



About the Print Version

The print version of the module includes all the substantive content from each screen. It does not include any of the exercises.

Why Maternal and Child Health Nutrition Matters

Naomi is a 25-year-old single mother in the second trimester of her second pregnancy and has gained more weight than she planned. Additionally, she was never able to return to her pre-pregnancy weight after the birth of her first child. Naomi commutes 15 miles by bus to her job at a food processing plant. At the end of her long and tiring day she often takes her daughter to one of the many fast-food restaurants in her low-income neighborhood. The low wages she earns do not always cover both rent and food for the whole month. Despite her high calorie diet, Naomi isn't able to get the right nutrients. Eating foods with inadequate nutrients, beginning pregnancy with a high maternal weight, and excessive weight gain in pregnancy are factors that may put Naomi and her baby at risk for health problems for the rest of their lives.

Naomi is like many women who have a higher risk of poor health outcomes. In fact, many families in low income communities have difficulty accessing healthy foods. They may not be able to afford healthy food or have time for food shopping and preparation. Their neighborhoods are unsafe to walk in and have poor transportation to retail stores that offer healthier foods.

Access to healthy food is important not only for Naomi but also for her children and grandchildren. Nutrition-related health risks and protective factors are passed from one generation to the next. Naomi's health is affected by what she experienced during her own childhood and adolescence, and even on the experiences of generations before her.

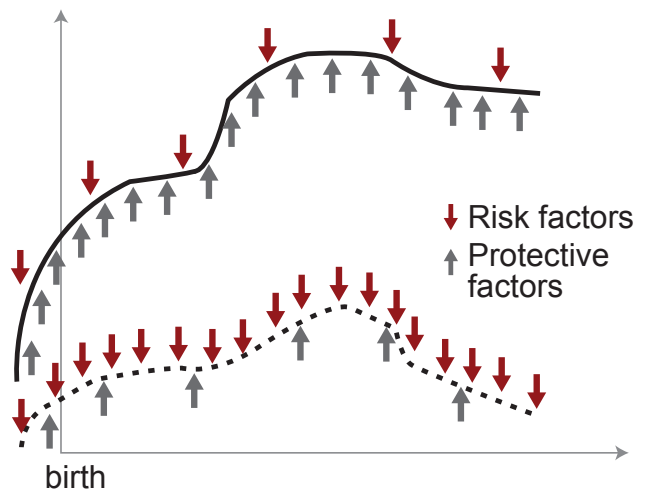
What can public health do at the state and community levels to improve maternal and child health (MCH) nutrition? This course will describe a framework that can be used to improve birth outcomes across generations and the long-term health of the entire population.

First, it is important to understand why nutrition is so important in maternal and child health.

Growth and Development Trajectories

Nutrition plays a vital role in how we grow and develop. Throughout our lives, we follow paths, or trajectories, that can be positive, resulting in health and high quality of life, or negative, increasing risk of poor health and poor quality of life. Understanding how and when nutrients affect our growth and development can guide public health initiatives.

The figure shows the potential effect of nutrition experiences on health across the life span. If, starting before birth, an individual experiences many nutritional risk factors and few protective factors then he or she is likely to have poor health, as illustrated by the lower



line (or trajectory) in the figure. On the other hand, an individual with many positive nutrition experiences will follow a trajectory with higher levels of health and quality of life over time.

In general, health trajectories across a person's life are affected by two important mechanisms: **early programming** and **cumulative pathways**.

Early programming: Exposures and experiences during sensitive developmental periods early in life may permanently alter the functions of organs or systems.

Cumulative pathways: "Wear and tear," or continual exposure to a particular set of risk factors, can add up over time to negatively affect health and function. Positive exposures (protective factors) also accumulate over time. Differences in exposures over time play a major role in health disparities.

Together, early programming and cumulative pathways shape the growth and development of a person from conception throughout life.

Let's look at early programming in more detail.

Early Programming

Poor nutrition may irrevocably change organ structure and function. During critical development stages, nutrition may permanently affect the way genes are expressed and the consequent paths that development will follow. This process is called early programming.

How might Naomi's access to healthy food and her daily eating habits affect her child's **early programming**?

If Naomi consumes insufficient calories or foods with many calories but few essential nutrients, it may trigger **physiological adaptations** in her unborn baby. Organs may change to maximize use of available nutrients, providing an advantage in the womb. Following birth, however, if the infant or child has access to adequate nutrition, the in-utero alterations result in a mismatch between its organ systems and its current healthier environment. Changes that helped the fetus survive now may hurt the infant and growing child. Children who did not grow well in utero and then consume excess calories are at especially high risk for health problems later in life.

Physiological adaptations: the changes an organism makes so that it can survive in the environment.

Cumulative Pathways

Risk factors and protective factors at critical periods and those accumulating over time affect the development of health.

For example, nutritional risk factors that begin in utero include:

- High availability of convenience stores and fast food restaurants, leading to limited access to fresh fruits and vegetables
- Maternal diet low in essential nutrients
- Unsafe neighborhoods for physical activities like walking
- Excessive or inadequate maternal weight gain
- Gestational diabetes

The environment in which Naomi lives, works, and spends time with family and friends influences the risk and protective factors to her and her baby.

Families who have good housing, adequate financial resources, and live in safe environments provide protective factors for their infants.

All families can provide nutritional protective factors in infancy by:

- Providing high quality child care
- Breastfeeding
- Feeding babies high iron foods during weaning

When Naomi breastfeeds her child, she will give her infant protections against infections in infancy, and obesity, diabetes, and some kinds of cancers in childhood. By the time he is a year old, Naomi's baby will have accumulated a large number of risk and protective factors that will influence his health trajectory.

Risk of Chronic Disease Starts in the Womb

Altered organ capacity and function from early programming and continued exposure to risk factors may result in multiple health issues. Poor nutrition before birth may increase a person's risk for developing chronic diseases. These include obesity, type 2 diabetes, cancer, heart disease, and coronary artery disease. Other related issues include hypertension, osteoporosis, and risk of stroke. Slow growth of organs and muscle tissue in utero, followed by failure to thrive during infancy and childhood, may also increase risk of stroke and coronary disease later in life.

The environmental and socio-economic factors that influenced the health of Naomi, Naomi's mother, and Naomi's grandmother play a significant role in the health trajectories of Naomi's children.

During her first pregnancy, Naomi developed gestational diabetes. Her first child, Kayla, was a pre-term birth, which could have been associated with poor nutritional status of her mother. Kayla was also born below the 10th percentile for weight, too small for her gestational age. Being born too small (or too large, above the 90th percentile) increases risk for chronic diseases. During infancy, Kayla had periods of rapid growth and weight gain, putting her at risk for increased fat tissue and obesity later in life.

Exposures to risk factors later in life can increase the health risks from these early influences. Alternatively, positive exposures, including a diet rich in nutrients, may mitigate health risks.

The Burden of Chronic Disease

- Seven out of ten deaths among Americans each year are from chronic diseases. Heart disease, cancer, and stroke account for more than 50% of all deaths.*
- Rates of type 2 diabetes, formerly known as adult onset diabetes, but now seen in children too, are increasing rapidly in association with higher obesity rates. Diabetes is the leading cause of kidney failure, non-traumatic lower-extremity amputations, and blindness among adults aged 20–74.*

* Based on 2011 Centers for Disease Control and Prevention [data](#).

Inequalities in Chronic Disease

Some populations have a greater burden of chronic diseases than others. African American, American Indian, and Hispanic communities have higher **prevalence** of obesity, diabetes, and heart disease than white communities. Addressing early life **determinants** of chronic disease offers a way to reduce health inequalities.

A Population-Based Approach

Naomi wants food for her children that is healthy and nutritious. If Naomi took a nutrition class, she would learn what foods to eat, but it would still be hard for her to choose healthy foods. Many factors influence Naomi's food consumption. Unhealthy foods are heavily advertised in her neighborhood. Her community stores offer more choices of unhealthy than healthy foods. If healthy foods, such as fresh fruits and vegetables are available, they often cost more and are of poor quality. Furthermore, public transportation is not convenient to neighborhoods with better stores.

Naomi's difficulties are due to problems in the systems that affect her access to healthy foods. Public health can make a real difference in Naomi's community by working to change these systems.

The rest of the module will discuss a **population-based approach** by applying the life course framework to successfully improve nutrition at the community level.

Nutrition and Public Health Goals

If Naomi and millions of other pregnant women in the United States have opportunities to choose healthy foods for themselves and their families and to breastfeed for the first six months, it will address the public health goals set by the United States Department of Health and Human Services.

Healthy People is a strategic planning document for the health of everybody in the U.S. It provides science-based ten-year national objectives for improving the health of all Americans. For three decades, Healthy People has established benchmarks and monitored progress to encourage collaboration, guide individuals toward making informed health decisions, and measure the effects of prevention activities.

Here are four overarching Healthy People 2020 goals and some examples of how they are related to nutrition:

1. **1. Attain high-quality, longer lives free of preventable disease, disability, injury, and premature death:** Risk of chronic disease starts in utero, or even earlier, and accumulates throughout life.
2. **2. Achieve health equity, eliminate disparities, and improve the health of all groups:** Equitable and reliable access to food during pregnancy, infancy, childhood, and throughout life can reduce health disparities for the maternal and child health population and their families.
3. **3. Create social and physical environments that promote good health for all:** Healthy nutrition environments with plentiful access to foods that

Prevalence: the proportion of people in a population who have a particular disease, chronic condition, injury, or attribute at a specified point in time.

Determinant: an influencing element or factor.

promote health and limited access to foods high in calories and low in nutrients make it easier to choose healthy foods at home, school, worksites, and communities.

- 4. Promote quality of life, healthy development, and healthy behaviors across all life stages:** Access to healthy foods, effective promotion of healthy nutrition behaviors, and access to nutrition services—especially at critical stages—improves lifelong health and quality of life.

Nutrition in Essential Public Health Services

The essential public health services were developed to define the role of public health and to describe the day-to-day work of public health practitioners. The ten essential services are a roadmap for how to do the core functions of public health: assessment, assurance, and policy development. Often this work is conducted across health department units—for example, one team conducts assessment activities while another works with partnerships and coalitions. Many health departments prioritize MCH nutrition actions because they contribute to achieving the Healthy People 2020 goals and they are part of the defined work of public health. Using the core functions in nutrition initiatives is discussed in the Applying the Life Course Framework section of this module.

Examples of how health department units can work collaboratively to improve MCH nutrition using the essential services may be found in the resources section.

Summary

MCH nutrition matters because the risks for developing chronic diseases and other health problems start early in a person's development trajectory. Biological changes that occur during early programming and from continual exposure to risk factors can increase the likelihood a person will be obese, develop diabetes, heart disease, or suffer a stroke later in life. On the other hand, the accumulation of positive nutrition factors early and throughout life increases the chance for a healthy developmental trajectory. Nutrition is key to improving health of the population.

Certain populations have a greater burden of nutrition-related diseases. Individual-based approaches to decreasing the risks for disease do not address the systemic problems many communities face. Therefore, we need to adopt a population-based approach to MCH nutrition initiatives.

The Life Course Framework

A health department's limited resources can be used most effectively to make changes in the systems that influence nutrition in communities. However, public health departments need to be strategic when taking actions to improve health at the population level. The US Maternal and Child Health Bureau adapted and consolidated elements of three health models (life course perspective, social determinants of health, and health equity) to develop a framework for understanding patterns of health and disease. The life course framework describes a complex relationship of biological, behavioral, psychological, environmental, and social protective and risk factors that contribute to health outcomes

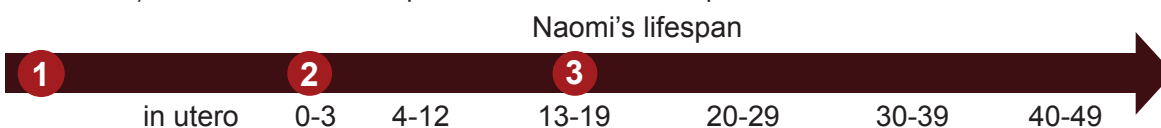
across the span of a person's life. Inequities in birth outcomes, such as low birth weight and infant mortality, result from differences in protective and risk factors between groups of women over the course of their lives. In this module we apply the framework specifically to nutritional health.

T²	Timeline: Today's exposures influence tomorrow's health.
	Timing: Health trajectories are especially affected during critical periods.
E²	Environment: The broader community environment strongly affects a person's capacity to be healthy.
	Equity: Inequality in access to resources has as much or more influence on health as genetics and personal choice.

You can easily remember these principles by thinking about them as T²E². First we'll look at the timeline concept.

Timeline

Today's exposures, positive or negative, influence tomorrow's health. At each point in Naomi's life, the accumulation of her nutritional behavior, environmental exposures, and life experiences determine her health. These influencing factors may confer either risk or protection as she develops.



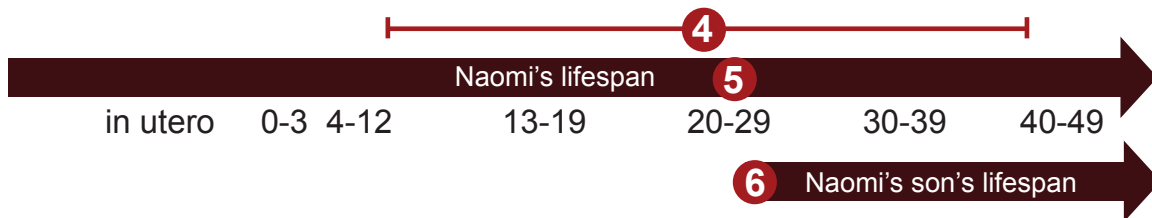
- 1 Naomi's health may be the legacy of previous generations. Public health interventions aimed at improving the systemic problems influencing the health of Naomi's mother and grandmother would have benefited Naomi.
- 2 Access to nutrition early is one of the most important protective factors in shaping health throughout Naomi's life. If intrauterine malnutrition resulted in a low birth weight for Naomi herself, she will be at greater risk for later chronic diseases. If Naomi was breastfed, she has a lower likelihood of being at risk for certain chronic diseases.
- 3 The presence or absence of specific nutrients can affect a person's health in later years. For example, if Naomi didn't get enough calcium in her teens, her bones wouldn't develop the maximum mineral content they need by the time she reaches her twenties. When a woman is in her early twenties, her bones are at the peak of development and lose mass from that point on. Without maximum mineral content, she's at risk for **osteopenia** and **osteoporosis**, and possible bone fractures, later in her life.

Osteopenia: a condition of low levels of minerals in the bone.

Osteoporosis: a disease where bones become weak and at risk for fractures.

Timing

Timing, the framework's second key concept, explains that health trajectories are improved or worsened during critical periods of development. Being exposed to risk and protective factors at certain points of a person's life may either promote or compromise optimal development.



- 4 The critical time to build bone mass through adequate amounts of calcium is relatively long, encompassing childhood, and during child-bearing years. Calcium adequacy also reduces risk of hypertensive disorders during pregnancy.
- 5 Naomi became pregnant in her mid-twenties. If there wasn't enough folate available to the embryo during the first three weeks of her pregnancy, her child might be affected by a neural tube defect. The neural tube—the first stage of nervous system development—rapidly forms very early in gestation. Folate is essential to cell division; insufficient folic acid may hamper cell division. Many women are not aware of pregnancy until their second or third month, after this critical brain development period. It is a public health recommendation that all women capable of becoming pregnant should take a folic acid supplement.
- 6 If Naomi is able to begin breastfeeding her son minutes after his birth and continues until he is at least a year old, both mother and child will be exposed to several protective factors at critical times. Breastmilk provides protection against infections in infancy and may impart developmental advantages to the infant. For Naomi, it will decrease postpartum bleeding and help her uterus return to normal size.

When to Take Action

Timeline and timing, or T^2 , show at what time in people's lives they need certain nutrients to be healthy. Knowing this, health departments can make sure that nutrition initiatives reach certain populations when it will be most beneficial. They can contribute to community-based efforts to promote more healthful neighborhoods and environments to reach those most at risk. Health professionals may emphasize healthy eating for middle-aged people to lower cholesterol or improve glucose tolerance. However, public health practitioners also need to pay attention to very early prevention.

Comprehensive public health efforts that make it easier for families to choose healthy foods, engage in physical activity, and limit time in front of televisions,

computers, or other screens, save costs by reducing pregnancy risks now and chronic disease risks throughout the lifespan.

To reduce the burden of chronic disease and other health problems, we must make sure that:

- Women of reproductive age are well nourished, of a healthy weight, and take folic acid supplements.
- Infants are breastfed to get the many health and developmental advantages.
- Toddlers experience healthy foods and in appropriate portion sizes, so that they learn good food habits.
- Children are surrounded by caring adults and institutions that provide a variety of enjoyable, healthy foods. They should have limited exposure to foods high in sugar and salt and to marketing of less healthy foods.
- Adolescents get adequate calcium intake and healthy foods and beverages at home, school, and in their communities. They should have the skills, encouragement, and media literacy they need to adopt a healthy lifestyle.

Environment

E², environment and equity, show where and what groups to focus on for nutrition initiatives. Let's start with where. Naomi's food environment contributes to her ability to be healthy. Convenient access to healthy foods provides the opportunity to choose a nutritious diet. Community factors that shape food access include:

- Physical access. Is Naomi close to retailers? Does she have consistent, reliable transportation?
- Financial access. Can Naomi afford to buy healthy food? Can she afford adequate food for her family monthly?
- Nutritional access. Is there a variety of food Naomi needs for a healthy diet?
- Cultural access. Does Naomi have access to foods that meet her **cultural norms**, and does she know about food storage and preparation?
- Time for meals. Does Naomi have time to plan, shop, and prepare meals?

Other aspects of Naomi's environment influence her family's nutrition, too. What are the social norms around food within her extended family, with her friends or co-workers, or at her church, synagogue, or other faith-based community? What kind of advertising is she exposed to when she walks down her street?

Equity

Chronic disease and other health issues are exacerbated for people living in low resource neighborhoods. Low-income families are less likely to have the support and resources they need to breastfeed their infants and have healthy diets. Social inequalities increase the risk of preterm infants and gestational diabetes. As mentioned in the first section, not getting the right nutrients can increase the

Cultural norms for foods are diverse and change for populations over time so that each family defines what is culturally appropriate for their situation. Some factors that may come into play are food beliefs such as "hot" and "cold" foods, preference or avoidance of foods during pregnancy and the postpartum period, and religious teachings about specific foods.

risk for some chronic diseases. Naomi's socio-economic situation puts her children at a disadvantage early in life.

Studies have shown that eating certain types of food can reduce the risk of chronic diseases. For example, fruit and vegetable consumption protects against some kinds of cancer. The nutrients in fruits and vegetables also protect against a wide variety of inflammatory conditions. In the US there are inequalities in access to fruits and vegetables and their health benefits. The highest levels of fruit and vegetable consumption are found in populations that are college-educated, white, and where households earn more than \$50,000* per year. People in lower socio-economic groups may not have easy access to or can't afford fruit and vegetables.

Based on [2005 data](#).

Nutritional equity means that Naomi and her children have the same opportunities to choose healthy foods, breastfeed, and be as physically active as any family in the US. Working toward equity means leveling the playing field in communities and institutions so that all children have a chance to grow up healthy.

Where to Take Action

Public health practitioners are taking action to assure healthy nutrition environments in the places where people spend their time. This is described further in the Assurance section of this module. For Naomi's family, these efforts can make it easier to choose healthy foods at restaurants, events at faith-based communities, child care, schools, community centers, and at Naomi's job site. Changes to nutrition environments are accomplished through policy development, implementation, and evaluation.

The E² concepts not only indicate who to target for interventions but also what to target. Two primary issues are access to food and food security.

Access to Food

Though the World Health Organization considers access to good nutrition to be a basic human right, inequalities of access to healthy foods remain. Populations with limited intake of protective foods or restricted access to healthy foods experience persistent health disparities.

Access to food also includes the ability to breastfeed. Naomi may find it difficult to schedule breastfeeding around work, and her workplace may not have policies to support breastfeeding moms or provide a private, hygienic space for her to pump breast milk. Low-income women are less likely to initiate breastfeeding at birth, breastfeed exclusively for the first six months, and continue breastfeeding for at least a year. Inequalities in access to breast milk worsen the nutrition-related health risks that babies face.

Food Insecurity

Another problem low income families like Naomi's may face is food insecurity. Food security is when all people at all times have access to sufficient, safe,

nutritious food to maintain healthy and active lives. **Food insecurity** means that nutritious and safe food may not always be available, plentiful, or easy to get in socially acceptable ways.

For families food insecurity is associated with poor physical and mental health and poor school performance. In 2009, 15% of U.S. households were food insecure at some point during the year. Food insecurity affects some populations at substantially higher rates.

Prevalence of food insecurity:

- 25% of Black households
- 27% of Hispanic households
- 37% of households with children headed by a single woman
- 43% of households with incomes below the federal poverty level

Summary

To be most successful at improving nutrition and health for women and children, public health needs a framework to direct initiatives. Knowing when and where to focus efforts will help health departments spend their resources efficiently and effectively. The life course concepts of timeline, timing, environment, and equity look at the big picture, focusing on population health over several generations. These concepts help health departments prioritize initiatives that address nutrition and pay special attention to lower socioeconomic groups.

Risks associated with health disparities accumulate before, during, and after pregnancy. Population-based approaches to nutrition can make real headway in improving health outcomes and reducing health disparities.

In the next section, we will discuss how to incorporate a population-based approach into public health's core functions.

Applying the Life Course Framework

How can you use the life course framework to improve maternal and child health nutrition? The life course approach provides a template for making sure families are able to feed themselves well. In this section, we'll discuss how to incorporate the framework in the public health core functions: **assessment**, **assurance**, and **policy development**.

The diagram below gives an example of how a local public health practitioner could improve the health of Naomi's community using the core functions. State-level practitioners can use the same approaches to work with state-level organizations and agencies. State health departments can provide technical assistance, training, and resources to support the work at local public health agencies.

Assessment: You use geographic information systems to find out how many convenience, corner, and liquor stores are in Naomi's neighborhood.

Assurance: You work with your local SNAP (food stamp) outreach program to reduce barriers to program participation.

The USDA distinguishes between low food security and very low food security. Low food security means a family has reduced quality, variety, or desirability of diet, but little or no reduction of food intake. Very low food security, or food security with hunger, means that families have disrupted eating patterns and reduced food intake.

Assessment: Knowing what needs to be done

Assurance: Making sure it happens

Policy Development: Being part of the solution



Policy Development: You work with city planners to change planning codes to encourage healthy food outlets.

First let's look at what you should assess.

Assessment

Assessment is an ongoing process. Initially, the information you collect from assessments will guide what kinds of actions you take. Continually assessing the health of the population and the effectiveness and reach of your initiatives will help you fine tune your efforts. You can use the T²E² principles of the life course framework when assessing a state or community.

Environment and equity

- Are families food secure?
- What access do communities have to healthy food?

Timeline and timing

- What are the nutritional practices of women and children?
- Do women breastfeed their babies?

Food Security

When assessing food security, be sure to look at the household and community levels. Food security at the household level means the ability of a family to acquire sufficient food to maintain health in **socially acceptable ways**. Food security at the community level concerns the underlying social, economic, and institutional factors within a community that affect the quantity and quality of available food and its affordability.

To assess food security in the individual households of Naomi and her neighbors you can use one of the standardized [food security measurement tools](#) developed by the US Department of Agriculture.

To assess food security in Naomi's community, you should look at

- General community characteristics
- Community food resources
- Prevalence of household food insecurity
- Food resource accessibility
- Food availability and affordability
- Community food production resources

The U.S. Department of Agriculture provides a toolkit of standardized measurement [tools](#) for assessing community food security.

Access to Food

Assessing what kind of access people have to healthy foods in their community will pinpoint where you should focus your efforts to improve access. Using a

Socially acceptable ways is a subjective concept, but in general would not include things like standing in a public line outside of a food bank, being forced to listen to a lecture while eating lunch in a soup kitchen, or begging on the street.

combination of state and local Geographic Information Systems (GIS) data and information from the [USDA food atlas](#), you can start to answer assessment questions like:

- How many census blocks have a healthy food retailer within a half mile boundary?
- How many stores accept WIC benefits?
- Where are community gardens and farmers markets?
- Where are fast food outlets?

The CDC has developed a [framework](#) to help state and community public health practitioners assess retail access to healthier food. If you have resources to conduct your own local assessment, several tools have been developed and tested. The National Cancer Institute has a comprehensive [list](#).

Preconception Nutrition

The T² concepts illustrate why nutrition is so important in women of childbearing age. For example, Naomi needs to have good folic acid status and maintain a healthy weight so that when she does get pregnant, she lowers her child's risk for health problems later in life. When looking at the food habits of women of childbearing age, you should consider:

- Fruit and vegetable consumption
- Weight status
- Use of preventive screenings
- Physical health
- Supplement intake
- Cultural or traditional food choices

For example, the Los Angeles County Department of Public Health's Maternal, Child and Adolescent Health Programs' assessment in 2007 showed a high number (40%) of women in the preconception period were obese. Almost half of African American women of reproductive age were obese. The agency also found that many Caucasian and Asian women and most African American and Latina women were not taking multivitamins. Between a quarter and almost half of these women did not know about the importance of folic acid supplements.

The assessment list in the resources section gives several excellent resources that can help you collect data about preconception nutrition.

Pregnancy Nutrition

As the timing and timeline (T²) concepts tell us, the nine months of pregnancy have a profound influence on the subsequent health of the mother and baby. Data systems highlighted in the resources section provide assessment data that can be used to monitor nutrition-related risk and protective factors in pregnancy. Some examples are:

- Gestational weight gain
- Hypertensive disorders of pregnancy
- Gestational diabetes

- Infant birth weight
- Prematurity
- Maternal drug, alcohol, and tobacco use

Breastfeeding

If you were to assess breastfeeding practices in Naomi's community, you would look at not only current indicators of breastfeeding prevalence, but also changes in rates over time and inequalities in breastfeeding. Breastfeeding indicators include the proportion of infants:

- Ever breastfed
- Breastfed at six months
- Breastfed at one year
- Exclusively breastfed through three months
- Exclusively breastfed through six months

Because environment can make a real difference in these breastfeeding indicators you should also consider community, worksite, child care, and health care practices related to breastfeeding.

Childhood Nutrition

Growth and dietary patterns from infancy through adolescence help to set the health trajectory for life. Data sources for infancy and early childhood are limited. National data on growth and nutrition are collected by NHANES (National Health and Nutrition Examination Survey). State and local data for low income children may be available through **WIC** agencies. Some school districts may collect information about BMI, fitness measures, and the percentage of children receiving free and reduced-price lunches and breakfast. For youth, state and some local data about weight, height, BMI, and some targeted dietary behaviors are available through the Youth Risk Behavior System.

Assurance

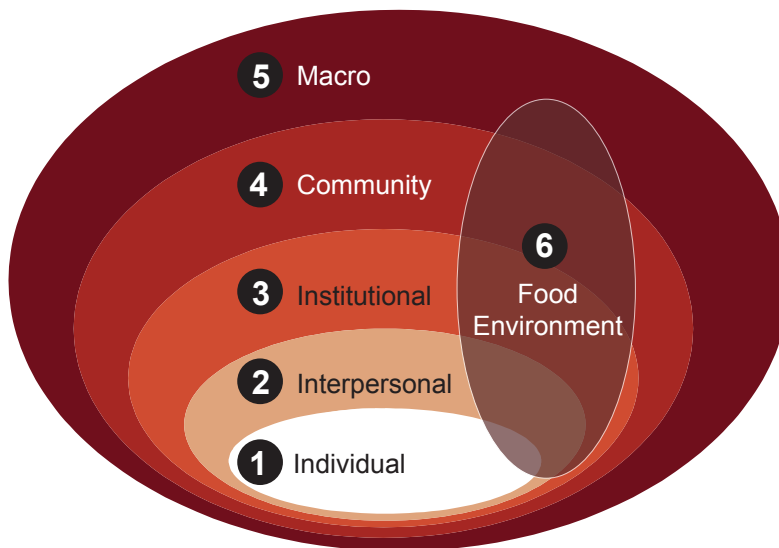
Information collected from the assessments you've done will guide you in deciding how to assure nutrition and health for mothers, children, their families, and the communities where they live. Your agency's role is to make sure that systems are in place for people to have access to strategies and resources to support healthy choices. This is done in partnership with state and local agencies, businesses, non-profit organizations, community groups and coalitions, faith-based entities in community-based initiatives, and other publicly funded-agencies, such as schools and police. For example, university extension agencies and anti-hunger groups can offer low-cost shopping and cooking classes, work-sites can support breastfeeding, and farmers markets organizations can accept SNAP benefits.

The socio-ecological model diagram below identifies factors that influence nutritional health. It will take action at all levels of the model to address T²E².

The resources page has a list of assessment data sources including breastfeeding data and surveillance systems.

Special Supplemental Nutrition Program for Women, Infants, and Children

The resources page has links to these and other assessment data sources.



- 1 Individual behavior and access to nutritious foods is influenced by knowledge, skills, values, and resources.
- 2 Interpersonal influences include social networks of friends and family that influence social norms and access to resources.
- 3 Institutional includes schools, worksites, faith communities, and other places that influence access to foods on site.
- 4 Community access to healthy foods in stores and other venues is essential.
- 5 Macro-level factors include food marketing, social norms, food production and distribution systems, agriculture policies, and economic price structures. The policy development section of this module will discuss this in more detail.
- 6 The food environment includes the kinds of foods that are available and affordable in our daily lives as well as the social and cultural perceptions about food. This environment is influenced by all levels of the model from the food purchased by families through the powerful effects of food marketing to children on television and the internet.

Individual Nutrition

The [2010 Dietary Guidelines for Americans](#) report concludes that “good health and optimal functionality across the life span are achievable goals.” To achieve these goals requires a lifestyle approach that emphasizes energy-balanced and nutrient-dense dietary choices supported through healthy home nutrition environments. A wide variety of groups in most communities are in a position to support these individual strategies.

Strategy	Actions
Nutrition literacy	Build skills to navigate the food and nutrition landscape (to make informed choices when shopping, cooking, reading food labels and other nutrition information).
Eating competence	Promote mindful eating, appropriate portion sizes, cooking skills, healthful relationship with food.
Food safety	Practice food safety principles of clean, separate, cook, and chill.
Low-calorie, high-nutrient foods	Promote filling plates with nutrient-rich foods that are mostly plant-based.
More physical activity and less sedentary time	Build skills for including physical activity in daily lives.
Breastfeeding skill building	Provide skills, understanding, and support for breastfeeding success.

To help Naomi be healthy, your agency could publicize local classes for healthy, low-cost food preparation and breastfeeding.

Interpersonal Nutrition

Public health agencies can partner with community agencies to support Naomi and other families in adopting healthy nutrition practices at home. Here are a few strategies.

Strategy	Actions
Positive role models	Provide regular meals and snacks for children, model the healthful food habits and attitudes they should adopt, have children help prepare meals, eat together as a family every day.
Healthy nutrition policies at home	Create family-level policies around meals and snacks (e.g., limit high fat/high sugar snacks and beverages, limit number of fast food meals per week, set goals for family-prepared meals and trying new foods and recipes together).
Peer breastfeeding support	Train women who have personal, practical experience of breastfeeding to offer support to other mothers from their communities.

Institutional Nutrition

When worksites, schools, child care, sporting events, and faith communities provide more healthy foods and fewer unhealthy foods, it is easier for women and children to have healthy diets. In the US the majority of children ages 2–10 spend time in non-parental child care, almost all children over the age of 5 attend school, and about 60% of mothers of young children spend time working away from home. The nutrition environments in these settings have a profound influence on the nutritional health of mothers and children. Public health agencies should assure that the following strategies are part of policies and practices.

Strategy	Actions
Procurement standards	Put in place standards that address the nutritional quality of foods purchased by the institution.
Healthy meeting standards	Require healthy foods and beverages be provided at worksite meetings, community/faith gatherings, and events.
Farm to institution	Initiate farm-to-institution procurement methods that allow institutions to purchase directly from farms.
School nutrition policies	Address policies about the quality of foods and beverages sold outside of school meals, free access to cold and clean water, nutrition education curriculum, foods served for parties and special events, and use of foods as a reward.
Child care licensing policies	Apply standards for center and home-based child care that emphasize the importance of serving foods of high nutritional quality, participating in the Child and Adult Care Food Program, and using developmentally appropriate feeding practices.
Breastfeeding policies	Adopt evidence-based maternity/infant care practices in all settings for childbirth, prenatal and pediatric health care visits, and child care. Adopt comprehensive breastfeeding worksites that include coverage for lactation consultants, maternity/paternity leave policies, facilities for breastfeeding and expression of breastmilk at worksites.

Community Nutrition

In the past, public health strategies for improving nutrition centered largely on individual behavior change. Today, we recognize how larger social and economic factors like income and neighborhood affect health. Public health practitioners now include environmental and policy-level nutrition standards in their approach to reduce and prevent obesity. Currently, community groups and agencies are exploring several ways of increasing local access to healthy food.

Strategy	Actions
Retail quality and proximity	Work in public/private partnership with local planners and industry to encourage grocers to come to underserved neighborhoods, revitalize old stores, or increase healthy food options in neighborhood stores.
Tax strategies	Encourage healthy food outlets with tax incentives that reward venues like farmers markets.
Community gardens	Provide local sources of produce and reinforce behaviors such as healthy eating, gardening, and walking.
Community supported agriculture	Encourage people to purchase local, seasonal food directly from a farmer.
Community kitchens	Create opportunities for families to prepare meals, learn to cook, save money, and enjoy eating together.

Farmers markets	Encourage farmers markets, which can provide fresh produce for families, support small and local farmers, serve as community venues, and revitalize community centers and downtown areas.
Transportation strategies	Include convenient and safe access for low-income households to grocery stores, community gardens.
Breastfeeding coalitions	Support breastfeeding coalitions. For example, WIC state agencies must ensure a sustainable infrastructure for breastfeeding activities and activities to support nutrition education for breastfeeding mothers, including peer support. See the resources section for more information on WIC.

The Center for Public Health Nutrition's [Opportunities for Increasing Access to Healthy Foods in Washington](#) is a comprehensive review of strategies for increasing access to healthy foods.

Policy Development

Many of public health's greatest achievements such as improving vehicle safety, creating smoke-free environments, and controlling infectious diseases have their roots in policy reform. Likewise, many policy makers recognize sustainable solutions to the problems of poor nutrition and obesity cannot be based solely on individual approaches. Given the very limited resources of public health staff at state and local levels, the most effective approach is to promote broader changes that can affect the entire population.

Policy is more than just legislation. Ordinances, resolutions, tax ordinances, design manual specifications, zoning plans, and internal policies could all be part of government policies at the state, county, or city level. In addition, policy can encompass both formal and informal rules and standards that may be explicit or implicit; these include unwritten social norms that influence behavior.

Although health department employees cannot directly advocate for specific legislation, you can participate in policy development in other ways:

1. **Identify problems:** What is preventing people from eating healthier foods? Your assessments will help you identify and prioritize the specific issues.
2. **Identify partners:** Which groups will be instrumental in coming up with a solution?
3. **Identify solutions:** What kinds of solutions might work? You will need to work with other groups to solve the problem.
4. **Help implement the solution:** What technical assistance do groups need? Are the solutions successful? Be sure to evaluate outcomes.
5. **Evaluate and re-assess:** What went well about the policy change process? What needs improvement? What was the impact of the policy change?

Identify a Problem

In Naomi's community, few women were gaining the right amount of weight in pregnancy or eating enough fruits and vegetables. Rates of gestational diabetes were growing. Naomi's personal environment was not conducive to helping her make healthy food choices. She had to commute an hour each way to her

job, leaving her with little time or energy to make healthy meals. The nearest store with healthy food options didn't accept SNAP benefits. Naomi's environment poses two problems: poor transportation to her job and limited access to healthy food.

These problems are not unique to Naomi. Many families in her neighborhood face these same challenges to healthy eating.

Once you've identified the problem(s), you need to identify who you should work with to solve these problems.

Identify Partners

Creating relationships with other organizations is a crucial step toward changing policies related to maternal and child health. You should think beyond public health circles. Public health can't make Naomi's commute shorter. Public health agencies can, however, partner with city planners and transportation agencies to work on designing communities with better transit options.

The choice of policy partners depends on the problem and policy solution. Organizations to partner with may include groups representing farmers, food retailers, health care providers, those interested in specific disease conditions, environmental and social justice groups, and advocates for housing, transportation, and health care policy.

Identify Policy Solutions

As a publicly-funded agency employee, you can't directly lobby government officials, but you can work with partners and coalitions to strategize about what initiatives would be most effective. If you find yourself tackling major E² issues such as access to healthy food or food security, the documents listed below can help. The documents give proposed actions, standards, and policies needed to implement effective policies. You can share these resources with decision makers or advocacy groups.

Topic	Example documents
Child care	Preventing Childhood Obesity in Early Care and Education Programs—Selected Standards from Caring for Our Children Selected set of standards on nutrition, physical activity, and screen time in early care and education programs.
Local government	Local Government Actions to Prevent Childhood Obesity A list of recommended action steps for local public health officials to prevent childhood obesity in their community.
Communities	Recommended Community Strategies and Measurements to Prevent Obesity in the United States, Implementation and Measurement Guide Strategies and measures about affordable healthy food, supporting healthy food choices, and encouraging breastfeeding, physical activity, and community change.

Breastfeeding	Surgeon General’s Call to Action to Support Breastfeeding Policy strategies for maternity care, hospitals, communities, worksites, childcare settings.
Schools	Centers for Disease Control and Prevention. Nutrition Standards for Foods in Schools: Fact Sheets. National Association of State Boards of Education. Fit, Healthy, and Ready to Learn: A School Health Policy Guide. Policies and standards for school food, physical activity/physical education, health education, school health services.

Example: Food Security

Many partners need to participate in the policy development process to reach the goal of providing equity for food access and environments that promote healthy nutrition throughout life. Because there is a fundamental relationship between economic security and food security goals, potential partners include a diverse set of organizations. Below are examples of three goals to increase food security, developed by the Oregon Hunger Task Force “[Ending Hunger Before It Begins.](#)” The table shows which groups you might work with to achieve the specific goal.

Goal	Groups
1. Increase economic stability	<ul style="list-style-type: none"> • Economic development groups • Housing groups • Education groups
2. Cultivate a strong regional food system	<ul style="list-style-type: none"> • Farmers • Retailers • Marketers • Producers • Transportation providers • Consumers • Waste management agencies
3. Improve the food assistance safety nets	<ul style="list-style-type: none"> • Government and non-governmental organizations that provide benefits and outreach for programs like SNAP, school lunch and breakfast, and summer food programs • Anti-hunger advocates

In Oregon, the Oregon Hunger Task Force, Oregon Food Bank, and Childhood Hunger Coalition work together with state agencies (WIC, the Department of Human Services, and the Department of Education), non-profit and education organizations (food banks and USDA Cooperative Extension), and health care institutions to improve food security by addressing all three of these goals.

Help Implement the Solution

In the middle of her pregnancy Naomi moved to a planned mixed-income community that was close to public transportation and saved Naomi an hour a day in commute time to her job. In partnership with public health practitioners, this community had been designed to provide walkable access to a grocery store that accepted SNAP benefits and was stocked with many enticing and healthy foods around the entrance and checkout counters.

The community also included safe and attractive places to walk and play, a community garden, and a community kitchen. The social norms in this community supported a healthful approach to living. Being in safe and stable housing and having more time in each day without a long commute gradually allowed Naomi the space to think about a more mindful approach to nutrition for her family. The next time she went to her WIC appointment at the local health department, she was able to work with the WIC nutritionist to develop a plan for healthy eating for her pregnancy and her family.

Public health agencies can provide technical assistance to city planners by identifying issues they need to take into consideration when planning communities. Practitioners can provide training and support to community groups running the garden and kitchens. Remember, after policy changes, assessment plays a key role. Public health agencies should monitor and evaluate the community kitchen and garden, WIC, and SNAP to make sure that these programs meet the needs of the population they are serving.

Evaluate and Re-assess

After policies have been changed, you can play an important role in assessing the results. This assessment process is essential to the public health function cycle of assessment, policy development, and assurance. Evaluation questions may include:

- To what extent is the policy being implemented or enforced?
- What is the effect of the policy change on behaviors or health outcomes?
- Are there unintended consequences associated with the policy change?
- What lessons can be learned to apply to future policy change initiatives?

For example, using results from the Youth Risk Behavior Survey, the Washington State Department of Health found that requiring each school district to develop its own nutrition policies was associated with a decrease in the number of sugar sweetened beverages purchased by youth at school.

The Life Course Framework and Policy Development

Policy development is a complex process. It often takes years to enact and implement policies. You can use the life course framework and T²E² ideas to help the process.

Getting a policy maker's attention: Most decision makers are asked to pay attention to many issues at a time. Short explanations of the effect of nutrition

during critical periods (timing) and to lifelong health (timeline) will put maternal child nutrition on policy makers' agendas.

Coming up with good policy proposals: Good ideas of resolving health problems usually emerge over time as practitioners, researchers, media providers, and others discuss and debate the best approaches. The concepts of equity and environment provide a structure for prioritizing policy solutions to assure that they address the broader determinants of nutritional health.

Identifying policy partners: Policy is more likely to be implemented when coalitions come together to achieve policy goals. Nutrition advocates can use T²E² to identify potential policy partners who are also interested in social justice (equity), food systems (environment), prevention of birth defects (timing) and the cumulative effects of health and social risk factors (timeline).

Summary

The life course approach provides a framework for how to incorporate MCH nutrition in public health's core functions.

Assessment: Be sure to assess T² factors such as preconception nutrition or E² concepts such as whether households and communities are food insecure. Remember, assessment is an ongoing activity.

Assurance: Make sure that there are systems in place at the individual, interpersonal, institutional, and community levels to assure that mothers and children can make healthy choices.

Policy development: Work with partners and coalitions to develop sustainable solutions.