

Census Tract Level State Maps of the Modified Retail Food Environment Index (mRFEI)

Background/Purpose

In April 2011, the CDC's Division of Nutrition, Physical Activity and Obesity released the [Children's Food Environment State Indicator Report, 2011](#). One indicator featured in the report is the modified retail food environment index (mRFEI). The mRFEI measures the number of healthy and less healthy food retailers within census tracts across each state as defined by typical food offerings in specific types of retail stores (e.g., supermarkets, convenience stores, or fast food restaurants).



Out of the total number of food retailers considered healthy or less healthy in a census tract, the mRFEI represents the percentage that are healthy. While the report includes median mRFEI values for each state, there is substantial variability in the retail

food environment within states. The maps included in the current release provide a useful starting place to identify specific geographic areas of states that could benefit from further examination of the retail food environment. The maps can identify census tracts that either lack access to healthy food retailers such as supermarkets or contain very high densities of fast food restaurants and convenience stores relative to the number of healthy food retailers.

How is the mRFEI calculated?

The mRFEI is calculated for each census tract using the following formula:

$$mRFEI = 100 \times \frac{\# \text{ Healthy Food Retailers}}{\# \text{ Healthy Food Retailers} + \# \text{ Less Healthy Food Retailers}}$$

Healthy food retailers include supermarkets, larger grocery stores, supercenters, and produce stores within census tracts or ½ mile from the tract boundary. The following stores as defined by North American Industry Classification Codes (NAICS) were included: supermarkets and larger grocery stores (NAICS 445110; supermarkets further defined as stores with ≥ 50 annual payroll employees and larger grocery stores defined as stores with 10–49 employees); fruit and vegetable markets (NAICS 445230); warehouse clubs (NAICS 452910). Fruit and vegetable markets include establishments that sell produce and include markets and permanent stands.



Less healthy food retailers include fast food restaurants, small grocery stores, and convenience stores within census tracts or ½ mile from the tract boundary. Fast food stores were defined according to NAICS code 722211 (fast food restaurants). Convenience stores were defined according to NAICS code 445120 (convenience stores) or NAICS code 445110 (small groceries) where the number of employees was three or fewer.

How is the mRFEI different from other measures of the food environment such as food deserts and food swamps?

Food deserts are areas that lack access to affordable fruits, vegetables, whole grains, low-fat/non-fat milk or dairy alternatives, and other foods that make up the full range of a healthy diet.^{1,2} Food swamps have been defined as "areas in which large relative amounts of energy-dense snack foods, inundate healthy food options."³ The mRFEI combines the concepts of "food desert" and "food swamp" into a single measure. Scores of zero generally correspond with the concept of food deserts. Among mRFEI scores greater than zero, lower scores correspond with the concept of food swamps.).

What defines a healthy food retailer or less healthy food retailer according to the mRFEI?

As defined above, healthy food retailers include supermarkets, larger grocery stores, supercenters, and produce stores. Less healthy food retailers include convenience stores, fast food restaurants, and small grocery stores with three or fewer employees. These classifications are based on typical food offerings in these types of retailers. The mRFEI was calculated on the basis of available data on every food retailer around the country. Therefore, it was not possible to assess the foods

actually offered in each store. Rather, stores were classified as healthy or less healthy based on typical food offerings in these types of retailers as defined by existing research.⁴⁻⁷ Examples of available healthy foods include fruits and vegetables, low-fat dairy items, meat products, and whole grain foods.⁴ Adequate access to healthy foods may still be achieved if smaller food stores and fast food restaurants provide quality and affordable healthy foods and beverages. Why aren't farmers' markets included?



Why aren't farmers' markets included?

At the time the mRFEI scores were calculated, national data on the location of farmers' markets was not available. States and localities are encouraged to include any data they have available on farmers' markets in their own jurisdictions when they assess the retail food environment.

What do the numbers mean?

The modified Retail Food Environment Index (mRFEI) is a way of measuring the number of healthy and less healthy food retailers in an area using a single number. Out of the total number of food retailers in that area considered either healthy or less healthy, the mRFEI represents the percentage that are healthy. Therefore, lower scores indicate that census tracts contain many convenience stores and/or fast food restaurants compared to the number of healthy food retailers. A zero score indicates that no healthy food retailers (supermarkets, large grocery stores, produce stores or supercenters) are located in the census tract.

When the mRFEI was calculated, the distribution of more than 1 million supermarkets, produce stores, supercenters, fast food restaurants, and convenience stores located throughout the country was examined. An mRFEI score of

10 means that only 10 out of every 100 of these stores were likely to offer healthy foods such as fruits and vegetables, low-fat dairy items, meat products, and whole grain foods. These include the supermarkets, produce stores, and supercenters. The other 90 stores were unlikely provide access to healthy foods. These include convenience stores, small grocery stores, and fast food restaurants.

What is a census tract?

Census tracts are relatively permanent subdivisions of a county and usually have between 2,500 and 8,000 people. Census tracts do not cross county boundaries. They are designed, when established, to be homogeneous with respect to population characteristics, economic status, and living conditions. Therefore, the spatial size of census tracts varies widely depending on population density. Census tract boundaries are established to be relatively stable over time to allow comparisons from one census to another. See the [U.S. Census Bureau web page about census tracts and block numbering areas](#) for more information.

What action steps can be taken based on the information provided in these maps?

State and local officials can next perform a more detailed survey of the areas that lack access to healthy food by using a variety of tools. For statewide initiatives, health or economic development officials can purchase retail data to map the precise actual locations of retail food providers throughout the state, or work with partners that have purchased data or conducted an assessment. For smaller areas, a local survey of the current food environment can be performed using basic online tools such as Google™ or Bing™ maps; however, these have the same data limitations as other secondary data sources (such as having a lag time between capturing newly opened and recently closed food retail businesses). Physically surveying these areas can confirm locations of different types of stores. There are also survey tools to assess the actual availability of healthier food options in small and large retail food stores and restaurants.



For more information on assessing healthier food retail, see CDC's Division of Physical Activity, Nutrition, and Obesity fact sheet [Healthier Food Retail: Beginning the Assessment Process in Your State or Community](#). This document provides an overview of steps state or local public health practitioners can take to initiate an assessment of the food retail environment in their area. [The Food Environment Atlas](#) and [Food Desert Locator](#) are additional online tools available from USDA that may be helpful in assessing the food environment in your area.

Once the food landscape is assessed, initiatives can be taken to locate supermarkets or grocery stores in underserved areas. There are also options to provide incentives and assistance for existing food stores, including corner convenience stores, to provide healthier food choices such as fresh, frozen, and canned fruits and vegetables, low-fat dairy and meat products, and whole grain foods.

Can I get the raw data on which the maps are based?

Unfortunately, most of the raw data on individual retail stores was purchased under a contractual agreement from private market research companies. These data are proprietary information from these companies and cannot be distributed by CDC. However, mRFEI scores according to census tract are available at

http://www.cdc.gov/obesity/downloads/2_16_mrfei_data_table.xls.



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