based education encourages specific healthy eating behaviors (e.g., eating less fat and sodium and eating more fruits and vegetables) (136,179); however, it does not detail the technical and scientific knowledge on which dietary recommendations are based and, therefore, might not fulfill science education requirements (180). The strategies listed in Appendix C can be used as central concepts in a behaviorally based nutrition education program.

Several programs using a behavioral approach have achieved significant ($p < 0.05$), positive changes in students' eating behaviors (167,181–190). Compared with students in control schools, students in some behaviorally based health and nutrition education programs had significant ($p < 0.05$), favorable changes in serum cholesterol levels (167,188,191), blood pressure level (167,191), and body mass index (184). Although most of the behaviorally oriented programs did not achieve all their behavioral aims—perhaps because of the limited amount of curriculum time (136)—current scientific knowledge indicates that a focus on behavior is a key determinant in the success of nutrition education programs (136–138).

Recommendation 3. Instruction for students: Provide nutrition education through developmentally appropriate, culturally relevant, fun, participatory activities that involve social learning strategies.

Developmentally Appropriate and Culturally Relevant Activities

Different educational strategies should be used for young persons at different stages of cognitive development. Regardless of the amount and quality of teaching they receive, young elementary schoolchildren might not fully understand abstract concepts (e.g., the nutrient content of foods or the classification of foods into groups) (192–194). Nutrition education for young children should focus on concrete experiences (e.g., increasing exposure to many healthy foods and building skills in choosing healthy foods) (169).

More abstract associations between nutrition and health become appropriate as children approach middle school. By this age, children can understand and act on the connection between eating behaviors and health (137,194). Nutrition education for middle and high school students should focus on helping students assess their own eating behaviors and set goals for improving their food selection (138,195). Lessons for older children should emphasize personal responsibility, decision-making skills, and resisting negative social pressures (183,185,187,189).

Nutrition education presents opportunities for young persons to learn about and experience cultural diversity related to food and eating. Students from different cultural groups have different health concerns, eating patterns, food preferences, and food-related habits and attitudes. These differences need to be considered when designing lesson plans or discussing food choices. Nutrition education can succeed only when students believe it is relevant to their lives.

Active Learning and an Emphasis on Fun

The context in which students learn about healthy eating behaviors and the feelings students associate with healthy foods are key factors in determining their receptivity to nutrition education. Students are more likely to adopt healthy eating behaviors when

- they learn about these behaviors through fun, participatory activities rather than through lectures (138,196,197);
- lessons emphasize the positive, appealing aspects of healthy eating patterns rather than the negative consequences of unhealthy eating patterns;
- the benefits of healthy eating behaviors are presented in the context of what is already important to the students; and
- the students have repeated opportunities to taste foods that are low in fat, sodium, and added sugars and high in vitamins, minerals, and fiber during their lessons.[§]

[§]When serving food, teachers must use hygienic food handling practices and consider possible food allergies and religious prohibitions; the food service director can help in this area.

Computer-based lessons on nutrition can also be effective (198), especially when teacher time is limited or when student self-assessment is appropriate. Interactive, highly entertaining, and well-designed computer programs are now available to help young persons learn healthy food selection skills and assess their own diets (199,200). Computer-based lessons allow students to move at their own pace and can capture their attention.

Social Learning Techniques

Most of the nutrition education programs that have resulted in behavioral change have used teaching strategies based on social learning theory (195,201–205). In such lessons, increasing student knowledge is only one of many objectives. Social learning instruction also emphasizes

- raising the value students place on good health and nutrition and identifying the benefits of adopting healthy eating patterns, including short-term benefits that are important to young persons (e.g., physical appearance, sense of personal control and independence, and capacity for physical activities);
- giving students repeated opportunities to taste healthy foods, including foods they have not yet tasted;
- working with parents, school personnel, public health professionals, and others to overcome barriers to healthy eating;
- using influential role models, including peers, to demonstrate healthy eating practices;
- providing incentives (e.g., verbal praise and small prizes) to reinforce messages;
- helping students develop practical skills for and self-confidence in planning meals, preparing foods, reading food labels, and making healthy food choices through observation and hands-on practice;
- enabling students to critically analyze sociocultural influences, including advertising, on food selection, to resist negative social pressures, and to develop social support for healthy eating; and
- helping students analyze their own eating patterns, set realistic goals for changes in their eating behaviors, monitor their progress in reaching those goals, and reward themselves for achieving their goals.

Nutrition education strategies include social learning techniques (Appendix C).

Recommendation 4. Integration of school food service and nutrition education: Coordinate school food service with nutrition education and with other components of the comprehensive school health program to reinforce messages on healthy eating.

The school cafeteria provides a place for students to practice healthy eating. This experience should be coordinated with classroom lessons to allow students to apply critical thinking skills taught in the classroom (2,8,9,11–15,18,169,178,206). School food service personnel can

- visit classrooms and explain how they make sure meals meet the standards of the Dietary Guidelines for Americans,
- invite classes to visit the cafeteria kitchen and learn how to prepare healthy foods,
- involve students in planning the school menu and preparing recipes,
- offer foods that reinforce classroom lessons (e.g., whole wheat rolls to reinforce a lesson on dietary fiber),
- post in the cafeteria posters and fliers on nutrition, and
- display nutrition information about available foods and give students opportunities to practice food analysis and selection skills learned in the classroom.

In addition, classroom teaching can complement the goals of the school food service. For example, teachers can help food service managers by teaching students about the importance of nutritious school meals and getting feedback from students on new menu items developed to meet the goals set by USDA's School Meals Initiatives for Healthy Children (154).

To ensure consistent nutrition messages from the school, food service personnel should work closely with those responsible for other components of the school health program. For example, the personnel can

- help develop and implement school policies that make healthful foods available;
- educate parents about the value of school meals (e.g., put health messages in monthly menus sent home to parents or make periodic presentations at parents' association meetings) (11,13);
- help schools access and assess community public health and nutrition services; and
- keep classroom teachers, physical education teachers, coaches, counselors, health-service providers, and other staff informed about the importance of healthy school meals.

Recommendation 5. Training for school staff: Provide staff involved in nutrition education with adequate preservice and ongoing in-service training that focuses on teaching strategies for behavioral change.

Training in nutrition and health education can increase the extent to which teachers implement a curriculum (207–209), which in turn affects the likelihood that students' eating behaviors will change (167,207). All elementary school teachers as well as secondary school teachers in disciplines such as home economics, family and consumer sciences, language arts, physical education, and science should receive nutrition education training. State NET Programs can provide technical assistance for training teachers in nutrition education (Appendix A).

Training should address content and teaching strategies. Because classroom teachers often need more help with innovative nutrition teaching techniques than with content (195,210), training should focus on giving teachers the skills they need to use the nonlecture, active learning methods discussed previously (195). Training programs are most effective if they

- are designed to meet the specific needs of the teachers and are based on the teachers' level of nutrition knowledge and experience with the suggested teaching strategies,
- model behavioral change techniques and give teachers practice in using them,
- involve multiple sessions spaced across time so that teachers can try out the newly learned techniques in their classrooms and report on their experiences to the training group, and
- provide posttraining sessions so that teachers can share experiences with their peers (211,212).

Teachers should understand the importance of fully implementing the selected curriculum and become familiar with its underlying theory and concepts. Training should also help teachers assess and improve their own eating practices and make them aware of the behavioral messages they give as role models (213).

Continuing education activities in nutrition education should be offered to food service personnel so this staff can reinforce classroom instruction through the school meal program and help shape the school's nutrition policy. State NET Programs and the National Food Service Management Institute provide technical assistance and training seminars for school nutrition professionals (see Appendix A). Administrative support is also critical to implementing a new program (214). Training for school administrators can help gain their support for nutrition education. Health promotion services for all school staff can positively affect their eating behaviors and their effectiveness in teaching healthy eating behaviors (180,215,216).

Recommendation 6. Family and community involvement: Involve family members and the community in supporting and reinforcing nutrition education.

The attitudes and behaviors of parents and caretakers directly influence children's and adolescents' choice of foods (217,218). Parents control most of the food choices available at home, so changing parents' eating behaviors may be one of the most effective ways to change their children's eating behaviors. Involving parents in a nutrition education curriculum at the elementary school level can enhance the eating behaviors of both the students (181,219–221) and the parents (181,219,222). Although parental involvement can enhance the effects of nutrition education programs at the elementary school level, it is not known whether involving parents at the secondary school level helps improve the students' eating behaviors. For older youths, self-assessment (185,189,198) and peer educators (187) might be more influential than parental involvement (137).

Parents are usually more receptive to activities that can be done at home than to those that require their attendance at the school (223,224). To involve parents and other family members in nutrition education, schools can

- send nutrition education materials and cafeteria menus home with students,
- ask parents to send healthy snacks to school,
- invite parents and other family members to periodically eat with their children in the cafeteria,
- invite families to attend exhibitions of student nutrition projects or health fairs (217),
- offer nutrition education workshops and screening services, and
- assign nutrition education homework that students can do with their families (e.g., reading and interpreting food labels, reading nutrition-related newsletters, and preparing healthy recipes).

Through school health advisory councils or through direct contact with community organizations, schools can engage community resources and services to respond to the nutritional needs of students (225,226). Schools can also participate in community-based nutrition education campaigns sponsored by public health agencies or voluntary organizations. Students are most likely to adopt healthy eating behaviors if they receive consistent messages through multiple channels (e.g., home, school, community, and the media) and from multiple sources (e.g., parents, peers, teachers, health professionals, and the media) (225).

Recommendation 7. Program evaluation: Regularly evaluate the effectiveness of the school health program in promoting healthy eating, and change the program as appropriate to increase its effectiveness.

Policymakers should regularly review the effectiveness of the school nutrition program. All groups affected by the program should have the opportunity to provide input. Assessment of nutrition programs and policies should include whether

- a comprehensive school nutrition policy exists and is implemented as written;
- nutrition education is provided throughout the preschool, primary, and secondary school years as part of comprehensive school health education;
- teachers deliver nutrition education through developmentally appropriate, culturally relevant, fun, participatory activities that involve social learning strategies;
- teachers and school food service personnel have undertaken joint project planning and action;
- teachers have received curriculum-specific training; and
- families and community organizations are involved in nutrition education.

Schools might also consider measuring the effects of their programs and policies on self-reported eating behaviors; key variables that influence behavior, such as knowledge, attitudes, self-confidence, and behavioral intentions; and in-school eating behaviors that are easy to assess, such as participation in school food service programs and the number of students choosing healthy alternatives in the cafeteria (e.g., salad bars or low-fat milk).

Schools can consult with the state NET Program or with evaluation specialists at universities, school districts, or the state departments of education or health to identify methods and materials for evaluating the effectiveness of their program (227,228). Valid evaluations can increase parent and community support for school programs, help schools reward teachers for exceptional work, and support grant applications for enhancing school health programs.

CONCLUSION

To ensure a healthy future for our children, school-based nutrition education programs must become a national priority. These programs should be part of comprehensive school health programs and reach students from preschool through secondary school. School leaders, community leaders, and parents must commit to implementing and sustaining nutrition education programs within the schools. Such support is crucial to promoting healthy eating behaviors.

The seven recommendations for school-based nutrition education presented in this report provide the framework for establishing such programs. By adopting these recommendations, schools can help ensure that all school-age youths attain their full educational potential and good health.

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APPENDIX A: NUTRITION EDUCATION RESOURCE LIST

Nutrition education curricula and print, audiovisual, and computer-based materials are available from government agencies, voluntary organizations, corporations, and commodity organizations. State Nutrition Education and Training Program coordinators can help schools identify the most appropriate nutrition education curricula and materials. National clearinghouses that can help schools identify a wide range of nutrition education and school food service resources are sponsored by the U.S. Department of Agriculture's Food and Nutrition Information Center and the National Food Service Management Institute; the former also serves as a lending library.

Food and Nutrition Information Center
National Agricultural Library
U.S. Department of Agriculture
10301 Baltimore Blvd., Room 304
Beltsville, MD 20705
301-504-5719

National Food Service Management
Institute
P.O. Box 188
University of Mississippi
University, MS 38677
800-321-3054

At the local and state levels, educational materials or curricula may be available from affiliates of voluntary health promotion organizations (e.g., the American Cancer Society or the American Heart Association), commodity organizations or national boards for specific food industries, county cooperative extension services, local and state health departments, school districts, state education agencies, and universities. At the national level, nutrition education materials can also be obtained from the following voluntary organizations and federal government agencies:

American Cancer Society
1599 Clifton Road, NE
Atlanta, GA 30328
800-ACS-2345 (800-227-2345)

American Dietetic Association
National Center for Nutrition
and Dietetics
216 W. Jackson Blvd., Suite 800
Chicago, IL 60606-6995
800-745-0775 ext. 5000

American Heart Association
7272 Greenville Ave.
Dallas, TX 75231-4596
800-AHA-USA1 (800-242-8721)

American School Food Service
Association
1600 Duke St., 7th Floor
Alexandria, VA 22314
800-877-8822 ext. 116

Consumer Information Center
Pueblo, CO 81009
719-948-4000 (call for catalog)

International Food Information Council
1100 Connecticut Ave., NW, Suite 430
Washington, DC 20036
202-296-6540

National Cancer Institute
Office of Cancer Communications
Building 31, Room 10A16
31 Center Drive MSC-2580
Bethesda, MD 20892-2580
800-4-CANCER (800-422-6237)

National Heart, Lung, and Blood
Institute Information Center
P.O. Box 30105
Bethesda, MD 20824-0105
301-251-1222

Team Nutrition
U.S. Department of Agriculture
3101 Park Center Drive, Room 802
Alexandria, VA 22302
703-305-1624

APPENDIX B: YOUTH RISK BEHAVIOR SURVEILLANCE SYSTEM AND SCHOOL HEALTH POLICIES AND PROGRAMS STUDY

In 1990, CDC established the Youth Risk Behavior Surveillance System to help monitor progress in attaining national health and education objectives by periodically measuring the prevalence of behaviors in six health risk categories. These behaviors, which are usually established during youth, contribute to the leading causes of death and disease in the United States. Dietary behaviors are one of the six health risk categories. CDC conducts the Youth Risk Behavior Survey (YRBS) biennially in a national probability sample of high school students and enables interested state and local education agencies to conduct the survey in comparable probability samples in states and cities (127). The specific dietary behaviors and attitudes monitored by the YRBS include consumption of fruits and vegetables, consumption of foods high in fat, perceptions of body weight, and attempted weight loss and weight-loss techniques used. The YRBS also obtains information about specific physical activity behaviors.

In 1994, CDC conducted the School Health Policies and Programs Study (SHPPS), which is a national study of school policies and programs at the school, district, and state levels that support comprehensive school health programs. The study also provides baseline data on national health and education objectives that can be attained through school health and physical education, school food service, and school health services and policies (229).

SHPPS included a mail survey of local and state education agencies' policies related to school health in grades kindergarten through 12. The survey was conducted in all states and in a nationally representative sample of districts. The study also included on-site, structured interviews with school principals, health education teachers, physical education teachers, school food service directors, school nurses, counselors, and other personnel in a nationally representative sample of middle schools and high schools. The questionnaire included the following: school nutrition education requirements for students; the content of nutrition education curricula; training and joint activities of food service staff and teachers responsible for nutrition education; school policies related to foods sold in vending machines and for fundraising; food service practices related to purchasing and preparing food; involvement of parents, staff, and students in planning food service meals; and involvement of fast-food or food service management companies in school meals.

Single copies of YRBS and SHPPS reports are available from CDC's Division of Adolescent and School Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Mailstop K-33, 4770 Buford Highway, NE, Atlanta, GA 30341-3724; telephone: (770) 488-5330.

APPENDIX C: SELECTED SCHOOL-BASED STRATEGIES TO PROMOTE HEALTHY EATING

Different, developmentally appropriate activities are listed for lower elementary school, upper elementary school, and middle and high school students (194). This list is not intended to be comprehensive. However, it does include many of the concepts critical to improving the diet and health of young persons in this country. Schools should review these educational activities in relation to their students' needs and abilities to determine which activities are appropriate at each grade level.

Interventions that promote healthy changes in eating behaviors need to target three interacting spheres of influence: (a) the environment, which influences the likelihood that healthy eating behaviors will be adopted through social norms, influential role models, cues to action, reinforcements, and opportunities for action; (b) personal characteristics (e.g., knowledge, attitudes, beliefs, values, confidence in one's ability to change eating behaviors, and expectations about the consequences of making those changes); and (c) behavioral skills and experience, which are related to selecting or preparing specific foods, dietary self-assessment, and decision-making (186, 194, 203, 204).

The strategies listed here require the involvement of teachers, administrators, food service personnel, other school staff, and parents (194). Classroom teachers play the lead role in most of these activities, but many activities would be most effective if they were reinforced by other persons; all adults in the school community can help by serving as role models. Each school or district should determine the policies it needs to guide its nutrition-related activities and who is responsible for the tasks.

For lower elementary students

Strategies to make the food environment more health-enhancing

- Make healthy foods (e.g., fruits, vegetables, and whole grains) widely available at school, and discourage the availability of foods high in fat, sodium, and added sugars.
- Involve parents in nutrition education through homework.
- Provide role models (e.g., teachers, parents, other adults, older children, and celebrities or fictional characters) for healthy eating.
- Provide cues, through posters and marketing-style incentives, that encourage students to make healthy choices about eating and physical activity.
- Use incentives, such as verbal praise or token gifts, to reinforce healthy eating and physical activity. Do not use food for reward or punishment of any behavior.

Strategies to enhance personal characteristics that will support healthy eating

- Make basic connections between food and health (e.g., "You need food to feel good and to grow").

- Teach the importance of balancing food intake and physical activity.
- Identify healthy snacks (e.g., fruits, vegetables, and low-fat milk).
- Increase students' confidence in their ability to make healthy eating choices by gradually building up their food selection and preparation skills and giving them practice.

Strategies to enhance behavioral capabilities that will support healthy eating

- Provide many healthy foods for students to taste in an enjoyable social context.
- Let students prepare simple snacks.
- Have students try unfamiliar and culturally diverse foods that are low in fat, sodium, and added sugars.

For upper elementary students

Strategies to make the food environment more health-enhancing

- Make healthy foods (e.g., fruits, vegetables, and whole grains) widely available at school, and discourage the availability of foods high in fat, sodium, and added sugars.
- Involve parents in nutrition education through homework.
- Provide role models (e.g., teachers, parents, other adults, adolescents, and celebrities or fictional characters) for healthy eating.
- Through class discussions and small-group exercises, provide social support for making healthy changes in eating and physical activity.
- Provide cues, through posters and marketing-style incentives that students design, that encourage students to make healthy choices about eating and physical activity.
- Use incentives, such as verbal praise or token gifts, to reinforce healthy eating and physical activity. Do not use food as a reward or punishment of any behavior.

Strategies to enhance personal characteristics that will support healthy eating

- Explain the effects that diet and physical activity have on future health as well as on immediate concerns (e.g., current health, physical appearance, obesity, sense of well-being, and capacity for physical activity).
- Teach the principles of the Dietary Guidelines for Americans and the Food Guide Pyramid. Instill pride in choosing to eat meals and snacks that comply with these principles.

- Help students identify foods high and low in fat, saturated fat, cholesterol, sodium, added sugars, and fiber.
- Teach the importance of balancing food intake and physical activity.
- Teach the importance of eating adequate amounts of fruits, vegetables, and whole grains.
- Help students increase the value they place on health and their sense of control over food selection and preparation.
- Increase students' confidence in their ability to make healthy eating choices by gradually building up their food selection and preparation skills and giving them practice.
- Have students analyze food preferences and factors that trigger eating behaviors.

Strategies to enhance behavioral capabilities that will support healthy eating

- Provide opportunities for students to taste many healthy foods in an enjoyable social context.
- Let students prepare healthy snacks or simple meals.
- Encourage students to try unfamiliar and culturally diverse foods that are low in fat, sodium, and added sugars and that are high in fiber.
- Have students select healthy foods from a fast-food restaurant menu.
- Teach students how to recognize the fat, sodium, and fiber contents of foods by reading nutrition labels.
- Help students record and assess their food intake.
- Teach students how to use the Food Guide Pyramid to assess their diet for variety, moderation, and proportionality.
- Have students set simple goals for changes in eating and physical activity, and devise strategies for implementing these changes and monitoring progress in reaching their goals.
- When appropriate, let students practice (through role plays) encouraging parents to make healthy choices about eating and physical activity at home.
- Have students examine media and social influences on eating and physical activity; teach students how to respond to these pressures.

For middle and high school students

Strategies to make the food environment more health-enhancing

- Make healthy foods (e.g., fruits, vegetables, and whole grains) widely available at school, and discourage the availability of foods high in fat, sodium, and added sugars.
- Provide role models (e.g., teachers, parents, other adults, and celebrities) for healthy eating.
- Use peers as role models, and use peer-led nutrition education activities.
- Through class discussions and small-group exercises, provide social support for making healthy changes in eating and physical activity.
- Provide cues, through posters and marketing-style incentives that students design, that encourage students to make healthy choices about eating and physical activity.

Strategies to enhance personal characteristics that will support healthy eating

- Explain the effects that diet and physical activity have on future health as well as on immediate concerns (e.g., current health, physical appearance, obesity, eating disorders, sense of well-being, and capacity for physical activity).
- Have students identify reasons to adopt healthy eating and physical activity patterns.
- Teach the principles of the Dietary Guidelines for Americans. Instill in the students pride in choosing to eat meals and snacks that comply with these principles.
- Teach students how to identify foods high and low in fat, saturated fat, cholesterol, sodium, and added sugars.
- Teach students how to identify foods that are excellent sources of fiber, complex carbohydrates, calcium, iron, vitamin A, vitamin C, and folate.
- Teach the importance of balancing food intake and physical activity.
- Teach the effects of unsafe weight-loss methods and the characteristics of a safe weight-loss program.
- Help students increase the value they place on health and their sense of control over food selection and preparation.
- Increase students' confidence in their ability to eat healthily by gradually building up their skills and giving them practice.
- Help students examine what motivates persons to adopt particular eating habits. Have students keep a food diary noting what cues their own eating behavior (e.g., mood, hunger, stress, or other persons).

Strategies to enhance behavioral capabilities that will support healthy eating

- Let students plan and prepare healthy meals.
- Have students select healthy foods from restaurant and cafeteria menus.
- Teach students how to use nutrition labels to make healthy food choices.
- Teach students ways to modify recipes and prepare foods to reduce fat and sodium content and to increase fiber content.
- Help students identify incentives and reinforcements for their current eating and physical activity behaviors.
- Have students examine media and social inducements to adopt unhealthy eating and physical activity patterns, teach them how to respond to these pressures, and let them use their new knowledge to identify their own resistance strategies.
- Have students analyze environmental barriers to healthy eating and physical activity; explore strategies for overcoming these barriers.
- When appropriate, give students practice in encouraging parents to make healthy choices about eating and physical activity at home.
- Teach students to record their food intake, then have them assess and compare their diets with the standards set forth in the Dietary Guidelines for Americans and the Food Guide Pyramid. Have them assess and compare their intake of key nutrients (e.g., calcium and iron) with the intake recommended by the Public Health Service.
- Have students set goals for healthy changes in eating and physical activity, identify barriers and incentives, and assess alternative strategies for reaching their goals and decide which to follow. Show students how to monitor their progress, revise their goals if necessary, and reward themselves for successfully attaining their goals.
- Teach students how to evaluate nutrition claims from advertisements and nutrition-related news stories.

MMWR

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APPENDIX D

**SELECTED U. S. CENTERS FOR DISEASE CONTROL AND PREVENTION
GUIDELINES FOR SCHOOL HEALTH PROGRAMS
TO PROMOTE LIFELONG HEALTHY EATING
AND CORRESPONDING QUESTIONS IN SCHOOL HEALTH POLICIES AND
PROGRAMS STUDY 2000, STATE QUESTIONNAIRE**

CDC Guidelines	School Health Policies and Programs State Questionnaire ¹⁹
<p><u>Healthy and appealing foods</u></p> <p>“An optimal policy on nutrition should publicly commit the school to...serving healthy and appealing foods at school...”</p> <p>U.S. Centers for Disease Control and Prevention. <u>Guidelines for school health programs to promote lifelong healthy eating.</u> (CDC 1996b, p. 13)</p>	<p><u>Food Service Q#23: Three types of milk</u> Has your state adopted a policy stating that schools will offer students 3 or more different types of milk (e.g., 2% chocolate milk, skim unflavored milk, etc.) <u>each day</u>?</p> <p><u>Food Service Q#24: Whole grains</u> Has your state adopted a policy stating that schools will offer students 5 or more foods containing whole grain <u>each week</u>?</p> <p><u>Food Service Q#25: Choices for lunch</u> Has your state adopted a policy stating that schools will offer students a choice between the following items <u>each day for lunch</u>?— 2 subparts:</p> <ul style="list-style-type: none"> (1) 2 or more different entrees or main courses (2) 2 or more different vegetables <p>2 or more different fruits or types of 100% fruit juice?</p>

¹⁹U.S. Centers for Disease Control and Prevention, School Health Policies and Programs Study, Data and Documentation, 2000b.

CDC Guidelines	School Health Policies and Programs State Questionnaire ¹⁹
<p><u>Adequate time to eat</u></p> <p>“Students should also be given adequate time and space to eat meals in a pleasant and safe environment.”</p> <p>(CDC, 1996b, p. 15)</p>	<p><u>Food Service Q#21: Minimum Time to Eat</u> [Regarding lunch policy] Does the policy require or recommend a minimum amount of time students will be given to eat lunch once they are seated?</p> <p>Require Recommend Neither</p>
<p><u>Staff credentials in nutrition</u></p> <p>“...teachers should be adequately trained to teach nutrition and be provided with ongoing in-service training.”</p> <p>(CDC, 1996b, p. 13)</p>	<p><u>Health Education Q#32: Newly-hired staff</u> Has your state adopted a policy stating that <u>newly-hired</u> staff who teach health education at each of the following levels will have undergraduate or graduate training in health education?</p> <p>Elementary school Middle/junior high school Senior high school</p>

CDC Guidelines	School Health Policies and Programs State Questionnaire ¹⁹
<p><u>Requirement to teach nutrition and diet</u></p> <p>“Implement nutrition education from pre-school through secondary school as part of a sequential, comprehensive school health education curriculum designed to help students adopt healthy eating behaviors.”</p> <p>(CDC, 1996b, p. 11)</p>	<p><u>Health Education Q#7(3): Elementary Schools</u> Has your state adopted a policy stating that elementary schools will teach each of the following health topics? ...(3). Nutrition and dietary behavior</p> <p><u>Health Education Q#13(3): Middle/Junior High Schools</u> Has your state adopted a policy stating that middle/junior high schools will teach each of the following health topics? ...(3). Nutrition and dietary behavior</p> <p><u>Health Education Q#19(3): High Schools</u> Has your state adopted a policy stating that high schools will teach each of the following health topics? ...(3). Nutrition and dietary behavior</p>

CDC Guidelines	School Health Policies and Programs State Questionnaire ¹⁹
<p><u>Using food for reward or punishment</u></p> <p>“Schools should discourage teachers from using food for disciplining or rewarding students. Some teachers give low-nutritive foods, such as candy, as a reward for good behavior, and punish misbehaving students by denying a low-nutritive treat. These practices reinforce students’ preferences for low-nutritive foods and contradict what is taught during nutrition education.”</p> <p>In recommending content of a coordinated school nutrition policy, guidelines suggest that “...such a policy would address...use of food to reward or discipline.”</p> <p>(CDC, 1996b, p. 12)</p>	<p><u>Food Service Q#31: Use of Food for Reward</u> Has your state adopted a policy prohibiting schools from using food or food coupons as a reward for good behavior or good academic performance?</p> <p><u>Food Service Q#32:</u> Does your state education agency discourage (e.g., memoranda or guidelines) schools from using food or food coupons as a reward for good behavior or good academic performance?</p>

APPENDIX E

SELECTED U. S. CENTERS FOR DISEASE CONTROL AND PREVENTION GUIDELINES FOR SCHOOL HEALTH PROGRAMS TO PROMOTE LIFELONG PHYSICAL ACTIVITY AMONG YOUNG PEOPLE AND CORRESPONDING QUESTIONS IN SCHOOL HEALTH POLICIES AND PROGRAMS STUDY 2000, STATE QUESTIONNAIRE

CDC Guidelines	School Health Policies and Programs State Questionnaire ²⁰
<p><u>Preventing Injury</u> “Children and adolescents should be provided with, and required to use, protective clothing and equipment appropriate to the type of physical activity and the environment.”</p> <p>“Explicit safety rules should be taught to, and followed by, young people in physical education, health education, extracurricular physical activity programs, and community sports and recreation programs.”</p> <p>U.S. Centers for Disease Control and Prevention. <u>Guidelines for school and community programs to promote lifelong physical activity among young people.</u> (CDC, 1997, p. 11)</p>	<p><u>Physical Education Q#46: Protective Gear</u> Has the state adopted a policy requiring that students wear appropriate protective gear when engaged in the following activities?</p> <ul style="list-style-type: none"> (1) Physical activities during physical education (2) Intramural sports (3) Interscholastic sports
<p><u>Adequate time to exercise</u></p>	<p><u>Physical Education Q#12: Time to Exercise</u> Does your state education agency require or</p>

²⁰U.S. Centers for Disease Control and Prevention, School Health Policies and Programs Study, Data and Documentation, 2000b.

CDC Guidelines	School Health Policies and Programs State Questionnaire ²⁰
<p>“Provide time within the school day for unstructured physical activity...The use of time during the school day for unstructured physical activity should complement rather than substitute for the physical activity and instruction children receive in physical education classes.”</p> <p>(CDC, 1997, p. 12)</p>	<p>recommend that elementary schools provide students with regularly scheduled recess?</p> <p>Require Recommend Neither</p>
<p><u>Staff credentials in physical education</u></p> <p>“Require the hiring of physical education specialists to teach physical education in kindergarten through grade 12.”</p> <p>(CDC, 1997, p.9)</p>	<p><u>Physical Education Q#52: Newly-hired staff</u> Has your state adopted a policy stating that <u>newly-hired</u> staff who teach physical education at each of the following levels will have undergraduate or graduate training in physical education or a related field?</p> <p>(1) Elementary school (2) Middle/junior high school (3) Senior high school</p>
<p><u>Requirement to teach fitness in the classroom</u></p> <p>“Planned and sequential physical education curricula should emphasize knowledge about the benefits of physical activity and the recommended amounts and types of physical activity needed to promote health.”</p> <p>(CDC, 1997, p. 13)</p>	<p><u>Health Education Q#7(4): Elementary Schools</u> Has your state adopted a policy stating that elementary schools will teach each of the following health topics? ...(4). physical activity and fitness – classroom instruction, not a physical activity period.</p> <p><u>Health Education Q#13(4): Middle/Junior High Schools</u> Has your state adopted a policy stating that middle/junior high schools will teach each of the following health topics? ...(4). physical activity and fitness – classroom</p>

CDC Guidelines	School Health Policies and Programs State Questionnaire ²⁰
	<p>instruction, not a physical activity period.</p> <p><u>Health Education Q#19(4): Senior High Schools</u> Has your state adopted a policy stating that senior high schools will teach each of the following health topics? ...(4). physical activity and fitness – classroom instruction, not a physical activity period.</p>
<p><u>Using exercise for punishment</u></p> <p>“Discourage the use or withholding of physical activity as punishment...Using physical activity as punishment risks creating negative associations with physical activity in the minds of young people. Withholding physical activity deprives students of health benefits important to their well-being.”</p> <p>(CDC, 1997, p. 12)</p>	<p><u>Physical Education Q#47: Using Physical Activity as Punishment During a Physical Education Class</u> Has your state adopted a policy that prohibits schools from using physical activity (e.g., laps or push-ups) to punish students for bad behavior in physical education?</p> <p><u>Physical Education Q#48: Does your state education agency discourage (e.g., in memoranda or guidelines) schools from using physical activity to punish students for bad behavior in physical education?</u></p> <p><u>Physical Education Q#49: Withholding Physical Activity as Punishment for Bad Behavior in Another Class</u> Has your state adopted a policy that prohibits schools from excluding students from all or part of physical education as punishment for bad behavior in another class?</p> <p><u>Physical Education Q#50: Does your state education agency discourage (e.g., in memoranda or guidelines) schools from excluding students from all or part of physical education to punish students for bad behavior in another class?</u></p>

APPENDIX F

**SELECTED U. S. CENTERS FOR DISEASE CONTROL AND PREVENTION
GUIDELINES FOR SCHOOL HEALTH PROGRAMS
TO PREVENT TOBACCO USE AND ADDICTION
AND CORRESPONDING QUESTIONS IN SCHOOL HEALTH POLICIES
AND PROGRAMS STUDY, 2000 STATE QUESTIONNAIRE**

CDC Guidelines	School Health Policies and Programs State Questionnaire ²¹
<p><u>No smoking by students</u></p> <p>[A school policy should include:]</p> <p>“Prohibitions against tobacco use by students...on school property, in school vehicles, and at school-sponsored functions away from school property.”</p> <p>U.S. Centers for Disease Control and Prevention. <u>Guidelines for School Health Programs to Prevent Tobacco Use and Addiction.</u> (CDC, 1994, p. 7)</p>	<p>Policy and Environment Q#11. Cigarette Smoking by Students</p> <p>Has your state adopted a policy prohibiting cigarette smoking by students?</p>

²¹U.S. Centers for Disease Control and Prevention, School Health Policies and Programs Study, Data and Documentation, 2000b.

CDC Guidelines	School Health Policies and Programs State Questionnaire ²¹
<p><u>Students cannot wear tobacco logos</u></p> <p>[A school policy should include:]</p> <p>“Prohibitions against tobacco advertising in school buildings, at school functions, and in school publications.”</p> <p>(CDC, 1994, p. 8)</p>	<p><u>Policy and Environment Q#20. Students wearing tobacco logos</u></p> <p>Has your state adopted a policy that prohibits students from wearing tobacco brand-name apparel or carrying merchandise with tobacco company names, logos, or cartoon characters on it?</p>
<p><u>No smoking by faculty and staff</u></p> <p>[A school policy should include:]</p> <p>“Prohibitions against tobacco use by...all school staff...in school property, in school vehicles, and at school-sponsored functions away from school property.”</p> <p>(CDC, 1994, p. 7)</p>	<p><u>Policy and Environment Q#21. Faculty and staff cigarette smoking</u></p> <p>Has your state adopted a policy prohibiting cigarette smoking by <u>faculty and staff</u> during any school-related activity?</p>

CDC Guidelines	School Health Policies and Programs State Questionnaire ²¹
<p><u>Requirement to teach tobacco use prevention</u></p> <p>[A school policy should include:]</p> <p>“A requirement that all students receive instruction on avoiding tobacco use.”</p> <p>(CDC, 1994, p. 8)</p>	<p><u>Health Education Q#7(13): Elementary Schools</u> Has your state adopted a policy stating that elementary schools will teach each of the following health topics? ...(13). Tobacco use prevention</p> <p><u>Health Education Q#13(13): Middle/Junior High Schools</u> Has your state adopted a policy stating that middle/junior high schools will teach each of the following health topics? ...(13). Tobacco use prevention</p> <p><u>Health Education Q#19(13): High Schools</u> Has your state adopted a policy stating that high schools will teach each of the following health topics? ...(13). Tobacco use prevention</p>
<p><u>Support for Tobacco Use Cessation by Students</u></p> <p>[A school policy should include:]</p> <p>“Provisions for students and all school staff to have access to programs to help them quit using tobacco.”</p> <p>(CDC, 1994, p. 8)</p>	<p><u>Health Services Q#37(1): Tobacco use cessation by students</u> Has your state adopted a policy stating that districts or schools will provide each of the following services to students when needed? Again, these services might be provided by any school staff.</p> <p>(1) Tobacco use cessation.</p>

APPENDIX G

CALCULATION OF HEALTHY EATING INNOVATION INDEX

	Category	SHPPS question	Calculation
a.	Serving healthy and appealing foods Variable Name: HLTHFD	Average of : FSS_23 Types of Milk = 1.0 FSS_24 Whole Grains = 1.0 FSS_25 Choices for lunch (Range = 0.0 – 1.0) Average of: FSS_25a 2+ entrees = 1.0 FSS_25b 2+ vegetables = 1.0 FSS_25c 2+ fruits = 1.0	All missing data recorded as 0. $\frac{[(FSS_{25a} + FSS_{25b} + FSS_{25c})/3] + 24 + 23}{3}$ Range = 0.0 – 1.0
b.	Allowing adequate time to eat Variable Name: EATIME	FSS_21: Required = 1.0 Recommended = 0.5 Neither = 0.0	All missing data recorded as 0. Range = 0.0, 0.5, 1.0
c.	Requiring new staff to have credentials in nutrition Variable Name: NUTRAIN	Average of: HES_32a elementary = 1.0 HES_32b middle school = 1.0 HES_32c sr. high school = 1.0	All missing data recorded as 0. $\frac{(32a + 32b + 32c)}{3}$ Range = 0.0 – 1.0
d.	Requirement to teach nutrition Variable name: TEANUT	Average of: HES_7c elementary = 1.0 HES_13c middle school = 1.0 HES_19c sr. high school = 1.0	All missing data recorded as 0. $\frac{(7c + 13c + 19c)}{3}$ Range = 0.0 – 1.0

	Category	SHPPS question	Calculation
e.	Prohibiting the use of food for reward or punishment Variable name: FDRWRD	FSS_31 – Prohibit = 1.0 FSS_32 – Discourage = 0.5 Neither FSS_31 nor FSS_32 = 0.0	All missing data recoded as 0. Range = 0.0, 0.5, 1.0
f.	Healthy Eating Innovativeness Index	Sum of: HLTHFD, EATIME, NUTRAIN, TEANUT, FDRWD	Range: 0.0-5.0

APPENDIX H

CALCULATION OF PHYSICAL ACTIVITY INNOVATION INDEX

	Category	SHPPS question	Calculation
a.	Requiring use of protective gear during exercise or sports Variable Name: GEAR	Average of : PES_46a – During physical education = 1.0 PES_46b – During intramural sports = 1.0 PES_46c – During interscholastic sports = 1.0	All missing data recoded as 0. (PES 46a + 46b + 46c) /3 Range: 0.0 – 1.0
b.	Providing time to exercise – elementary school recess Variable Name: RECESS	PES_12: Required = 1.0 Recommended = 0.5 Neither = 0.0	All missing data recoded as 0. Range: 0.0, 0.5, 1.0
c.	New staff has credentials in physical education Variable Name: PETRAIN	Average of: PES_52a elementary = 1.0 PES_52b middle school = 1.0 PES_52c senior high school = 1.0	All missing data recoded as 0. (PES 52a + 52b + 52c)/3 Range: 0.0 – 1.0
d.	Requirement to teach fitness and physical activity (not in a physical education class) Variable name: TEAPE	Average of: HES_7d elementary = 1.0 HES_13d middle school = 1.0 HES_19d senior high school = 1.0	All missing data recoded as 0. (HES 7d + 13d + 19d)/3 Range: 0.0-1.0

	Category	SHPPS question	Calculation
e.	Prohibiting the use of exercise for reward or punishment Variable name: REPUNPE	Average of: Use as punishment during PE class: PES_47 Prohibit = 1.0 PES_48 Recommend = 0.5 Neither 47 nor 48 = 0.0 And Withhold as punishment for misbehavior elsewhere PES_49 Prohibit = 1.0 PES_50 Recommend = 0.5 Neither 49 nor 50 = 0.0	All missing data recoded as 0. $(PES_{47} + PES_{48} + PES_{49} + PES_{50})/2$ (yes, by 2) Range: 0.0 – 0.1
f.	Physical Activity Innovativeness Index	Sum of: GEAR, RECESS, PETRAIN, TEAPE, REPUNPE	Range: 0.0 – 0.5

APPENDIX I

CALCULATION OF TOBACCO INNOVATION INDEX

	Category	SHPPS question	Calculation
a.	Prohibiting smoking by students Variable Name: KIDSMK	ENVS_11 Yes = 1.0 No = 0.0	All missing data recoded as 0. Range: 0.0 – 1.0
b.	Students may not wear tobacco logos Variable Name: LOGOS	ENVS_20: Yes = 1.0 No = 0.0	All missing data recoded as 0. Range: 0.0 – 1.0
c.	Prohibiting smoking by faculty and staff Variable Name: FTYSMK	ENVS_21 Yes = 1.0 No = 0.0	All missing data recoded as 0. Range: 0.0 – 1.0
d.	Requirement to teach tobacco prevention Variable name: TEATOB	Average of: HES_7m elementary = 1.0 HES_13m middle school = 1.0 HES_19m senior HS = 1.0	All missing data recoded as 0. (HES7m + 13m + 19m)/3 Range: 0.0 – 1.0
e.	Tobacco cessation support provided to students Variable name: KQUIT	HSS_37a Yes = 1.0 No = 0.0	All missing data recoded as 0. Range: 0.0 – 1.0
f.	Tobacco Innovativeness Index	Sum of: KIDSMK, LOGOS, FTYSMK, TEATOB, KQUIT	Range: 0.0-5.0

APPENDIX J

GROUPS OR “LEAGUES” OF 48 UNITED STATES¹ BASED ON 88 POLICIES EXAMINED BY WALKER (1969)²

<u>New England</u>	<u>Mid-Atlantic and Great Lakes</u>	<u>Border, Great Lakes and California</u>
Connecticut	New Jersey	California
Massachusetts	Wisconsin	Missouri
New Hampshire	New York	Kentucky
Rhode Island	Minnesota	Michigan
New York	Illinois	Ohio
Vermont	Pennsylvania	Nebraska
Maine	Indiana	Illinois
Pennsylvania		
<u>Mountains and Northwest</u>	<u>South</u>	
New Mexico	Florida	
Idaho	Tennessee	
Montana	Alabama	
Utah	Virginia	
Washington	Georgia	
North Dakota	Mississippi	
Wyoming	Delaware	
Oklahoma	North Carolina	
Louisiana	South Carolina	
South Dakota	Arkansas	
Oregon	Texas	
Maryland	Nebraska	
Arkansas	West Virginia	
West Virginia	Louisiana	
	Iowa	
	South Dakota	
	Nevada	

¹Alaska and Hawaii are omitted.

²Categories are not mutually exclusive.

APPENDIX K**CENSUS REGIONS AND DIVISIONS OF THE UNITED STATES**

PACIFIC

AK

0 200 400 Miles

Census Regions and Divisions of the United States

WEST

MIDWEST

NORTHEAST

PACIFIC

MOUNTAIN

WEST
NORTH
CENTRAL

EAST
NORTH
CENTRAL

MIDDLE
ATLANTIC

NEW
ENGLAND

EAST
SOUTH
CENTRAL

SOUTH
ATLANTIC

WEST
SOUTH
CENTRAL

SOUTH

LEGEND



REGION

DIVISION

STATE

0 200 400 Miles

PACIFIC

HI

0 100 200 Miles

Census Bureau Regions and Divisions with State FIPS Codes

Region I: Northeast

Division 1: New England

Connecticut (09)
Maine (23)
Massachusetts (25)
New Hampshire (33)
Rhode Island (44)
Vermont (50)

Division 2: Middle Atlantic

New Jersey (34)
New York (36)
Pennsylvania (42)

Region 2: Midwest*

Division 3: East North Central

Indiana (18)
Illinois (17)
Michigan (26)
Ohio (39)
Wisconsin (55)

Division 4: West North Central

Iowa (19)
Kansas (20)
Minnesota (27)
Missouri (29)
Nebraska (31)
North Dakota (38)
South Dakota (46)

Region 3: South

Division 5: South Atlantic

Delaware (10)
District of Columbia (11)
Florida (12)
Georgia (13)
Maryland (24)
North Carolina (37)
South Carolina (45)
Virginia (51)
West Virginia (54)

Division 6: East South Central

Alabama (01)
Kentucky (21)
Mississippi (28)
Tennessee (47)

Division 7: West South Central

Arkansas (05)
Louisiana (22)
Oklahoma (40)
Texas (48)

Region 4: West

Division 8: Mountain

Arizona (04)
Colorado (08)
Idaho (16)
New Mexico (35)
Montana (30)
Utah (49)
Nevada (32)
Wyoming (56)

Division 9: Pacific

Alaska (02)
California (06)
Hawaii (15)
Oregon (41)
Washington (53)

**Prior to June 1984, the Midwest Region was designated as the North Central Region.*

APPENDIX L

PEARSON CORRELATIONS AMONG VARIABLES USED IN INTERNAL DETERMINANTS MODEL

	Population	Median Income	# School Districts	% School Revenues from Fed Gov't.	Per pupil expen- diture	Teacher/ student ratio	% Eligible for free/ reduced price lunch	% Urban	% of Adults who smoke	% of H.S. Student Smokers (N = 34 states)
Population	-	0.10	0.70	-0.19	0.08	0.28	0.23	0.51	-0.15	-0.03
Median Income		-	0.04	-0.56	0.70	-0.05	-0.61	0.62	-0.31	-0.32
# School Districts			-	-0.22	0.11	0.04	-0.02	-0.21	-0.14	0.23
% School Rev from Fed Govt				-	-0.34	0.02	0.63	-0.30	0.06	-0.01
Per pupil expenditure					-	-0.39	-0.43	0.39	-0.08	-0.14
Teacher/student ratio						-	0.07	0.28	-0.32	-0.45
% Eligible for free lunch							-	-0.12	0.19	0.09
% Urban								-	-0.25	-0.44
% Adult Smokers									-	0.63
% H.S. School Smokers										-
% Adults Obese	0.12	-0.46	0.14	0.41	-0.31	-0.06	0.56	-0.19	0.47	0.30
% Eat Few Fruit/Vegetables	-0.12	-0.38	0.00	0.08	-0.40	0.03	0.38	-0.44	0.29	0.20
% Inactive	0.14	-0.34	0.16	0.17	-0.22	-0.30	0.59	-0.06	0.47	0.52
Adj Deaths Lung Cancer	-0.03	-0.22	-0.07	0.06	-0.02	-0.30	0.41	-0.08	0.70	0.45
Tobacco % cash crops	0.00	-0.12	-0.19	0.06	-0.17	-0.11	0.23	-0.08	0.42	0.28
% HS Graduates	0.08	0.72	0.06	-0.21	0.53	-0.08	-0.55	0.45	-0.55	-0.49
HS Completion Rate	-0.29	0.29	-0.05	-0.17	0.35	-0.48	-0.48	-0.32	-0.07	0.05
Average SAT Scores	-0.28	-0.26	0.13	0.23	-0.036	-0.02	-0.12	-0.38	-0.02	0.23
Fed FTE at State Ed Agency	0.86	0.20	0.67	-0.17	0.33	0.06	0.22	0.58	-0.14	-0.14
% Democrat	0.20	0.48	0.05	-0.04	0.59	-0.18	-0.02	0.62	-0.06	-0.27

APPENDIX L, Continued

	% Adults Obese	% Eat few fruit/ Veggies	% Inactive	Adjusted Rate of Death by Lung Cancer	Tobacco as % of Cash Crops	% of Pop that is H.S. Graduate	High School Com- pletion Rate	Average SAT Score	# Fed- Funded FTEs at State Ed. Agency	% Democrat
Population	.012	-0.12	0.14	-0.03	-0.00	0.08	-0.29	-0.28	0.86	0.20
Median Income	-0.46	-0.38	-0.34	-0.22	-0.12	0.72	0.29	-0.26	0.20	0.48
# School Districts	0.14	0.00	0.16	-0.07	-0.19	0.06	-0.05	0.13	0.67	0.05
% School Rev from Fed Govt	0.41	0.08	0.17	0.06	0.06	-0.21	-0.17	0.23	-0.17	-0.04
Per pupil expenditure	-0.31	-0.40	-0.022	-0.02	-0.17	0.53	0.35	-0.36	0.33	0.59
Teacher/student ratio	-0.06	0.03	-0.030	-0.30	-0.11	-0.08	-0.48	-0.02	0.06	-0.18
% Eligible for free lunch	0.56	0.38	0.59	0.41	0.23	-0.55	-0.048	-0.12	0.22	-0.02
% Urban	-0.19	-0.44	-0.06	-0.08	-0.08	0.45	-0.32	-0.38	0.58	0.62
% Adult Smokers	0.47	0.29	0.47	0.70	0.42	-0.55	-0.07	-0.02	-0.14	-0.06
% H.S. School Smokers	0.30	0.20	0.52	0.45	0.28	-0.49	0.05	0.23	-0.14	-0.27
% Adults Obese	-									
% Eat Few Fruit/Vegetables	0.22	-								
% Inactive	0.46	0.07	-							
Adj Deaths Lung Cancer	0.50	0.06	0.64	-						
Tobacco % cash crops	0.25	-0.10	0.44	0.38	-					
% HS Graduates	-0.50	-0.49	-0.41	-0.43	-0.18	-				
HS Completion Rate	-0.15	0.04	-0.20	-0.15	0.01	0.21	-			
Average SAT Scores	0.22	0.34	0.05	-0.19	-0.12	-0.07	0.22	-		
Fed FTE at State Ed Agency	0.10	-0.16	0.25	-0.04	-0.09	0.16	-0.21	-0.24	-	
% Democrat	-0.12	-0.51	0.01	0.13	-0.07	0.51	-0.01	-0.28	0.47	-

APPENDIX M

POLICIES IN SCHOOL HEALTH INDEX ADOPTED
BY STATES AND DISTRICT OF COLUMBIA
(N = 51)

	<u>Mean</u>	<u>Median</u>	<u>Standard Deviation</u>
Healthy Eating Policies:			
Schools must serve certain healthful foods	0.02	0.00	0.10
Students must have adequate time to eat	0.09	0.00	0.21
Food not to be used for reward or punishment	0.08	0.00	0.21
Principles of healthy eating must be taught	0.69	1.00	0.46
Credentials for nutrition teachers (new hires)	0.52	0.67	0.52
Total for Healthy Eating Index:	1.40	1.67	0.79
Physical Activity Policies:			
Protective gear must be worn for all athletics	0.23	0.00	0.37
Elementary school students must have recess	0.15	0.00	0.27
Exercise not to be used for reward or punishment	0.15	0.00	0.25
Principles of lifetime fitness must be taught	0.61	1.00	0.47
Credentials for fitness teachers (new hires)	0.67	0.67	0.39
Total for Physical Activity Index:	1.82	1.67	1.12
Tobacco Policies:			
Students may not wear tobacco logos	0.08	0.00	0.27
Programs/support provided to help students quit	0.10	0.00	0.30
Faculty/staff cannot smoke at school	0.65	1.00	0.48
Tobacco use prevention must be taught	0.76	1.00	0.42
Students cannot smoke on school grounds	0.94	1.00	0.24
Total for Tobacco Index:	2.52	3.00	0.91