



**PART I**

Overview of the Public Health  
Nutrition Landscape





# Community Nutrition and Public Health

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## CHAPTER OUTLINE

- Introduction
- The Concept of Community
- Public Health and Nutrition
- The Relationship Between Eating Behaviors and Chronic Diseases
- Reducing Risk Through Prevention
- Health Promotion
- Knowledge and Skills of Public Health and Community Nutritionists
- Places of Employment for Public Health and Community Nutritionists
- Preventive Nutrition

## LEARNING OBJECTIVES

- Define public health and community nutrition.
- Discuss the relationship between diet and diseases.
- List current nutrition- and diet-related public health problems.
- Explain primary, secondary, and tertiary prevention.
- Outline the educational requirements, practice settings, roles, and responsibilities of community and public health nutritionists.
- Define the terms *Registered Dietitian (RD)* and *public health nutrition*.

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### Introduction

**Community nutrition** is a modern and comprehensive profession that includes, but is not limited to, public health nutrition, dietetics/nutrition education, and medical nutrition therapy.<sup>1</sup> Community nutrition deals with a variety of food and nutrition issues related to individuals, families, and special groups that have a common link such as place of residence, language, culture, or health issues.<sup>2</sup> There is an increasing need to focus on community in **health promotion** and disease prevention because behavior is highly influenced by the environment in which people live. Local values, norms, and behavior patterns have a significant effect on shaping an individual's attitudes and behaviors.<sup>3,4</sup> The increasing movement toward using a community approach requires community **nutritionists** to become more visible and vocal leaders of community health. However, before community nutrition-

ists can participate in nutrition and healthcare planning, they must be knowledgeable about the concept of community as client.

### The Concept of Community

The concept of community varies widely. The World Health Organization (WHO) defines **community** as “a social group determined by geographic boundaries and/or common values and interests.”<sup>5</sup> Community members know and interact with one another; function within a particular social structure; and show and create norms, values, and social institutions.<sup>6</sup> Suburbs and other areas surrounding the legal limits of a city are also an integral part of that city's total community.

A second definition of community is demographic and involves viewing the community as a subgroup of the population, such as people of a particular age, gender, social class, or race.<sup>8</sup> A community can

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also be defined on the basis of a common interest or goal. A collection of people, even if they are scattered geographically, can have a common interest that binds its members. This is called a common-interest community.<sup>9</sup> Many successful prevention and health promotion efforts, including improved services and increased community awareness of

**community nutrition** an area of nutrition that addresses the entire range of food and nutrition issues related to preventing disease and improving the health of individuals, families, and the community.

**health promotion** the process of enabling people to increase control of and improve their health.

**nutritionist** a professional with academic credentials in nutrition; may also be a registered dietitian.

**community** a group of people who share a common geographical location, values, culture, or languages.

**primary prevention** activities designed to prevent a problem or disease before it occurs.

**secondary prevention** activities related to early diagnosis and treatment, including screening for diseases.

**tertiary prevention** designing activities to treat a disease state or injury and to prevent it from further progression.

**public health** the science and art of preventing disease, prolonging life, developing policy, and promoting health and efficiency through organized community effort.

**public health nutrition** focuses on the community and society as a whole and aims at optimal nutrition and health status. Public health nutritionist positions require dietetic registration by Commission on Dietetic Registration status and a graduate-level science degree that includes study of environmental sciences, health promotion, and disease prevention programs.

specific problems, have resulted from the work of common-interest communities. The following are some examples of common-interest communities:<sup>9</sup>

- Members of a national professional organization (e.g., American Dietetic Association, American Medical Association, Federation of American Societies for Experimental Biology, African American Career Women, National Association of Asian American Professionals, American Public Health Association)
- Members of churches
- Disabled individuals scattered throughout a large city
- Individuals with specific health condition (e.g., diabetes, hypertension, breast cancer, mental illness)
- Teenage mothers
- Homebound elderly persons

Community nutrition and dietetics professionals are also members of a community and are public health agency professionals who provide nutrition services that emphasize community health promotion and disease prevention. They deal with the needs of individuals through primary, secondary, and tertiary preventions (which will be discussed in more detail later in this chapter).

- **Primary prevention** involves designing activities to prevent a problem or disease before it occurs.
- **Secondary prevention** involves planning activities related to early diagnosis and treatment, including screening for diseases.
- **Tertiary prevention** consists of designing activities to treat a disease state or injury and to prevent it from progressing further.<sup>10</sup>

These professionals establish links with other professionals involved in a wide range of education and human services, such as childcare agencies; social work agencies; services to older persons; high schools; colleges and universities; and community-based epidemiological research.

### Public Health and Nutrition

**Public health** is defined as “the science and art of preventing disease, prolonging life, and promoting health and efficiency through organized community efforts, so organizing these benefits as to enable every citizen to realize his/her birthright of health and longevity.”<sup>11</sup> It has been viewed as the scientific diagnosis and treatment of the community. In this vision, the community, instead of the individual, is seen as the patient. When the focus is on the community, patterns and processes begin to emerge and combine to form a unified whole.<sup>12</sup> Using this approach avoids focusing on risks and diseases; instead, the focus is on the community’s strengths and resilience. Community strengths can be physiological, psychological, social, or spiritual. They include such factors as education, coping skills, support systems, knowledge, communication skills, nutrition, coherent belief systems, fitness, ability to develop a supportive environment, and self-care skills.<sup>3</sup>

Increasing nutrition knowledge can reduce medical care costs and improve the quality of life.<sup>13–16</sup> The negative consequences of nutrition-related problems include malnutrition and chronic health conditions such as obesity, cardiovascular disease, cancer, and diabetes mellitus.<sup>17,18</sup> In addition, these conditions contribute significantly to the world’s burden of morbidity, incapacity, and mortality, despite the tremendous amount of biological knowledge accumulated over the years.<sup>18</sup> The WHO estimated that prevention of the major nutrition-related risk factors (cigarette smoking, inactivity, poor dietary habits, and alcohol abuse) could translate into a gain of 5 years of disability-free life expectancy.

A community and public health nutrition approach will make it possible to reverse the course of major nutrition problems.<sup>21,22</sup> Dietetic professionals can take the lead in prevention programming because their training as counselors and educators provides skills that make them important members of a public health profession.

**Public health nutrition** was developed in the United States in response to societal events and changes to the following situations:<sup>1,23,24</sup>

- Infant mortality
- Access to healthcare
- Epidemics of communicable disease
- Poor hygiene and sanitation
- Malnutrition
- Agriculture and food production (in response to changes in food production)
- Economic depression, wars, and civil rights
- Aging of the population
- Behavior-related problems/lifestyle (poor dietary practices, alcohol abuse, inactivity, and cigarette smoking)
- Chronic diseases (obesity, heart disease, diabetes mellitus, mental health, cancer, osteoporosis, and hypertension)
- Poverty and immigration
- Preschool/after-school child care and school-based meals

### The Relationship Between Eating Behaviors and Chronic Diseases

As evidenced by an introductory review of literature and research in the area of eating behavior and chronic disease, the relationship between

TABLE  
1.1

Some Possible Health Problems Linked with Poor Dietary Habits

Behavior	Risk of Heart Disease	Risk of Some Cancers	Risk of Diabetes	Risk of Obesity	Risk of Osteoporosis	Risk of Birth Defects	Risk of High blood Pressure	Risk of Anemia
Eat foods lower in total fat, saturated fat, and cholesterol	✓	✓	✓	✓			✓	
Eat foods lower in calories; balance caloric intake with physical activity	✓	✓	✓	✓			✓	
Drink alcohol in moderation	✓	✓						
Eat less cured and smoked foods		✓						
Prepare foods with less salt	✓						✓	
Eat foods high in calcium and vitamin D	✓				✓		✓	
Eat foods high in iron								✓
Eat foods high in folic acid	✓	✓				✓		✓
Eat foods high in antioxidants	✓	✓	✓			✓	✓	
Eat foods high in soluble and insoluble fiber	✓	✓	✓	✓		✓	✓	✓
Eat foods high in omega-3 fatty acids	✓	✓	✓			✓		
Breastfeed infants			✓	✓				

eating behaviors and chronic diseases is significant and impacts individuals and communities greatly.<sup>25</sup> Table 1-1 shows dietary factors that are linked to some of the most common chronic diseases. It is important to note that dietary factors overlap with other problems and are applicable to many of the health conditions listed.

The *Surgeon General's Report on Nutrition and Health*, government agencies, and nonprofit health and scientific organizations have provided comprehensive analyses of the relationship among diet, lifestyle, and major chronic diseases.<sup>26-28</sup> Health conditions such as coronary heart disease, stroke, cancer, and diabetes are still the leading causes of death and disability in the United States, and changes in Americans' current dietary practices could produce substantial health gains.

There have been concerns about the eating patterns of the U.S. population since the 1980s. Health policy makers have linked several dietary-related factors to chronic diseases, such as heart disease, cancer, birth defects, and osteoporosis, among the U.S. population and that of other industrialized countries.<sup>25,29</sup> This link between diet and disease has led to the publication of guidelines to promote healthier eating habits. The National Academy of Sciences, the U.S. Department of Health and Human Services, and the U.S. Surgeon General have published the majority of these guidelines.<sup>11,12,26</sup>

In addition to dietary intake, many other factors contribute to chronic diseases, such as genetic factors and lifestyle factors (e.g., cigarette smoking).<sup>30</sup> Medical geneticists working on the Human Genome Project, a major international initiative to decipher the 3-billion-unit code of DNA in the 80,000 to 100,000 genes found in humans, have already identified genes associated with many chronic diseases, such as breast, colon, and prostate cancers; severe obesity; and diabetes.<sup>31-34</sup>

Programs to promote health and longevity start with examining the major causes of death and disability. The top causes of death from



Public speaking is a great way to pass along nutrition information.

6 **PART I** Overview of the Public Health Nutrition Landscape**Box 1-1** The 10 Leading Causes of Death in the United States

1. Heart disease
2. Cancer
3. Stroke
4. Chronic lower respiratory disease
5. Accidents
6. Diabetes
7. Pneumonia/influenza
8. Alzheimer's disease
9. Nephritis, nephritic syndrome, and nephrosis
10. Septicemia

Source: National Center for Health Statistics. [www.cdc.gov/nchs/data/dis/2003](http://www.cdc.gov/nchs/data/dis/2003). Accessed July 11, 2006.

the National Center for Health Statistics and Global Statistics and the WHO's 2003 and 2004 data are presented in Boxes 1-1 and 1-2.<sup>35,36</sup>

The public health approach to prevention understands that the reduction of risk for individuals with average risk profiles might be small or negligible. However, high-risk persons need special attention through primary, secondary, and tertiary preventions. Although it may not eliminate a disease for people who are genetically inclined to it, good primary prevention strategies could reduce the severity of the disease.<sup>37</sup>

**Reducing Risk Through Prevention**

Prevention is important in public health as well as community nutrition practice. The three important parts of prevention are personal, community-based, and systems-based.<sup>6</sup> Each part has a different role

**Box 1-2** The 10 Leading Causes of Death Worldwide

1. Ischemic heart disease
2. Stroke
3. Acute lower respiratory infections
4. HIV/AIDS
5. Chronic obstructive pulmonary disease
6. Perinatal conditions
7. Diarrheal diseases
8. Tuberculosis
9. Malaria
10. Cancer of the lung/bronchus/trachea

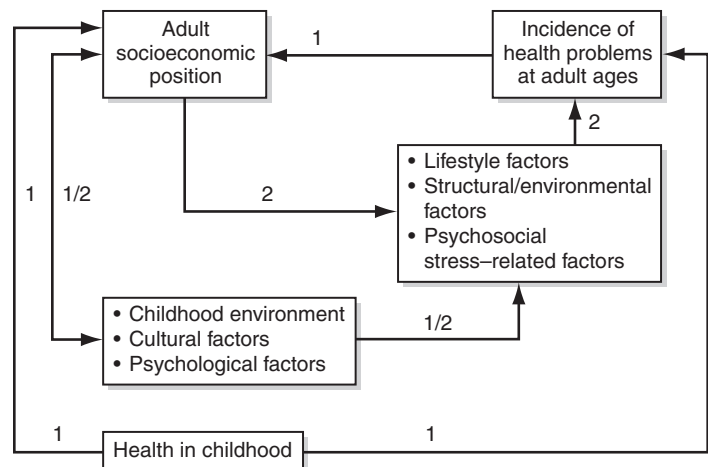
Source: World Health Organization. [www.who.int/features/qa/](http://www.who.int/features/qa/). Accessed July 11, 2006.

and focus. Establishing an overall effective community nutrition practice involves correctly using and combining each part.

- *Personal prevention* involves people at the individual level; for instance, educating and supporting a breastfeeding mother to promote the health of her infant.
- *Community-based prevention* targets groups; for example, public campaigns for low-fat diets to decrease the incidences of obesity and/or heart disease.<sup>38,39</sup>
- *Systems-based prevention* deals with changing policies and laws in order to achieve the objectives of prevention practice; for example, laws regarding childhood immunization, food labels, food safety, and sanitation.

One part of systems-based prevention deals with socioeconomic status, which affects health through environmental or behavioral factors. The socioeconomic model hypothesizes that poor families do not have the economic, social, or community resources needed to be in good health. For instance, poverty affects children's well-being by influencing health and nutrition, the home environment, and neighborhood conditions.<sup>40a,40b</sup> The combined effects of poverty provide the foundation for a cycle of poverty and hopelessness among family members, who in turn engage in risky health behaviors, such as substance abuse, smoking, and poor dietary habits, that can result in obesity and nutrition-related chronic diseases.

Socioeconomic models have been used to develop policies and disease prevention strategies, such as the Mackenbach model, which can be used as a basis for developing policies and intervention strategies. The Mackenbach model is presented in **Figure 1-1**. Mackenbach proposed that the link between socioeconomic status and health-related problems is triggered and maintained by two processes (selective and causative) that are active during different periods of life.<sup>41</sup> The selective



1: Selective processes.

2: Causative processes.

Note: The different arrows between socioeconomic factors represent potential entry points for policies and interventions to reduce health inequalities.

**FIGURE 1-1** Selective and Causative Factors Involved in the Development of Health Inequalities in Society

Source: Mackenbach J, Bakker M. *Reducing Inequalities in Health: A European Perspective*. London: Routledge; 2002:18. Reprinted with permission.

<b>Primary Prevention</b>		<b>Personal Approach</b>	
<p><b>Health Promotion</b></p> <ul style="list-style-type: none"> <li>• Nutrition education</li> <li>• Water fluoridation to prevent dental decay</li> <li>• Provision of nutritious foods</li> <li>• Physical activity education</li> <li>• Genetic screening</li> <li>• Food intake analysis</li> <li>• Food safety education</li> <li>• Prenatal care</li> </ul> <p><b>Specific Protection</b></p> <ul style="list-style-type: none"> <li>• Use of specific immunizations</li> <li>• Attention to personal hygiene</li> <li>• Use of 24-hour recall and food frequency list</li> <li>• Use of environmental sanitation</li> <li>• Protection against obesity</li> <li>• Protection from foodborne illness</li> <li>• Use of specific nutrients</li> <li>• Protection from carcinogens</li> <li>• Avoidance of food allergens</li> </ul>		<ul style="list-style-type: none"> <li>• Breastfeeding support</li> <li>• Wellness education for an individual/physical activity</li> <li>• Stress management education for an individual to reduce blood pressure</li> </ul>	
		<b>Community Approach</b>	
		<ul style="list-style-type: none"> <li>• “Fruits &amp; Vegetables—More Matters” campaign</li> <li>• School health education</li> <li>• Community campaign for wellness (Heart Healthy for women)</li> </ul>	
		<b>System Approach</b>	
		<ul style="list-style-type: none"> <li>• Congregate dining meals for older persons</li> <li>• School breakfast required to meet the Dietary Guidelines</li> <li>• Calcium-fortified foods</li> <li>• Folic acid fortification of foods</li> <li>• Advocating for support of fruits in the school vending machine</li> <li>• Advocating for recreational activities at schools and daycares</li> </ul>	

<b>Secondary Prevention</b>		<b>Personal Approach</b>	
<p><b>Early diagnosis and Prompt Treatment</b></p> <ul style="list-style-type: none"> <li>• Screening surveys</li> <li>• Selective examinations to:                             <ul style="list-style-type: none"> <li>• Prevent disease process</li> <li>• Prevent the spread of communicable disease</li> </ul> </li> <li>• Identify and intervene for individuals at risk of obesity, diabetes, and iron deficiency anemia</li> </ul> <p><b>Disability Limitations</b></p> <ul style="list-style-type: none"> <li>• Adequate food intake to arrest disease process and prevent further complications</li> <li>• Provision of exercise facilities to limit disability and prevent death from obesity, heart disease, and cancer</li> </ul>		<ul style="list-style-type: none"> <li>• Nutrition education for high-risk pregnant teenagers</li> <li>• Bone density screening for individuals at risk</li> <li>• Blood pressure screening for individuals at risk</li> </ul>	
		<b>Community Approach</b>	
		<ul style="list-style-type: none"> <li>• Cholesterol screenings</li> <li>• Blood pressure screening at the community center</li> </ul>	
		<b>System Approach</b>	
		<ul style="list-style-type: none"> <li>• “Shape up America”</li> <li>• Fat and calorie labels</li> <li>• Pasteurization of dairy products</li> <li>• Fortification of milk with vitamin D</li> </ul>	

<b>Tertiary Prevention</b>		<b>Personal Approach</b>	
<p><b>Restoration and Rehabilitation</b></p> <ul style="list-style-type: none"> <li>• Provision of medical nutrition therapy for individuals with nutrition-related problems</li> <li>• Education for the public and industry to produce low-fat foods</li> </ul>		<ul style="list-style-type: none"> <li>• Medical nutrition therapy for individuals with special healthcare conditions (e.g., heart disease)</li> </ul>	
		<b>Community Approach</b>	
		<ul style="list-style-type: none"> <li>• Advocating for special diets to be provided with diabetic nutrition education in the community</li> </ul>	
		<b>System Approach</b>	
		<ul style="list-style-type: none"> <li>• Passing legislation mandating that low-fat diets be provided in schools</li> <li>• New regulations for folate fortification of certain foods</li> <li>• Legislation to mandate payment of nutrition services for diabetes and obesity services</li> <li>• Advocating for fast-food restaurants to provide information on the fat content of meals</li> </ul>	

**FIGURE 1-2** The Three Levels of Prevention and Intervention Approaches

Modified from: Mandle CL. *Health Promotion Throughout the Lifespan*. 5th ed. St. Louis: Mosby; 2002. Public Health Nutrition Practice Group, 1995. Also Owen AL, Splett PL, Owen GM. *Nutrition in the Community*. 4th ed. New York: McGraw-Hill; 1999. Reprinted with permission.

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process is represented by childhood health, which determines adult health as well as socioeconomic position. The causative process represents three groups of risk factors (lifestyle, structural/environmental, and psychosocial stress-related factors), which are intermediaries between socioeconomic position and health problems. The model also acknowledges that childhood environment and cultural and psychological factors contribute to inequalities in health through both selection and causation. Health inequalities become self-perpetuating through a cycle of inadequate childhood health, adult socioeconomic position, and incidence of health problems at adult ages.<sup>41</sup>

### Levels of Prevention

Each part of prevention itself has three levels. *Primary prevention* is an early intervention focused on controlling risk factors or preventing diseases before they happen, thus reducing their incidence. Examples of primary prevention include fortifying milk with vitamin D to prevent rickets in children, fortifying infant formula with iron to prevent anemia, and fluoridating public water supplies to prevent dental decay. *Secondary prevention* includes identifying disease early (before clinical signs and symptoms manifest) through screening. Timely intervention is provided to deter the disease process and prevent disability that may be caused by the disease. For instance, providing nutrition education on the importance of reducing dietary cholesterol, saturated fat, and caloric intake and increasing dietary fiber to individuals with high blood cholesterol is a secondary intervention to prevent the complications of heart disease.<sup>42-45</sup> *Tertiary prevention* is intervention to reduce the severity of diagnosed health conditions in order to prevent or delay disability and death. For example, providing education programs for persons recently diagnosed with hypertension is an intervention to prevent disability and additional health problems.<sup>46</sup> **Figure 1-2** presents the three levels of prevention and intervention approaches.

**interdisciplinary team**  
collaborating personnel  
representing different  
disciplines (e.g., nurses, social  
workers, physicians, daycare  
workers, dietitians, and dietetic  
technicians).

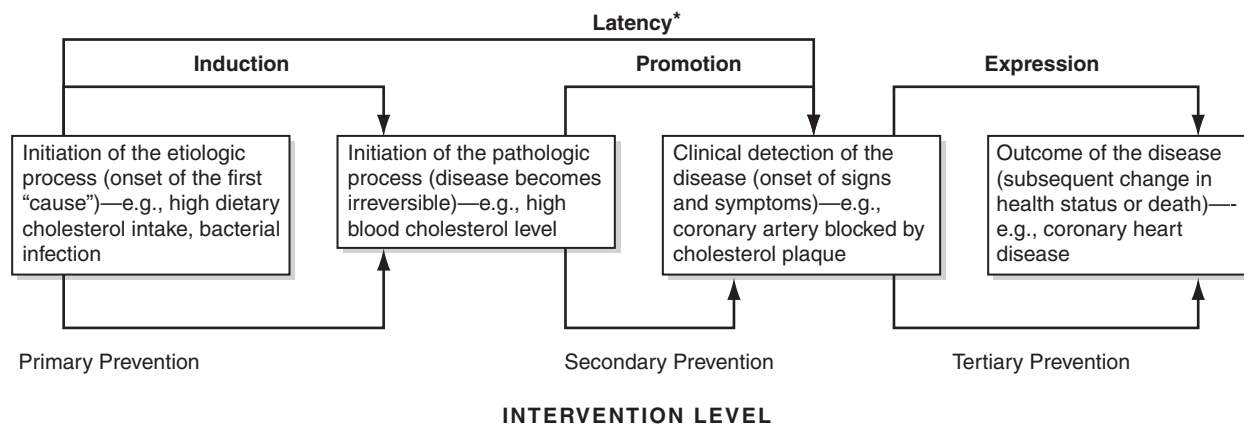
**Figure 1-3** shows that a natural progression of a disease starts at the induction or initiation period. It also shows the relationship between disease progression and level of intervention. Early intervention (primary prevention) can reduce disease progression in its early stages. For example, for bacterial infections (such as *E. coli*), the incubation period is an early stage of disease development when individuals are not yet feeling the infection's effects. Also, an intervention such as a structured daily physical activity can slow weight gain and prevent obesity. Latency or dormancy is a similar early period when a disease (such as cardiovascular disease) has the potential of being expressed. Secondary prevention, such as blood pressure screening, will detect clinical symptoms and can help prevent the progression of a disease. The expression period is when the disease has occurred. At this point an intervention (tertiary prevention) is provided to reduce the severity of the disease or to prevent death; for example, a person could reduce their dietary fat intake to manage heart disease.<sup>1</sup>

### Health Promotion

Health promotion is another major concept that is important to community and public health nutrition. Health promotion can be defined as the process of enabling people to increase control over the determinants of good health and subsequently improve their health. Two strategies that can be used to design a health promotion campaign in order to reduce risk are presented in Table 1.2, and the advantages and disadvantages of these strategies are presented in Box 1-3.

### Knowledge and Skills of Public Health and Community Nutritionists

In most instances a community or public health nutritionist must be a member of an interdisciplinary team in order to provide an effective nutrition program. An *interdisciplinary team* is a collaboration among personnel representing different disciplines of public health workers (nurses, social workers, physicians, daycare workers, dietitians, and dietetic technicians). They use various approaches to diagnose and address public or community issues, including:<sup>47</sup>



\*Observed duration from the onset of any particular cause to disease detection.

**FIGURE 1-3** Levels of Epidemiologic Research: A Conceptual Elaboration

Source: Copyright 1982, Kleinbaum DG, Kupper LL. *Epidemiologic Research: Principles and Quantitative Methods Solution Manual*, p. 22. New York: Van Nostrand Reinhold. Reprinted with permission of John Wiley & Sons, Inc.



TABLE  
1.2

Strategies for Designing a Health Promotion Campaign

	Concept	Benefit	Example
<b>Population</b>	Instruction is directed at the entire population (national, local community, schools, and neighborhoods) with messages and programs aimed at reducing behavioral risk factors, such as poor eating habits or physical inactivity.	Members of the community may lower their risk by a small percentage, thereby reducing new cases of chronic health conditions and mortality.	<p>A nutritionist changing the eating patterns of families and advocating for fluoridation of the water supply—rather than screening all postmenopausal women for bone loss or hiring dentists to treat every child and adolescent—may reduce the risk of osteoporosis and dental decay.</p> <p>Instruction about reducing sodium intake may reduce a population's mean systolic blood pressure by 3 percent, which will decrease the number of people in the high-risk group by 25 percent if high risk for systolic blood pressure is considered to begin at 140 mmHg.</p> <p>If excess body weight is 92/kg/202 pounds, reducing the population's mean weight by 1kg/2.2 pounds (about 1 percent) will cut the number of overweight people by 25 percent.</p> <p>Instruction could be provided to engage in regular physical activity and reduce excess calorie consumption.</p> <p>If everyone is encouraged to consume high calcium and/or low-fat food products and then food industries develop and market these food products, this will subsequently prevent osteoporosis and obesity.</p> <p>The Fruits &amp; Veggies—More Matters campaign is an example of a population approach to health promotion.</p>
<b>Individual</b>	The nutritionist focuses on identifying individuals at risk, and the intervention is directed specifically at these "high-risk" individuals.	This method may be more beneficial when the risk conditions are highly restricted, such as with preschool children who were exposed to foods containing lead.	<p>Intervention could be limited to persons with family histories of heart disease, and these people could be taught about reducing fat intake and increasing physical activities to reduce the potential of experiencing heart disease.</p> <p>Nutrition intervention could be limited to the children of adult alcoholics, individuals with a family history of diabetes, and low-income pregnant women participating in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), which may translate to risk reduction.</p>

Source: Webb G. *Nutrition: A Health Promotion Approach*. 2nd ed. New York: Arnold; 2002.

## Box 1-3 Advantages and Disadvantages of Population and Individual Health Promotion Strategies

### Advantages

#### Population Approach

- The population approach may instigate a behavior change that may become the norm and create conditions that makes it easier for any individual to change. For example, if everyone is urged to reduce their fat and saturated fat intake, this increases the incentive for the food industry to develop and market products that are low in fat and/or saturated fat, such as low-fat milk, which makes it easier to adopt a low-fat diet.
- The population approach is likely to save more lives and prevent more illness than the individual approach when the risk factors are widely diffused throughout the community.

#### Individual Approach

- Using the individual approach, people at high risk are specifically targeted, and the intervention is provided on

time. More attention is given to ensuring that individuals with chronic disease are following necessary, strict dietary programs.

- Using the individual approach reduces the costs associated with screening an entire population and releases health professionals to attend to the community's other healthcare needs.

### Disadvantages

#### Population Approach

- This approach requires mass change and may not be needed by the entire population.
- It may not be cost effective and may inconvenience people.

#### Individual Approach

- With the individual approach, screening may not be universal and thus some high-risk individuals may not be identified.

Source: Webb G. *Nutrition: A Health Promotion Approach*. 2nd ed. New York: Arnold; 2002.

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- Utilizing interventions that promote health and prevent communicable or chronic diseases by managing or controlling the community's environment.
- Channeling funds and energy to problems that affect the lives of the largest numbers of people in a community.
- Seeking out unserved or underserved populations (due to income, age, ethnicity, heredity, or lifestyle) and those who are vulnerable to disease, hunger, or malnutrition.
- Collaborating with the public, consumers, community leaders, legislators, policy makers, administrators, and health and human service professionals to assess and respond to community needs and consumer demands.
- Monitoring the public or community's health in relation to public health objectives, and continuously addressing current and future needs.
- Planning, organizing, managing, directing, coordinating, and evaluating the nutrition component of health agency services.

For community nutritionists to accomplish these actions, they need to acquire normal and clinical nutrition knowledge and be skilled in educating the public regarding changes in eating behavior. The minimum education requirements for a community nutritionist include a bachelor's degree in foods and nutrition or dietetics from an accredited college or university and a Master of Public Health degree with a major in nutrition or a Master of Science degree in applied human nutrition with a minor in public health or community health.<sup>47</sup> Some community nutrition positions require certification as a *Registered Dietitian (RD)* and/or an advanced degree in nutrition. Academic training includes knowledge of biostatistics and skill in collecting, analyzing, and reporting demographic, health, and food nutrition data.<sup>48,49</sup>

The community nutritionist must understand the epidemiology of health and disease patterns in the population as well as trends of

diseases over a long period of time. She or he must be knowledgeable about the principles of health education, program planning, program evaluation, community organization, management, and marketing and policy formation.<sup>50</sup> Marketing skills are very important because they help nutritionists know how to convey effective nutrition messages using a variety of media formats for their audiences. Community nutritionists must keep current with advances in research and food and nutrition sciences, and changing practices in public health service.<sup>48</sup>

In some situations, Dietetic Technicians, Registered (DTRs) are employed in the food service area, clinical settings, and community settings. They may assist the community nutritionist/Registered Dietitian in determining the community's nutritional needs and in providing community nutrition programs and services. At a minimum, DTRs must have an associate's degree from an approved educational program. After that, they must successfully complete a national examination administered by the Commission on Dietetic Registration (CDR).

Both community and public health nutritionists provide a wide variety of nutrition services through government and non-government agencies at the local, state, national, and international levels.<sup>47</sup> In most cases, the activities require multitasking roles such as blood pressure screening, diet counseling, and medical nutrition therapy. At the international level, duties may include education on sanitation, water purification, and gardening.

### Places of Employment for Public Health and Community Nutritionists

Community and public health nutritionists' work in official community settings or voluntary agencies to promote health, prevent disease, conduct epidemiologic research, and provide both primary and secondary preventive care. The agencies include city, county, state,

## Successful Community Strategies

### The National Cancer Institute's Health Promotion Intervention

Community and public health nutritionists can also target worksites as a priority location for intervention efforts. An effective worksite nutrition program must include how to effectively communicate to clients how to choose and prepare foods that follow established dietary guidelines. One example of an effective worksite program is Working Well, which was a randomized worksite intervention trial. This 5-year study funded by the National Cancer Institute (NCI) tested the effectiveness of health promotion interventions directed at individual and organizational changes to reduce employee cancer risk in 57 matched pairs of worksites. Workers and worksites from a variety of geographic and industrial settings were utilized. Four project study centers, a coordinating center,

and the NCI collaborated on common elements of design, data collection and analysis, and intervention standards for the common risk factor areas. All Working Well study centers targeted nutrition and at least one other prevention component (e.g., smoking, cancer screening, occupational health, or physical activity). The study centers were Brown University School of Medicine and The Miriam Hospital (Rhode Island); the University of Florida; the University of Massachusetts Medical School and Dana-Farber Cancer Institute; and the University of Texas M.D. Anderson Cancer Center.

The Working Well intervention was based on a conceptual model that incorporated three important elements:

- The use of participatory strategies operated through a primary worksite contact and an employee advisory board
- An ecological approach targeting both individual behavior change and change in environmental and organizational structures
- The use of adult education and behavior change strategies in all aspects of intervention planning and delivery

The nutrition intervention messages are available in a summarized format at <http://nutrition.jbpub.com/communitynutrition>. The messages were translated from nutrient terms into food terminology. They addressed groups of foods that contribute the highest amount of fat and fiber to the U.S. diet. All groups of foods were stated in positive terms.

federal, and international agencies.<sup>47</sup> The following are examples of places where community and public health nutritionists may be employed:

#### State/City/County Level

- Cooperative extension services
- Home healthcare agencies
- Hospital outpatient nutrition education departments
- Local public health agencies
- Migrant worker health centers
- Native American health services
- Neighborhood or community health centers
- Nonprofit and for-profit private health agencies
- Universities, colleges, and medical schools
- Wellness programs

#### National/Regional Level

- Food and Drug Administration (FDA)
- U.S. Department of Agriculture (USDA)
- U.S. Department of Health and Human Services (USDHHS)

#### International Level

- Food and Agriculture Organization of the United Nations (FAO)
- Pan American Health Organization (PAHO)
- United Nations (UN)
- United Nations Children's Emergency Fund (UNICEF)
- World Food Agency (WFA)
- World Health Organization (WHO)

## Preventive Nutrition

**Preventive nutrition** can be defined as dietary practices and interventions directed toward a reduction in disease risk and/or improvement in health outcomes.<sup>51</sup> Preventive nutrition is an important strategy that works to prevent disease instead of treating the condition after it materializes.

The U.S. government and other health agencies have taken actions to reduce the incidences of chronic diseases, such as recommending a reduction in saturated fat intake for cardiovascular disease prevention and inclusion of B vitamins, vitamins A and D, iron, and calcium in staple foods such as grain products, milk, and cereals to prevent nutrient-related health conditions.<sup>52,53</sup> These preventive nutrition strategies have been part of public health policy for many years and have been effective in preventing nutrition-related health conditions.<sup>54,55</sup> For example, there has been a decrease in cardiovascular disease mortality in the past 25 years due to the massive campaign to reduce fat intake and increase physical activity in the United States and most industrialized countries.<sup>28,56</sup>

Other concerns have prompted policy change regarding prevention of chronic diseases. The high costs of medical care put economic pressure on both individuals and nations to prevent chronic diseases.

### Registered Dietitian (RD)

A dietitian meeting eligibility requirements (education, experience, and a credentialing examination) of the Commission on Dietetic Registration. Some RDs possess additional certifications in specialized areas of practice, such as diabetes, pediatric geriatrics, or renal nutrition.

**preventive nutrition** dietary practices and interventions directed toward reducing disease risk and/or improving health outcomes.

The intervention was implemented in 114 worksites employing 37,291 workers who were engaged in a variety of businesses. In the fall of 1990, 20,801 respondents completed and returned a self-administered baseline survey. The worksite mean response rate was 71.6 percent. Responses to behavioral items regarding meat were used to measure meat preparation behaviors that could not be obtained from the food frequency questionnaire (FFQ).

The intervention outcome showed that the average servings of fruits and vegetables per day were less than three in all study centers—2.7 in Florida, Massachusetts, and Rhode Island and 2.4 in Texas. Less than 30 percent of workers in Rhode Island and Massachusetts reported eating

beans and lentils at least once a week while 42 percent in Florida and 56 percent in Texas reported frequent bean and lentil consumption. Fifty-six to 64 percent of workers reported eating high-fiber cereal at least half of the time that they ate cereal, and 34 to 46 percent reported eating dark bread at least half of the time that they ate bread.

The majority of workers reported eating chicken and fish that were not fried (55 to 84 percent), rarely eating visible meat fat (57 to 69 percent), and choosing lean meat (68 to 81 percent). On the other hand, avoiding the skin on chicken was reported less frequently (33 to 47 percent). Avoidance of meat fat was lower in Texas than in the other study sites for all four measures.

With regard to fat in dairy products, 65 to 71 percent drank low-fat or skim milk more than half of the time that they drank milk. Also, a smaller percentage, 42 to 64 percent, used low-fat cheese or low-fat frozen dairy products. The percentage that used low-fat dairy products other than milk was much higher in the Florida worksite than in worksites at the other study centers. Finally, 46 to 53 percent of subjects used low-fat salad dressing.

Modified from: Hunt MK, Stoddard, A.M et al. Measures of food choice behavior related to intervention messages in worksite health promotion. *J Nutr Educ* 1997; 29:3–11. Copyright by Elsevier. Reprinted with permission.

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The cost of cardiovascular diseases and stroke in the United States for 2006 was estimated at \$403.1 billion.<sup>57</sup> Estimates show that \$22 billion per year could be saved in this disease category if preventive nutrition measures were fully implemented.<sup>51</sup>

Another disease category that could be significantly impacted if prevention were emphasized more strongly is that of birth defects. Birth defects are the number one cause of hospitalizations.<sup>58</sup> The possibility of reducing infant morbidity and mortality by nutritional interventions becomes a tangible outcome when research shows that women who take a folic acid-containing multivitamin daily for at least 1 month before conception and during their pregnancies have about a 50 percent decrease in neural tube defects.<sup>57,58</sup> This outcome alone is expected to save about \$70 million annually.<sup>59</sup>

In addition, a decrease in medical care for breastfed infants is the primary socioeconomic benefit of breastfeeding. Medicaid costs for infants breastfed by low-income mothers in Colorado were \$175 lower than for infants who were fed formula.<sup>60</sup> However, breastfed infants are less likely to have any illness during the first year of life. It is reported that infants who were never breastfed required more care for lower respiratory tract illness, otitis media (ear infection), and gastrointestinal disease than infants breastfed for at least 3 months.<sup>61</sup>

### The Cooperative Extension System

The Cooperative Extension System (CES) is an agency under the U.S. Department of Agriculture. It provides educational programs that help individuals and families acquire life skills. The CES's mission is to

empower people through education using scientific, research-based information.<sup>1</sup> Typically, land grant universities or colleges help carry out the CES's mission by providing their expertise to county and regional extension offices, which administer these programs. The colleges and universities help the public through nonformal, noncredit programs. The federal government provides support for the programs through the Cooperative State Research, Education, and Extension Service (CSREES). CSREES supports both the universities and their local offices by annually distributing federal funding to supplement state and county programs.<sup>62</sup>

The Morrill Act of 1862 established land-grant universities to educate citizens in agriculture, home economics, mechanical arts, and other practical professions. In 1914 the Smith-Lever Act established a partnership between the USDA and land-grant universities. Currently, CES works in six major areas:<sup>62</sup>

- *4-H youth development:* Helps youth make life and career choices. At-risk youth participate in school retention and enrichment programs. They learn science, math, and social skills using hands-on projects and activities.
- *Agriculture:* Helps individuals learn new ways to improve their agricultural income through research-based management skills, resource management, controlling crop pests, soil testing, livestock production practices, and marketing.
- *Leadership development:* Trains extension professionals and volunteers to serve in leadership roles in the community and deliver

## Successful Community Strategies

### The Clemson University Cooperative Extension Nutrition Program on Low-Fat Products and Fat Intake<sup>64-69</sup>

The percentage of calories from saturated and polyunsaturated fat and the amount of cholesterol in the diet are important determinants of the level of plasma cholesterol, a major contributor to heart disease risk. It is estimated on average that a 1 percent decrease in the intake of saturated fat results in a 2-mg/dl decrease in plasma cholesterol. This, in turn, can bring about a reduction in heart disease risk. High intake of dietary fat is also associated with an increased risk for developing cancer of the colon, prostate, and breast.

Programs that have demonstrated effective community interventions for a decrease in dietary fat include a program from Clemson University in South Carolina, which incorporated community nutrition classes, grocery store tours, speakers' bureaus, professional education classes, home

study courses, and worksite nutrition education programs. This program focused on the impact of low-fat diets on serum cholesterol. The intervention community, compared with a control community, had a significant decrease in the intake of dietary fat (9 percent vs. 4 percent) and an increase in awareness of restaurant information (33 percent vs. 19 percent).

In South Carolina, 61 percent of adults were overweight or obese. From 1990 to 2002, the obesity rate among adults in South Carolina increased by 90 percent. The African American, Hispanic, and Native American populations in South Carolina had significantly high prevalence rates of obesity. About 15 percent of South Carolina's high school students were at risk of becoming overweight and approximately 11

percent were overweight. Data showed that less than 25 percent of all South Carolina's adults and only 18 percent of South Carolina high school students ate the recommended five or more servings of fruits and vegetables each day. Obesity is associated with many health conditions, some of which include heart disease, stroke, and diabetes. These also make up the three major causes of death and disability in South Carolina. In South Carolina, medical expenditure due to obesity per year was \$1.06 billion.

Clemson's Extension agent provided low-fat programs at regional volunteer leader training, an assisted living facility, three community groups, and a summer youth camp. A low-fat nutrition education program was presented to 38 family and community project leaders at regional

programs in gardening, health and safety, and family and consumer issues.

- *Natural resources*: Provides educational programs in water quality, timber management, composting, lawn and waste management, and recycling to landowners and homeowners.
- *Family and consumer sciences*: Teaches families and individuals about nutrition, food preparation, positive child care, family communication, financial management, and healthcare strategies so they can become healthy.
- *Community and economic development*: Helps local governments improve job creation and retention, small and medium-sized business development, effective and coordinated emergency response, solid waste disposal, tourism development, workforce education, and land use planning.

In addition, the Expanded Food and Nutrition Education Program (EFNEP) is a federally funded program designed specifically for nutrition education. The county extension home economists provide on-the-job training and supervise paraprofessionals and volunteers who teach EFNEP to low-income families and individuals.<sup>63</sup> The Successful Community Strategies features in this chapter discuss the successful Clemson University Cooperative Extension Nutrition Program on low-fat products and fat intake as well as a National Cancer Institute health promotion intervention program.



Children learn more about nutritious foods when they are involved in meal preparation.

leader training. These project leaders taught the program to over 400 adult members in their four counties. In addition, the agent taught four 1-hour lessons emphasizing dietary guidelines to a senior group, two adult groups, and a group of young mothers of preschoolers. Also, a 3-hour workshop on nutritious snacks and nutrition facts labels was provided to 10 middle school youth. Thirty-two articles on low-fat ideas and nutrition tips were sent to 18 print media outlets in a three-county area (Richland, Lexington, and Fairfield). These print media outlets reached a circulation of 473,000. The local Fairfield County newspaper (*Herald Independent*) published the nutrition articles 21 times from June 2004 to January 2005. Two Lexington County papers (*The Twin City News* and *The Chronicle and Dispatch News*) published the nutrition articles 16 times from April 2004

to January 2005. These three newspapers had a circulation of 19,600 weekly. The state newspaper published three special interviews with the Extension agent concerning nutrition information on a vegetable featured in their Life and Style food section. The newspaper had a circulation of 150,000 daily. The *Focus on Family Matters* quarterly newsletter published nine articles providing research-based nutrition information. The newsletter had a circulation of 1,000 in Lexington, Richland, and Fairfield counties. Nutrition recipe analyses on calories, carbohydrates, dietary fiber, sugar, fat, cholesterol, and sodium were published in the Cook's Corner column of *Living in South Carolina* magazine. The agent analyzed 45 recipes for 11 monthly columns. The magazine had a circulation statewide of 523,000 homes and businesses with a readership of 1.2 million monthly.

At the end of the Extension programs, 89 percent of participants surveyed said that the program increased their nutrition knowledge. About 72 percent said they would read the Nutrition Facts Label on packaged foods. Seventy-five percent said they would reduce their intake of refined sugars. About 78 percent said that they planned to control portion sizes and servings for each food group. Seventy percent said they would include 30 minutes of exercise per day. Sixty-five percent said they would include more whole grain breads and cereals in their diet. Eighty-seven percent said they would make one positive change as a result of the low-fat and healthy ideas programs.

## Chapter Summary

- Community nutrition is a modern and comprehensive profession that includes, among other disciplines, public health, dietetics/nutrition education, and medical nutrition therapy.
- The World Health Organization (WHO) defined community as “a social group determined by geographic boundaries and/or common values and interests.” Community members know and interact with one another, function within a particular social structure, and create norms, values, and social institutions.
- A community can also be defined on the basis of a common interest or goal. A collection of people, even if they are scattered geographically, can have a common interest that bind the members together.
- Community strengths can be physiological, psychological, social, or spiritual.
- Community nutrition and dietetics professionals are members of community and public health agency professionals who provide nutrition services that emphasize community health promotion and disease prevention.
- Public health has been viewed as the scientific diagnosis and treatment of the community. In this vision, the community, instead of the individual, is seen as the patient.
- In addition to dietary factors, two primary determinants of health status are genetics and lifestyle.
- Prevention is important in public health as well as in community nutrition practice. The three aspects of prevention are personal, community-based, and systems-based health.
- The three levels of prevention are primary, secondary, and tertiary prevention.
- Population and individual approaches are the two important strategies to choose from when designing a health promotion campaign aimed at risk reduction. The population approach directs instruction at the whole population or large sections of it whereas the individual approach identifies those most at risk from the risk factor, and intervention is targeted specifically at these “high-risk” individuals.
- Health promotion can be defined as the process of enabling people to increase control over the determinants of good health and subsequently improve their health.
- The negative consequences of nutrition-related problems include malnutrition and chronic health conditions such as obesity, cardiovascular diseases, cancer, diabetes mellitus, and childhood deaths.
- Public health and community nutritionists carry out a wide variety of nutrition activities through various agencies at the local, state, national, and international levels. In most cases, the activities require multitasking roles such as blood pressure screening, diet counseling, and medical nutrition therapy.
- Preventive nutrition can be defined as dietary practices and interventions directed toward the reduction in disease risk and/or improvement in health outcomes.

**working poor** families whose earnings are less than twice the federal poverty level and in which the adults work an average of half time or more during the year.

- The Cooperative Extension (CE) System is an agency under the U.S. Department of Agriculture. It provides educational programs that help individuals and families acquire life skills.

## Critical Thinking Activities

The **working poor** (defined as families whose earnings are less than twice the federal poverty level and in which the adults work an average of half time or more during the year<sup>70</sup>) are increasing in the current economy. Many public health programs may be eliminated or minimized, such as immunizations for all children and flu shots on demand for all people. Additionally, eligibility criteria for the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) program may be altered.

- Divide into groups and provide each group a certain amount of money, for instance, \$100,000. Then distribute the funds among the three levels of prevention (primary, secondary, and tertiary) and discuss the rationale behind the decisions. The table below presents examples of programs.
- Select four health issues from Table 1.1 and discuss the types of early intervention programs that can prevent the health conditions.

Primary Prevention	Secondary Prevention	Tertiary Prevention
Local Fruits & Veggies—More Matters campaign to schools	Worksite nutrition education for high-risk employees	Medical nutrition therapy for individuals with nutrition-related problems (e.g., heart disease)
School breakfast and lunch	Health fair screening and referrals to primary care providers	
Breastfeeding support		
Immunizations for all children		
Prenatal care		

## Case Study 1-1

Beatrice is a community nutritionist (RD) who was employed to provide nutrition education programs to a group of pregnant teenagers attending high school in a Midwestern city of 200,000 people. The teenagers eat most of their meals on campus. Some participate in the school lunch program; others prefer purchasing foods from the vending machine located a few feet away from the cafeteria. Beatrice was asked to help improve the teenagers’ nutrition and fitness status. Meetings with the teenagers revealed their opinions about food and physical activity. A 3-day dietary record and food frequency questionnaire were administered to the teenagers, and body measurements, such as height and weight for determining body mass index (BMI), were collected. She uncovered the following information:

- Analysis of the teenagers’ food choices revealed a high fat intake of 39 percent of total calories.
- Thirty percent of the teen mothers surveyed were obese and anemic, 40 percent were overweight, and 30 percent were underweight and anemic.
- In the vending machines in and around the high school, 80 percent of snacks were sugary or high fat, such as chips, and the machines contained soft drinks or other items with empty calories.

- Further analysis showed that the teen mothers' physical activity levels were inadequate.

The following plans reflect the program Beatrice devised after several meetings with the pregnant teenagers:

- Included fresh fruits and vegetables on every cafeteria menu. (These foods can offer vitamins, minerals, and fiber as well as decrease the number of high fat items available.)
- Evaluated and found a place where they can perform physical activity and campaigned for needed changes.
- Established a place for physical activity around the teens' homes. (Inactivity is a major contributor to obesity.)
- Collaborated with the school food service director and the vending machine vendors to stock the vending machines with snacks low in fat and sugar and replace sugary soft drinks with fruit juices.

### Activities

- Divide into groups and determine the locations for the WIC and Food Stamp Programs in your community. Then, encourage the teen mothers to enroll in these programs to obtain adequate prenatal care and nutrition counseling by giving them the addresses of the Food Stamp and WIC Programs and the name of the WIC nutritionist.
- Collect and analyze a 3-day food record from a female high school student and compare the results with a female college student.
- Analyze a school lunch meal and determine the fat, protein, calcium, vitamin D, folic acid, iron, and fiber content.
- Provide a list of foods that are high in iron, calcium, and vitamin D.
- Provide a list of foods fortified with folic acid.
- Provide a list of foods low in saturated fat and cholesterol.

## References

1. Frank-Spohrer G. *Community Nutrition: Applying Epidemiology to Contemporary Practice*. 2nd ed. Sudbury, MA: Jones and Bartlett; 2008.
2. Winterfeldt EA, Ebro LL. *Dietetics: Practice and Future Trends*. Sudbury, MA: Jones and Bartlett; 2005.
3. Goodman R, Wandersman A, Chinman M, Imm P, Morrissey E. An ecological assessment of community-based interventions for prevention and health promotion: approaches to measuring community coalitions. *J Community Psychol*. 1996;24:1-9.
4. Merzel C, D'Afflitti J. Reconsidering community-based health promotion: promise, performance, and potential. *Am J Public Health*. 2003; 93(4):557-574.
5. World Health Organization. *Diet, Nutrition and the Prevention of Chronic Diseases*. Geneva: Author; 1990.
6. Hawe P. Capturing the meaning of community in community intervention evaluation: some contributions from community psychology. *Health Promotion Int*. 1994; 9(3):199-210.
7. Denver A. *Community Health Analysis: Global Awareness at the Local Level*. 2nd ed. Gaithersburg, MD: Aspen; 1991.
8. McKenzie JF, Pinger RR, Kotecki JE. *An Introduction to Community Health*. 4th ed. Sudbury, MA: Jones and Bartlett; 2002.
9. Allender JA, Spradley BW. *Community Health Nursing: Promoting and Protecting the Public's Health*. 6th ed. New York: Lippincott Williams and Wilkins; 2005.
10. Lancaster SA. *Community and Public Health Nursing*. 5th ed. New York: Mosby; 2000.
11. Winslow C. *The Untitled Field of Public Health*. Vol 2. Chicago: Modern Medicine; 1920: 183.
12. Keegan DBA. *Holistic Nursing Practice*. Sudbury, MA: Jones and Bartlett; 2005.
13. Finkelstein EA, Ruhm CJ, Kosa KM. Economic causes and consequences of obesity. *Ann Rev Public Health*. 2005; 26:239-257.
14. Nedra K, Williams P, Pfister R. Cost savings and clinical effectiveness of an extension service diabetes program. *Diabetes Spectrum*. 2004; 17:171-175.
15. Qureshi AI, Suri MF, Kirmani JF. The relative impact of inadequate primary and secondary prevention on cardiovascular mortality in the United States. *Stroke*. 2004; 35(10):2346-2350.
16. Guthrie JJ, Smallwood DM. Evaluating the effects of the Dietary Guidelines for Americans on consumer behavior and health: methodological challenges. *J Am Diet Assoc*. 2003; 103(12):S42-S49.
17. Richardson RA, Cotton JW, Mark OR. Diet and colorectal cancer risk. Impact of a nutrition education leaflet. *J Hum Nutr Diet*. 2004; 17(6):576.
18. Beaudry M, Hamelin AM, Delisle H. Public nutrition: an emerging paradigm. *Can J Public Health*. 2004; 95(5):375-377.
19. World Health Organization. *Health and Welfare Canada and Canadian Public Health Association Ottawa Charter for Health Promotion*. Ottawa, Ontario: Author; 1986.
20. Pena M, Bacallao J, eds. *Obesity and Poverty: A New Public Health Challenge*. Washington, DC: World Health Organization; 2000.
21. U.S. Department of Health and Human Services, Healthy People 2010, 2nd ed. *With understanding and improving health and objectives for improving health, 2 vols*. Washington, DC: U.S. Government Printing Office; November 2000.
22. Centers for Disease Control and Prevention. The Surgeon General's call to action to prevent and decrease overweight and obesity, 2007. Available at: <http://www.cdc.gov/nccdphp/dnpa/obesity/consequences.htm>. Accessed April 10, 2006.
23. Kaufman M. *Nutrition in Public Health: A Handbook for Developing Programs and Services*. Sudbury, MA: Jones and Bartlett; 2007.
24. Webb G. *Nutrition: A Health Promotion Approach*. 2nd ed. New York: Arnold; 2002.
25. Millen BE, Quatromoni PA, Nam BH, et al. Dietary patterns, smoking, and subclinical heart disease in women: opportunities for primary prevention from the Framingham Nutrition Studies. *J Am Diet Assoc*. 2004; 104(2):208-214.
26. U.S. Department of Health and Human Services. *The Surgeon General's Report on Nutrition and Health*. PHS Publication No. 88-50210. Washington, DC: Author; 1988.
27. U.S. Department of Health and Human Services. *Nutrition and Your Health: Dietary Guidelines for Americans, 2004*. Available at: <http://www.health.gov/dietaryguidelines>. Accessed April 10, 2006.
28. American Heart Association. *Healthy Lifestyle Diet and Nutrition, 2004*. Available at: <http://www.americanheart.org>. Accessed May 5, 2006.
29. Tulchinsky TH, Kaluski DN, Berry EM. Food fortification and risk group supplementation are vital parts of a comprehensive nutrition policy for prevention of chronic diseases. *Eur J Public Health*. 2004; 14(3):226-228.
30. Bauman AE. Updating the evidence that physical activity is good for health: an epidemiological review 2000-2003. *J Sci Med Sport*. 2004; 7(1):6-19.
31. Mullen B, Cupples A, Franz M, Gagnon D. Diet and Heart Disease Risk Factors in Adult American Men and Women: The Framingham Offspring-Spouse Nutrition Studies. *Int J Epidemiol*. 2006; 22(6):1014-1025.
32. William M. *Nutrition for Health, Fitness and Sport*. 6th ed. St. Louis, MO: McGraw-Hill; 2002.
33. Berdanier C, Feldman E, Flatt W, Sachiko J. *Handbook of Nutrition and Food*. New York: CRC Press; 2007.
34. Roche HM. Dietary lipids and gene expression. *Transactions*. 2004; 32(Pt 6):999-1002.
35. National Center for Health Statistics. Death-leading causes. Available at: <http://www.cdc.gov/nchs/fastats/lcod.htm>. Accessed January 30, 2008.

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36. World Health Organization. The top ten causes of death. Available at: <http://www.who.int/mediacentre/factsheets/fs310/en/index.html>. Accessed January 30, 2008.
37. Vanden Heuvel JP. Diet, fatty acids, and regulation of genes important for heart disease. *Curr Atherosclerosis Rep.* 2004; 6(6):432–440.
38. Skidmore PM, Yarnell JW. The obesity epidemic: prospects for prevention. *QJM.* 2004; 97(12):817–825.
39. Bautista-Castaño I, Doreste J, Serra-Majem L. Effectiveness of interventions in the prevention of childhood obesity. *Eur J Epidemiol.* 2004; 19(7):617–622.
- 40a. Nies MA, McEwen M. *Community Health Nursing: Promoting the Health of Populations.* 3rd ed. London: Saunders; 2001.
- 40b. Gakidou E, Oza S, Vidal Fuertes C, Li A, Lee D. Improving child survival through environmental and nutritional interventions. *JAMA.* 2007; 298:1876–1887.
41. Mackenbach J, Bakker M. *Reducing Inequalities in Health. A European Perspective.* London: Routledge; 2002.
42. Qureshi AI, Suri MF, Kirmani JF, Divani AA. The relative impact of inadequate primary and secondary prevention on cardiovascular mortality in the United States. *Stroke.* 2004; 35(10):2346–2350.
43. Stoddard AM, Palombo R, Troped PJ, Sorensen G, Will JC. Cardiovascular disease risk reduction: the Massachusetts WISEWOMAN project. *J Women's Health.* 2004; 13(5):539–546.
44. Cheng C, Graziani C, Diamond JJ. Cholesterol-lowering effect of the Food for Heart Nutrition Education Program. *J Am Diet Assoc.* 2004; 104(12):1868–1872.
45. Pereira M, O'Reilly E, Augustsson K, Fraser G, Goldbourt U. Dietary fiber and risk of coronary heart disease. A pooled analysis of cohort studies. *Arch Intern Med.* 2004;164:370–376.
46. Bemelmans WJ, Broer J, Hulshof KF, Siero FW, May JF, Meyboom-de Jong B. Long-term effects of nutritional group education for persons at high cardiovascular risk. *Eur J Public Health.* 2004; 14(3):240–245.
47. Kaufman M. *Nutrition in Promoting the Public's Health: Strategies, Principles, and Practice.* 2nd ed. Sudbury, MA: Jones and Bartlett; 2007.
48. Dodds JM, Lاراia BA, Carbone ET. Development of a master's in public health nutrition degree program using distance education. *J Am Diet Assoc.* 2003; 103:602–607.
49. Winterfeldt EA, Ebro LL. *Dietetics: Practice and Future Trends.* Sudbury, MA: Jones and Bartlett; 2005.
50. Johnson DB, Eaton DL, Wahl PW, Gleason C. Public health nutrition practice in the United States. *J Am Diet Assoc.* 2001; 101(5):529–534.
51. Bendich A, Richard J. *Preventive Nutrition: The Comprehensive Guide for Health Professionals.* Totowa, NJ: Humana Press; 2001.
52. Reddy K, Katan M. Diet, nutrition and the prevention of hypertension and cardiovascular diseases. *Health Nutrition.* 2007; 7(1A):167–186.
53. Dietrich M, Coralie JP, Brown, Block G. The effect of folate fortification of cereal-grain products on blood folate status, dietary folate intake, and dietary folate sources among adult non-supplement users in the United States. *JACN.* 2005; 24(4):266–274.
54. Shepherd SK. Consumer information gap on behavioral aspects of dietary change. *J Nutr Educ Behav.* 2004; 36(3):113.
55. Cohen SJ, Meister JS, deZapian JG. Special action groups for policy change and infrastructure support to foster healthier communities on the Arizona-Mexico border. *Public Health Rep.* 2004; 119(1):40–47.
56. Thomas HN, Wayne R. Heart disease and stroke statistics—2006 update: a report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. *Circ.* 2006; 113:e85–e151.
57. Canfield MA, Anderson JL, Waller DK, Palmer SE, Kaye CI. Folic acid awareness and use among women with a history of a neural tube defect pregnancy—Texas, 2000–2001. *MMWR Recommend Rep.* 2002; 51(RR-13):16–19.
58. Mosley BB. Folic acid and the decline in neural tube defects in Arkansas. *J Arkansas Med Soc.* 2007; 103(10):247–250.
59. Bendich A. *Preventive Nutrition: The Comprehensive Guide for Health Professionals.* Totowa, NJ: Humana Press; 2005.
60. Splett PL, Montgomery DL. *The Economic Benefits of Breastfeeding an Infant in the WIC Program: Twelve-Month Follow-Up Study.* Washington, DC: Food and Consumer Service, U.S. Department of Agriculture; 1998.
61. Cattaneo A, Ronfani L, Burmaz T, Quintero-Romero S, Macaluso A, Di Mario S. Infant feeding and cost of health care: a cohort study. *Pædiatrica.* 2006; 95:540–546.
62. U.S. Department of Agriculture. Extension. Available at: <http://www.csrees.usda.gov/qlinks/extension.html>. Accessed April 1, 2005.
63. U.S. Department of Agriculture. Expanded Food and Nutrition Education Program. Available at: <http://www.csrees.usda.gov/nea/food/efnep/about.html>. Accessed April 1, 2005.
64. Lupo BH. Low-fat products and nutrition success story, 2005. Available at: <http://www.clemson.edu/lexington/Acomp133.htm>. Accessed January, 26, 2008.
65. Pieterse Z, Jerling JC, Oosthuizen W, et al. Substitution of high monounsaturated fatty acid avocado for mixed dietary fats during an energy-restricted diet: effects on weight loss, serum lipids, fibrinogen, and vascular function. *Nutr.* 2005; 21(1):67–75.
66. Constant J. The role of eggs, margarines and fish oils in the nutritional management of coronary artery disease and strokes. *Keio J Med.* 2004; 53(3):131–136.
67. Washington State. Washington State Risk and Protective Factors: Nutrition. Available at: <http://depts.washington.edu/commnutr/wadocs/wadocs-nutrition.htm>. Accessed April 10, 2006.
68. Newman VA, Thomson CA, Rock CL, et al. Achieving substantial changes in eating behavior among women previously treated for breast cancer—an overview of the intervention. *J Am Diet Assoc.* 2005; 105(3):382–391.
69. Bemelmans WJ, Broer J, Hulshof KF, Siero FW, May JF, Meyboom-de Jong B. Long-term effects of nutritional group education for persons at high cardiovascular risk. *Eur J Public Health.* 2004; 14(3):240–245.
70. Kazis R, Miller MS. *Low-Wage Workers in the New Economy.* Washington, DC: The Urban Institute Press; 2001.