



Figure 1. A systems-oriented, multilevel model applied to the study of obesity. The contingent effects of risk regulators (ie, embodiment, opportunity, and constraint) are shown with dotted arrows. “Causal” effects of biological and behavioral variables are shown with solid arrows. Feedback loops existing within grouped variables are not shown. Specific effects and multiple, time-ordered feedback loops between variables are not shown in order to reduce diagram complexity. Reprinted with permission from Elsevier (8). [A [text description of this figure](#) is also available.]

http://www.cdc.gov/pcd/issues/2009/jul/09_0013a.htm#1

This model shows the determinants that influence population energy balance at different levels. From left to right, they are International Factors, National/Regional, Community/Locality, Work/School/Home, and Individual, which lead to the population outcome Obesity Prevalence.

Within International Factors, the sectors are Globalization of markets, Development, and Media programs and advertising.

- Globalization of markets is linked in International Factors to Development, in Community/Locality to Public Transport, and in Work/School/Home to Leisure Activity/Facilities.

- Development is linked in National/Regional to Urbanization, to Health, and to Food and Nutrition, in Community/Locality to Agriculture/Gardens/Local markets, and in Work/School/Home to Leisure Activity/Facilities and to Labour.
- Media programs and advertising is linked in National/Regional to Media and Culture, to Education, and to Food and Nutrition.

Between the International Factors and National/Regional is a marker denoting the National perspective that is also a factor in the model.

Within National/Regional, the sectors are Transport, Urbanization, Health, Social Security, Media and Culture, Education, and Food and Nutrition.

- In National/Regional, the Transport sector and the Food and Nutrition sector are linked together, and the link between these two is linked in Community/Locality to Manufactured/Imported Food. The Urbanization sector, Health sector, and Food and Nutrition sector are linked together.
- Transport is linked in Community/Locality to Public Transport and to Public Safety.
- Urbanization is linked in Community/Locality to Public Transport, to Public Safety, and to Sanitation.
- Health is linked in Community/Locality to Health Care and to Sanitation.
- Social Security is linked in Work/School/Home to Leisure Activity/Facilities, to Family and Home, and to School Food and Activity.
- Media and Culture is linked in Community/Locality to Manufactured/Imported Food, and in Work/School/Home to Worksite Food and Activity and to Family and Home.
- Education is linked in Work/School/Home to Family and Home and to School Food and Activity.
- Food and Nutrition is linked in Community/Locality to Manufactured/Imported Food and to Agriculture/Gardens/Local markets, and is linked in Work/School/Home to Family and Home and to School Food and Activity.

Within Community/Locality, the sectors are Public Transport, Public Safety, Health Care, Sanitation, Manufactured/Imported Food, and Agriculture/Gardens/Local Markets.

- Public Transport is linked in the Individual sector to Energy Expenditure.
- Public Safety is linked in Work/School/Home to Leisure Activity/Facilities and in the Individual sector to Energy Expenditure.
- Health care is linked in Work/School/Home to Infections.
- Sanitation is linked in Work/School/Home to Infections.
- Manufactured/Imported Food is linked in Work/School/Home to Worksite Food and Activity, to Family and Home, and to School Food and Activity, and in the Individual sector to Food intake: Nutrient density.
- Agriculture/Gardens/Local markets is linked in Work/School/Home to Family and Home and to School Food and Activity, and in the Individual sector to Food intake: Nutrient density.

Within Work/School/Home, the sectors are Leisure Activity/Facilities, Labour, Infections, Worksite Food and Activity, Family and Home, and School Food and Activity.

- Leisure Activity/Facilities is linked in the Individual sector to Energy Expenditure.
- Labour is linked in the Individual sector to Energy Expenditure.

- Infections, Worksite Food and Activity, Family and Home, and School Food and Activity are each linked in the Individual sector to Energy Expenditure and to Food intake: Nutrient density.

Within Individual are 2 sectors, Energy Expenditure and Food intake: Nutrient density. Both are linked separately and together to the population outcome, Obesity Prevalence.