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The Food and Water System:

Impacts on Obesity

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On May 7–9, 2012, obesity prevention leaders, including public health professionals across federal, state and local levels, policymakers and decision makers, community leaders as well as researchers engaged in policy, systems and environmental (PSE) efforts related to obesity prevention, convened at the Weight of the Nation (WON) conference in Washington, D.C. In recognition of the growing interest in the relationship between the food system and public health, and obesity in particular, organizers of the WON invited leading experts from multiple disciplines to work as a committee to plan five sessions related to these topics. These experts decided to expand the focus of the sessions to include public drinking water systems and to organize sessions with the goal of identifying solutions to create a healthy, sustainable, and equitable food and water system. This paper presents the key themes, challenges, and potential solutions and discussed within the Food and Water System: Agriculture, Access and Sustainability track (hereinafter referred to as the “Food and Water System Track”). Key themes include:

- The need to work towards improving the food and water system using a systems approach that considers the many components of as well as participants in the system.
- The importance of multidisciplinary coordination, collaboration, and partnerships.
- The need to continue to build the evidence linking the food and water system to obesity prevention and health promotion.

Key Terms

Food system

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Interrelated activities involved in getting food from the farm to the consumer, including: growing, harvesting, processing, packaging, transporting, marketing, consuming and disposing of food and food packages.¹

Food hub

Business or organization that actively manages the aggregation, distribution, and marketing of source-identified food products primarily from local and regional producers to strengthen their ability to satisfy wholesale, retail, and institutional demand.²

Public Drinking Water System

Means of delivering water for human consumption through pipes (shortened here to “water system”).³

Background

Poor nutrition along with physical inactivity contributes to obesity and other chronic diseases, including heart disease, diabetes, and some cancers.⁴ There has been growing interest among public health community about the role the food system may play in contributing to, and potentially improving, the obesity epidemic in the United States.⁵ The food system is comprised of many interrelated factors involved in getting food from the farm to the consumer.⁶ As defined by Garry Stephenson and Debra Sohm-Lawson (2012),⁷ the food system includes all processes needed to feed people: growing, harvesting, processing, packaging, transporting, marketing, consuming and disposing of food, and food packages. The food system also involves and is influenced by human resources and social, political, economic, and environmental factors.⁸

Over the last century, the food system has evolved from one characterized by small farms with diversified products that were distributed to local retail venues to one that is globalized, commercial, modernized and complex.⁹ Changes in the food system have included distant transport of food, changes in farming practices, the consolidation of the farming and food industry, and the increasing production of a few commodity crops.¹⁰ For the last several decades, the amount of energy in the food supply has increased, and inexpensive, processed, energy dense foods have become widely marketed and available, potentially playing a role in the rising levels of overweight and obesity in the United States.¹¹ The way people experience food has also changed, with a greater reliance on foods eaten outside the home¹² and a lack of connection by individuals to where food comes from.¹³

Research indicates that there are racial/ethnic and socioeconomic disparities related to diet, food security, obesity, and diet-related diseases in the U.S.¹⁴ In a 2009 literature review, Roni Neff and colleagues assert that the food system has a role in generating and exacerbating health disparities.¹⁵ Factors contributing to disparities include: inequitable availability of healthier food options, higher prices of healthier foods vs. less healthy foods, food and beverage marketing, and food production and processing exposures (particularly affecting those working in aspects of the food system, such as production and processing).¹⁶ Further, there is growing recognition that food insecurity exists within the same vulnerable groups affected by obesity, poor dietary quality, and chronic diseases.¹⁷

The IOM recommends that free, safe drinking water be available in public places to encourage water consumption instead of sugar-sweetened beverages.¹⁸ Because of the potential role of water as a weight management strategy,¹⁹ water issues were included in the Food and Water System track. Public drinking water infrastructure includes four main components: water sources, physical infrastructure (e.g., treatment facilities), operational/managerial capacity, and government policies and agencies that regulate, monitor, and support the system).²⁰ According to the EPA, community water systems serve 96% of Americans (these systems serve at least 15 service connections or 35 or more full-time residents and are comprehensively regulated).²¹ Less than 12% of this population was served by systems that report health-based violations in a given year from 1999 through 2009.²² However, mistrust of local water safety may be common. A 2010 national study found that 13% of respondents disagreed that their local tap water was safe, and 26% agreed that bottled water was safer than tap water.²³ Mistrust of local tap water and belief that bottled water was safer was more common among younger adults, lower socioeconomic status populations, and non-white racial/ethnic groups. Other studies have also found that worries about the safety of tap water are more common among younger adults and minority populations.²⁴

While there are several case studies and reports of a lack of piped water or serious water quality problems in low-income and minority communities, this issue has not been well-studied.²⁵ In 2010, the federal Healthy Hunger Free Kids Act required that water be made available at no cost to students in food service areas (effective for the 2011–2012 school year). Contamination of school drinking water from sources like lead pipes has been documented in a number of cities across the country, highlighting the need for additional supports for equitable potable water access.²⁶

Goals and Themes of the Food and Water Track Sessions

Committee members planned the sessions of the Food and Water System track with the goal of “working towards solutions that cultivate a sustainable and equitable food and water system that is aligned with national dietary and health priorities and ensures healthful food and beverages are the easiest choices for all.”

A sustainable and equitable food and water system, in which healthful foods and beverages are accessible and affordable to all, may help meet the nutritional and health needs of the American population in the short- and long-term.²⁷ An environmentally and economically sustainable food system and water system would integrate production, processing, distribution, access, consumption, and waste management in a way that minimizes the stresses on the food system (examples of stresses include water scarcity and climate change), regenerate rather than degrade natural resources, and support the development of local communities and economies.²⁸ A food system and water system that aligns with national priorities related to diet²⁹ and achieving health equity³⁰ would provide all individuals with equal access to an adequate level of healthier foods and safe, potable drinking water.

Story and colleagues propose an ecological model that describes the influences on food choices across settings with multi-level linkages (Figure 1).³¹ These factors are grouped into four main levels: individual (e.g., skills, preferences), social environment (e.g., social support), physical environment (e.g., retail and food service opportunities in settings such as schools, worksites, early care and education, and the broader community), and macro-level influences (e.g., systems-level factors such as social norms, food marketing, food production, and distribution/outlet density).³² This multilevel model includes components of the food and water system, but also illustrates that there are multiple factors and systems that influence an individual's diet. Supportive environments in which people live, work, and play may make it easier for people to make healthier choices. Considering this model in conjunction with the food and water system illustrates multiple areas of intervention and potential avenues to support positive dietary behaviors.

A multidisciplinary group of experts was brought together to highlight many successful initiatives across the U.S. that are making progress towards creating such a system. Throughout the sessions, many themes emerged that may help guide future directions and efforts to address obesity prevention and control. Many of these themes and resulting suggested solutions align with those described in the Institute of Medicine's report, "Accelerating Progress in Obesity Prevention,"³³ that was released at the WON conference. The sessions from the Food and Water System Track are most relevant to Goal 2 from the IOM report: *Create food and beverage environments that ensure that healthy food and beverage options are the routine, easy choice.* Within this goal, several strategies from the IOM report are also relevant and were discussed within the track:

- Utilize strong nutrition standards for all foods and beverages sold or provided through the government, and ensure that these healthy options are available in all places frequented by the public.
- Introduce, modify, and utilize health-promoting food and beverage retailing and distribution policies.
- Broaden the examination and development of U.S. agriculture policy and research to include implications for the American diet.

Below, we describe three key themes that emerged across the sessions. We then present an overview of the discussion that occurred in each session, and finally in Table 1, we summarize the challenges, solutions, and program examples that were discussed at each session. Because the first session provided an overview of challenges and future directions regarding improvements to the food and water system, many of the issues that were discussed during that session were repeated and expanded upon in later sessions. Given the wide reaching and complex nature of the food and water system, and the multidisciplinary expertise of the panelists, many of the themes, challenges, and solutions are related not only to obesity and public health, but to other areas and sectors, such as the economy and the environment.

Themes

Systems Approach

Creating a food and water system that is sustainable, equitable, and promotes health will likely require a systems approach, meaning that changes and solutions will involve each component of the food and water system singularly, as well as comprehensively, since all components of the system are interrelated and changing one component will potentially affect another.³⁴ A systems approach considers the many components of the food and water system as well as the participants (e.g., farmers, retailers, institutional purchasers, and consumers).³⁵ These efforts would target multiple levels of the social ecological model (e.g., policy, environment, communities, and individuals) and the multiple components of the food and water system. As stated in the IOM report, a systems approach allows for potential overlap with other systems, including schools, worksites, and health care environments to create the synergy needed to accelerate progress in preventing obesity.³⁶

Partnerships

There is a need to develop partnerships among public health stakeholders and those who work across the multiple components of the food and water system. This may be challenging as the food and water system includes a wide array of public and private organizations, many of whom do not have public health as their primary mission.

Expanded Evidence Base

A systems approach to the food and water system is a novel area of research. As such, there is a need to build the evidence base linking changes and improvements to the food and water system to obesity prevention and health promotion. One current challenge to building this evidence base is a lack of commonly used tools and indicators to measure the effectiveness of initiatives and programs. Researchers and practitioners need to share tools and methodologies and use valid and reliable measures when possible.

Overview of Food and Water Track Sessions

The first session in the Food and Water System Track, “Addressing Current Challenges and Future Directions for the Food and Water System in the U.S.,” provided an overview of the food and water system components and accompanying infrastructure. Panelists described elements that may negatively affect the health of the population and play a role in the obesity epidemic. Panelists discussed that a food and water system that supports public health is one that is sustainable and equitable and made several recommendations for achieving such a system. One key strategy was increased development of regionally integrated, sustainable food systems in the U.S. Panelists defined these systems as a dynamic blend of local, regional, and global food sources and said that they may not only improve health, but may also have positive impacts in other areas including food security, climate change, and the economy. Sustainable food systems may be advanced through policies and programs such as Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) and Senior Farmers’ Market Nutrition Programs (e.g., coupons for low-income women and children or seniors to spend at farmers’ markets), Double-Up Food

Bucks and similar programs that allow recipients of Supplemental Nutrition Assistance Program (SNAP) to increase the value of their food assistance dollars at farmers' markets, Community Food Projects (USDA funded grants that address food needs of low-income people and community self-reliance), and Farm to Where You Are Programs (that connect local farmers with schools and other institutions). In addition, panelists contended that increased access to and promotion of safe and free drinking water across all communities may encourage intake of water to displace intake of calorically sweetened beverages and help attenuate obesity. Water fountains known as hydration stations are being used and promoted at colleges and in community settings (e.g., parks, offices, restaurants) to promote tap water and the use of refillable water bottles, instead of single-use disposable bottles. Finally, this session addressed the importance of community engagement in developing long-term solutions. Specifically, panelists recommended food policy councils (FPCs), and related coalitions, as venues to gain support for and implement initiatives and policies to improve the food and water system. FPCs convene community members and food and water system stakeholders to examine and make recommendations for improvements to local, state, or regional food systems.

The session, "Hidden Areas of the Food and Water System – Food Insecurity and Drinking Water Access," addressed food and water access for vulnerable populations, including those that are food insecure and children, and addressed the inequitable burden of obesity and other chronic diseases in the U.S.³⁷ Panelists asserted that the extent to which an equitable food and water system exists is a measure of social justice and engagement. Traditionally, the issue of food insecurity has been addressed in isolation from obesity. However, there is growing recognition that food insecurity exists within the same vulnerable groups affected by obesity, poor dietary quality, and chronic diseases.³⁸ In response, national anti-hunger organizations such as Feeding America have begun to address these issues simultaneously. Panelists recommended that anti-hunger and obesity prevention groups work more closely together and gave examples of initiatives that emergency food programs and other groups are implementing that may alleviate both food insecurity and obesity. Initiatives include providing more fruits and vegetables and other healthful foods recommended by the *Dietary Guidelines for Americans, 2010*³⁹ within food banks and pantries, partnering with community gardens and farms, and providing outreach to SNAP and WIC programs.

The potential roles of increasing water access and promoting consumption of water in obesity prevention, particularly in children, were also discussed during this session. In 2010, the federal Healthy Hunger Free Kids Act required that water be made available at no cost to students in food service areas (effective for the 2011–2012 school year), a positive step towards increasing access to water for children. However, contamination of school drinking water from sources like lead pipes has been documented in a number of cities across the country,⁴⁰ highlighting the need for improvements to water system infrastructure that may be needed for this policy to be implemented. They also suggested that provision and promotion of tap water sources within schools was economical and promoted equity, since the cost of bottled water may be more burdensome to lower income groups.⁴¹ Panelists suggested that eliminating sales of single-use bottled water in schools could be step towards

promoting equitable access to and consumption of free drinking water and reducing environmental impact.

The next session, “Innovative Healthier Food Retail Programs: Community, State, and Tribal Perspectives,” presented efforts to improve access to healthier foods and beverages in community settings. Under its Healthy Parks, Healthy People program, the U.S. National Parks Service has begun an initiative to provide healthier, more sustainably sourced foods as part of its concessions. The goal is to create an overall health promoting experience for visitors of national parks, in which visitors “...have access to healthy, sustainable, and high-quality food at reasonable prices, while reducing our overall impact on the environment.”⁴² Speakers also discussed the important role of corner/convenience stores, small grocery stores, and discount stores in providing healthier foods and beverages to small rural communities and groups at highest risk for obesity, such as ethnic minority populations. Initiatives such as healthy checkout aisles (which feature only healthier items), in-store marketing of healthy foods and beverages, and incentives for store owners to provide healthier options were also presented as options to encourage purchase and consumption of healthier foods. Finally, farmers’ markets were discussed as venues for providing communities with access to high-quality, affordable fruits and vegetables. Community organizations and other groups are facilitating use of these markets by low-income individuals through initiatives such as equipping these markets to accept SNAP benefits (e.g., providing electronic benefits transfer devices) and waiving permit fees for vendors to sell at these markets.⁴³

The session, “Farm to Where You Are: Closer Connections through Food Hubs, Farmers’ Markets, and Urban Agriculture,” relayed the importance of economic and environmental sustainability as necessary for improvements to the food and water system to be long-term and have a lasting positive impact on health. Developing and maintaining a vibrant, healthful, and regionally integrated food and water system can create economic opportunities for communities, such as employment in local production and creation of distribution infrastructures.⁴⁴ Minimizing the environmental impact of the food and water system could help ensure that resources are available for future generations. Panelists discussed the need for food distribution infrastructure to support the growth of regionally based food systems across the U.S. Food hubs were presented as one such solution. One example of a successful food hub is *Common Market*, a non-profit organization that was started to fill a gap in the local food distribution system in Philadelphia. *Common Market* operates as the intermediary between local producers and end users, including schools, hospitals, universities, grocery stores and worksites. *Common Market* and other food hubs aggregate and deliver local and regional foods to various institutions, making it simpler and economical for institutions to procure local and regional products. Local governments can play a role in supporting a regional food system, as illustrated by the Healthy Cleveland Initiative, which has been championed by a city council member. The initiative includes urban agriculture activities that relate to food justice, such as forgivable loans to market gardeners and implementation of zoning laws that allow for more community gardens and markets, as well as bee hives and chicken coops (which were previously not allowed within the city). Panelists also emphasized that farmers’ markets may confer many benefits to a

community beyond increasing access to healthier foods, such as increased social and economic capital and strengthened connections among sectors such as schools, health care, and farming.

The training session, “Tools for Use across the Food and Water System,” addressed measurement and evaluation of components of the food and water system and obesity and related outcomes and stressed the importance of evaluation, guidance, and technical assistance. Three specific initiatives were used to illustrate these points and to show application of key issues identified in earlier sessions: a baseline assessment of the National Parks Service healthy concessions program, a food system needs assessment that relied on community engagement, and the development of a farm to school toolkit. The National Park Service partnered with CDC to conduct a baseline assessment of foods and beverages offered at concessions in national parks throughout the U.S. Methodologies that relied on community engagement and innovative measurement tools were presented to inform how FPCs can conduct needs assessments to inform their work. A Farm to School toolkit was presented, along with information on replication and dissemination so that others can facilitate farm to school activities in their communities. The training session highlighted the importance of having consistent, valid, and reliable measurement tools and evaluation methodologies to assess key components related to the food and water system and ultimately obesity prevention.

Conclusions

Participants and expert panelists at the WON Food and Water System sessions highlighted ways in which the creation of an equitable and sustainable food and water system that is aligned with national dietary and health priorities can help address the obesity epidemic in the U.S. They identified key factors and challenges in our current food and water system and discussed potential solutions that will require a greater degree of cross-collaboration and unified efforts. Finally, they called for more research to understand the role that improvements to the food and water system can have in obesity prevention.

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Subcommittee Members:

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Panelists:

James Barham, Carrie Brainard, Dan Carmody, Joe Cimperman, Gail Feenstra, Kate Fitzgerald, Christine Fry, Steve Gortmaker, Haile Johnston, Michelle Marshall, Stacy Miller, Steve Onufrak, Anisha Patel, Courtney A. Pinard, Kurt M. Rausch, Joseph R Sharkey

*Served as Panelists or Moderators

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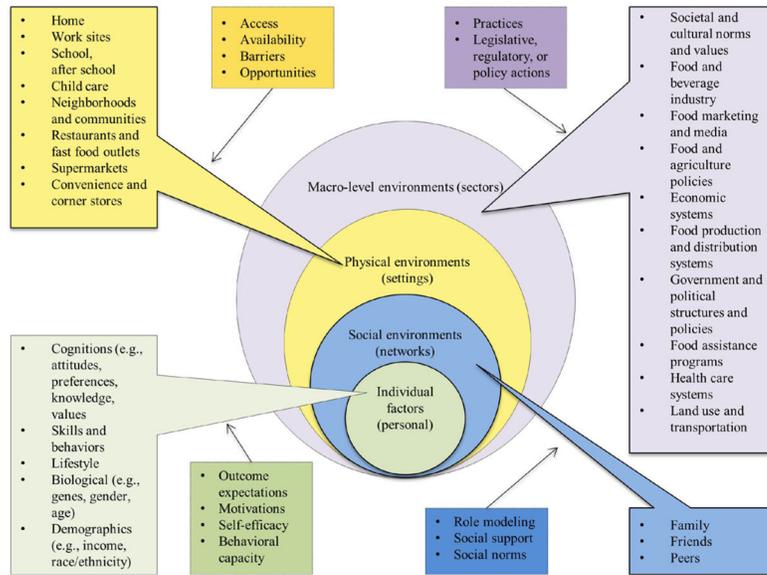


Figure 1.
 A Food and Environment Social Ecological Framework
 Reprinted with permission: M. Story et al., *Annual Review of Public Health* 29 (2008): 253–272.

Table 1

Summary of Food and Water System Track Sessions of the Weight of the Nation Conference, May 7–9, 2012

Session	Current Challenges Discussed	Suggested Solutions and Strategies	Example Program from Session
Addressing Current Challenges and Future Directions for the Food and Water System in the U.S.	<ul style="list-style-type: none"> • Many stresses on production systems are present (e.g., land use, water availability, population growth, etc.). • The current food system does not provide enough healthier food for Americans to meet dietary recommendations. • Some underserved communities do not have adequate access to healthier foods and beverages. • There is a lack of community empowerment and control over local food policy issues. • Some communities have concerns about safety of tap water. 	<ul style="list-style-type: none"> • Develop regionally integrated food systems with an optimal blend of local regional, national, and global sources. • Shift production practices towards ones that conserve and regenerate rather than deplete resources. • Enhance access to local food systems for high need populations. • Engage communities and stakeholders through Food Policy Councils and similar coalitions. • Educate about safety of tap water. 	<ul style="list-style-type: none"> • WIC and Senior Farmers' Market Nutrition Programs — provide coupons for low-income women and seniors to use at farmers' markets. • Double-Up Food Bucks and similar incentive programs that increase purchasing power of SNAP recipients at farmers markets. • Community Food Projects — USDA funded grants that address food needs of low-income people and community self-reliance. • Hydration stations at colleges and restaurants — water fountains to promote tap water and use of refillable water bottles. • Tap water marketing campaigns.
Hidden Areas of the Food and Water System – Food Insecurity and Drinking Water Access	<ul style="list-style-type: none"> • Some schools do not have working drinking fountains due to lead or other contaminants. • Many groups are at risk of both food insecurity and obesity simultaneously, yet these issues are often addressed singularly. • Access to free, potable drinking water is lacking in some community settings, (e.g., parks, schools). 	<ul style="list-style-type: none"> • Enhance water system infrastructure in schools. • Implement programs and interventions that simultaneously address food insecurity, hunger, and dietary quality • Develop partnerships among anti-hunger and obesity prevention stakeholders. • Connect local/regional food systems to populations in need (e.g., Supplemental Nutrition Assistance Program recipients). • Improve water quality and infrastructure where needed. • Eliminate single-use bottled water for greater equity and reduced environmental impact (cost of bottled water may be more burdensome to lower income groups). 	<ul style="list-style-type: none"> • Healthy Hunger Free Kids Act — requires that water be made available at no cost to students in food service areas. • Feeding America is promoting nutrition initiatives among food banks including: providing more fresh produce, connecting to community gardens, SNAP and WIC outreach, and medical community partnerships.
Innovative Healthier Food Retail Programs:	<ul style="list-style-type: none"> • There is limited access to healthful foods and 	<ul style="list-style-type: none"> • Increase availability and promotion of healthy food in community settings, 	<ul style="list-style-type: none"> • U.S. National Parks Service Healthy Parks, Healthy People — initiative to provide

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Community, State, and Tribal Perspectives	beverages in some populations.	including parks and corner stores. <ul style="list-style-type: none"> • Engage both customers and store staff in initiatives to promote purchases of healthier foods. • Encourage retailers to stock culturally acceptable healthier foods. 	healthier, more sustainably sourced foods as part of concessions. <ul style="list-style-type: none"> • Healthy checkout aisles at stores — feature healthier foods and beverages.
Farm to Where You Are: Closer Connections Through Food Hubs, Farmers' Markets, and Urban Agriculture	<ul style="list-style-type: none"> • There are many stresses on the local economy and environment (e.g., unemployment, pollution, water availability). • There is a lack of community engagement in the food system, including a lack of connection to where food comes from. 	<ul style="list-style-type: none"> • Develop a community-based regionally-integrated food system to create jobs, improve the local economy, minimize environmental impact (e.g., reduced food-miles traveled), and improve access to healthier foods. • Implement farmers' markets, which can foster social and economic capital in a community, as well as increase access to healthier foods. • Develop and promote regional food hubs, which can facilitate retailers' and institutions' purchases of local products from small and mid-sized farmers. • Promote urban agriculture. 	<ul style="list-style-type: none"> • Healthy Cleveland initiative – promotes and supports urban agriculture. • <i>Common Market</i>, a Philadelphia-based food hub.

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