The Multiethnic Cohort Study
Obesity and Cancer

UNIVERSITY OF HAWAI'I CANCER CENTER

USC University of Southern California

Obesity is a Leading Risk Factor for Many Cancers.

13 cancers are associated with overweight and obesity
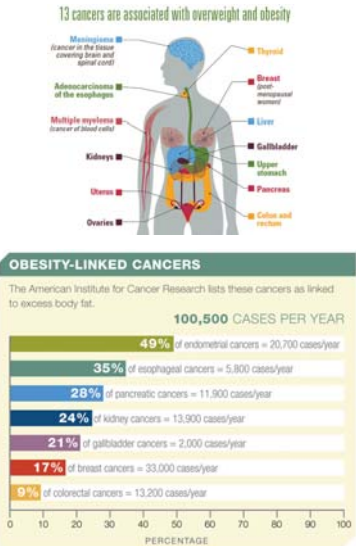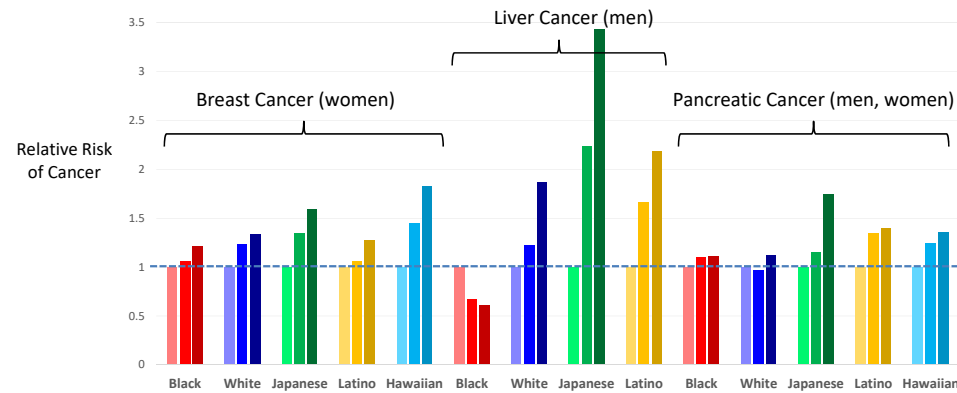
Obesity has been associated to increase the risk of thirteen different types of cancers (International Agency for Research on Cancers 2016).

Obesity contributes differently to different types of cancers.

Obesity is typically defined by Body Mass Index (BMI) of 30 kg/m^2 or higher.
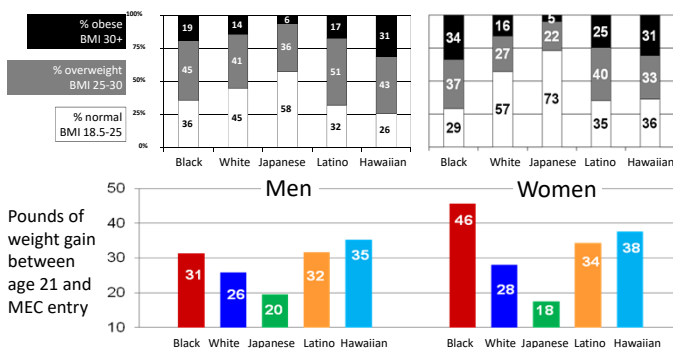
BMI = weight (kg) / height (meter)^2

OBESITY-LINKED CANCERS

The American Institute for Cancer Research lists these cancers as linked to excess body fat.

100,500 CASES PER YEAR

- 49% of endometrial cancers = 20,700 cases/year
- 35% of esophageal cancers = 5,800 cases/year
- 28% of pancreatic cancers = 11,900 cases/year
- 24% of kidney cancers = 13,900 cases/year
- 21% of gallbladder cancers = 2,000 cases/year
- 17% of breast cancers = 33,000 cases/year
- 9% of colorectal cancers = 13,200 cases/year

Obesity is Associated with a Greater Risk of Cancers in Some than Other Ethnic Groups.

Relative Risk of Cancer

Breast Cancer (women) | Liver Cancer (men) | Pancreatic Cancer (men, women)

Black | White | Japanese | Latino | Hawaiian

Risks of cancer for the overweight and obese (darker colors) are compared to the risk for normal-weight individuals (lightest color at the dotted line)

The risk of cancer associated with higher BMI (overweight or obese) compared to normal-weight BMI differed by race/ethnicity. The relative cancer risks increased more rapidly along the increasing BMI among Japanese Americans, Latinos and Native Hawaiians than in whites or blacks.

In MEC, Body Size and Weight Gain Differ by Ethnicity.

% obese BMI 30+ / % overweight BMI 25-30 / % normal BMI 18.5-25

Black | White | Japanese | Latino | Hawaiian

Men
Pounds of weight gain between age 21 and MEC entry:
Black 31, White 26, Japanese 20, Latino 32, Hawaiian 35

Women
Black 46, White 28, Japanese 18, Latino 34, Hawaiian 38

High-Risk Fat Amounts Differ by Race/Ethnicity at a Given BMI.

fat around organs | fat under skin

MRI cross-sectional view in the lumbar region of the abdomen, showing fat around organs (visceral fat) and fat underneath the skin (subcutaneous fat).

Body fat distribution can be substantially different between two people with the same levels of BMI, total body fat, and even abdominal fat (white area in this MRI image): people with "high-risk" fat distribution (left) stores relatively more intra-abdominal fat and less subcutaneous fat.

Intra-abdominal Fat (area at L4L5 in cm^2)

Men / Women

Japanese | Hawaiian | White | Latino | Black
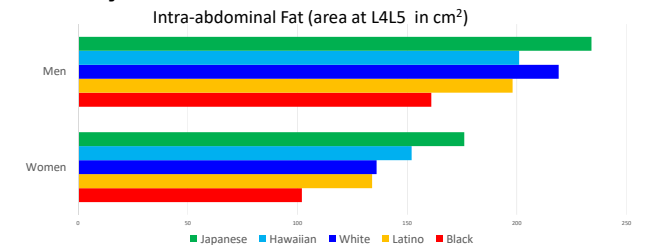
We invited a subset of the MEC participants for a whole-body imaging study of fat distribution. The intra-abdominal fat amounts differed by sex and ethnicity, and liver fat differed by ethnicity. Japanese Americans showed highest levels of the high-risk fat, followed by intermediate levels in Native Hawaiians, Whites and Latinos, and lowest levels in African Americans.

The Multiethnic Cohort Study is one of the largest cohort studies in the world for cancer research, and the most ethnically diverse.
This diversity has proven especially important for our research on obesity, body fat distribution and cancer risk.
◆ ◆ ◆ We thank the participants for their extremely valuable contribution that enabled us to conduct these studies. ◆ ◆ ◆