DESCRIBE/EVALUATE PREVALENCE OF NUTRITION-RELATED CHRONIC HEALTH CONDITIONS: DATA ANALYSIS PROTOCOL

This document describes the protocol for data analysis to address the following question: Describe and evaluate prevalence of nutrition-related chronic health conditions. This data analysis protocol is being developed by the 2020 Dietary Guidelines Advisory Committee, Data Analysis and Food Pattern Modeling Cross-Cutting Working Group with support from a federal interagency data analysis team (DAT).

This document describes the protocol, or plan, for how the data analysis is conducted. The protocol provides:

- The analytic framework (p. 2) describes the overall scope of the question and approach used to describe prevalence of nutrition-related chronic health conditions
- The analytic plan (p. 4) details the data and subsequent included analyses
- The analysis results (p. 8) includes reports that describe the analytic methods and summarize results (e.g. data tables and figures)

This protocol is up-to-date as of: 07/03/2019.
ANALYTIC FRAMEWORK

The analytic framework describes the overall scope of the analyses, including the population and type of analyses and data sources identified to answer the question. It also includes the definitions of key terms.

**Question:** Describe/evaluate prevalence of nutrition-related chronic health conditions.

The prevalence of nutrition-related chronic health conditions are outcomes consistent with nutrition-related chronic health conditions being examined as part of the systematic review approach. These will be described using nationally representative data descriptive of the U.S. population. The following categories of nutrition-related chronic health conditions will be considered:

- Growth, Size and Body Composition Outcomes
- Food Allergy Disease Outcomes
- Cardiovascular Intermediate and Endpoint Outcomes
- Cancer Outcomes
- Type 2 Diabetes
- Metabolic Syndrome
- Chronic Liver Disease
- Osteoporosis
- Sarcopenia
- Gestational Diabetes
- Pregnancy-related Hypertensive Disorders

**Population:** Nationally representative sample of the U.S. population.

**Life stages:**

- Infants and toddlers (birth to 24 months)
- Children and adolescents (ages 2-18 years)
- Adults (ages 19-64 years)
- Pregnant women (ages 20-44 years)
- Older adults (ages 65 years and older)

**Demographic subgroups:**

- Sex
- Race/ethnicity
- Socioeconomic status

**NOTE:** Exceptions to age groupings will be specified.

**Data Sources:**

The prevalence of nutrition-related chronic health conditions will be described using the following data sources. The data source will be specified in the Analytic Plan.

**National Health and Nutrition Examination Survey (NHANES):** cross-sectional, nationally representative survey that includes both laboratory and questionnaire data. Data years: 2013-2014, 2015-2016.

The most recent cycle of NHANES data collected in 2015-2016 will be the most current data available for consideration by the Committee. Exceptions will be noted.

**National Health Interview Survey (NHIS):** cross-sectional, nationally representative household interview survey.
NHIS survey data collected in 2017 will be the most current data available for consideration by the Committee. Exceptions will be noted.

**National Vital Statistics System (NVSS);** cross-sectional data provided by the CDC National Center for Health Statistics through contracts with systems legally responsible for the registration of vital events – births, deaths, marriages, divorces, and fetal deaths. NVSS data from 2017 will be the most current data available for consideration by the Committee. Exceptions will be noted.

**Pregnancy Risk Assessment Monitoring System (PRAMS);** cross-sectional data on maternal behaviors, attitudes, and experiences before, during and shortly after pregnancy. The CDC Division of Reproductive Health in collaboration with state health departments conduct this surveillance survey which covers 83% of live births. PRAMS 2017 is the most recently released data available for consideration by the Committee. Exceptions will be noted.

**Surveillance Epidemiology End Results (SEER);** cancer statistics in the U.S. population. SEER is supported by the Surveillance Research Program (SRP) in the National Cancer Institute Division of Cancer Control and Population Sciences (DCCPS). SEER data from 2016 will be the most current data available for consideration by the Committee. Exceptions will be noted.

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**Key definitions:**

**Stage of life** – The age groups defined by the NHANES sampling weights or by the DRI age-sex groups.

**Socioeconomic status** – Indicators of socioeconomic status may include income in dollars, income as a percent of the poverty ratio, food security, eligibility for federal assistance programs, or level of education.
ANALYTIC PLAN

The following analyses will be used to describe and evaluate prevalence, and in some cases the incidence, of nutrition-related chronic health conditions in the U.S. population for each life-stage. The data source and data years are noted for each analyses.

Birth to less than 24 months of age

**Growth, Size and Body Composition Outcomes**

- Prevalence of low weight-for-recumbent length, recumbent length for age, and weight for age measured among infants and toddlers from birth to 24 months of age using NHANES 2015-2016
- Prevalence of high weight-for-recumbent length, recumbent length for age, and weight for age measured among infants and toddlers from birth to 24 months of age using NHANES 2015-2016
- Prevalence of low birthweight among U.S. infants by race-ethnicity and age of mother using data from the NVSS 2017

**Food Allergy Disease Outcomes**

- Prevalence of food allergy among U.S. infants and children ages 0-4 years reported by proxy using NHIS 2017

Children (2-19 years)

**Growth, Size and Body Composition Outcomes**

- Prevalence of overweight, obesity, and severe obesity among children ages 2–19 years in the U.S. by age, sex and race-ethnicity using NHANES 2015–2016
- Prevalence of underweight among children age 2–19 years in the U.S. by age, sex and race-ethnicity using NHANES 2015-2016
- Differences in obesity prevalence by demographics (age, race-ethnicity, household education), and urbanization using NHANES 2013-2016
- Changes in obesity and severe obesity prevalence among children in the U.S. by age and sex using NHANES 2007-2008 to 2015-2016

**Cardiovascular Intermediate Outcomes**

- Prevalence of hypertension among children in the U.S. ages 12-19 years, by age, sex, race-ethnicity and BMI status using NHANES 2013-2016
- Prevalence of high LDL cholesterol among U.S. children ages 12-19 years by age, race-ethnicity and BMI status using NHANES 2013-2016
- Prevalence of low HDL cholesterol among U.S. children ages 12-19 years by age, race-ethnicity and BMI status using NHANES 2013-2016

**Cancer Outcomes**

- Leukemia incidence and death rates among children ages 0-19 years using age-adjusted SEER 2011-2015
**Children (2-19 years) continued**

**Type 2 Diabetes**
- Prevalence of type 2 diabetes among children ages 12-19 years, by age, sex and race-ethnicity using NHANES 2013-2016
- Prevalence of prediabetes among children ages 12-19 years, by age, sex and race-ethnicity using NHANES 2013-2016

**Adults (19 years and older, age ranges specified)**

**Growth, Size and Body Composition Outcomes**
- Prevalence of overweight, obesity, and severe obesity among adults ages 20 years and older in the U.S. by age, sex and race-ethnicity using NHANES 2015–2016
- Prevalence of underweight among adults ages 20 years and older in the U.S. by age, sex and race-ethnicity using NHANES 2015-2016
- Mean body weight, height, waist circumference, and body mass index among adults ages 20 years and older in the U.S. using NHANES 2015-2016
- Obesity prevalence by demographic characteristics and urbanization level among adults ages 20 years and older in the U.S., using NHANES 2013-2016

**Cardiovascular Intermediate and Endpoint Outcomes**
- Prevalence of high triglycerides among adults ages 20 years and older, by age, sex and race-ethnicity using NHANES 2015-2016
- Prevalence of high total cholesterol among adults ages 20 years and older, by age, sex and race-ethnicity using NHANES 2015-2016
- Prevalence of high low-density lipoprotein among adults ages 20 years and older, by age, sex and race-ethnicity using NHANES 2015-2016
- Prevalence of low high-density lipoprotein among adults ages 20 years and older, by age, sex and race-ethnicity using NHANES 2015-2016
- Prevalence of hypertension among adults ages 20 years and older, by age, sex and race-ethnicity using NHANES 2015-2016
- Age-adjusted prevalence of hypertension among adults ages 18 years and older, by age, sex, race-ethnicity and education in the U.S. using NHIS, 2017
- Age-adjusted prevalence of coronary heart disease among adults ages 18 years and older, by age, sex, race-ethnicity and education in the U.S. using NHIS, 2017
- Age-adjusted prevalence of stroke among adults ages 18 years and older, by age, sex, race-ethnicity and education in the U.S. using NHIS, 2017

**Type 2 Diabetes and Prediabetes**
- Prevalence of diagnosed, undiagnosed and total type 2 diabetes among adults ages 20 years and older, by age, sex and race-ethnicity using NHANES 2013-2016
Prevalence of prediabetes among adults ages 20 years and older, by age, sex and race-ethnicity using NHANES 2013-2016

**Metabolic Syndrome**
Prevalence of metabolic syndrome among adults ages 20 years and older, by sex and race-ethnicity using NHANES 2013-2016

**Chronic Liver Disease Outcomes**
Prevalence of self-reported liver disease among adults ages 18 years and older, by sex and race-ethnicity using NHIS, 2017
Age adjusted chronic liver disease and cirrhosis mortality in the U.S. using NVSS, 2017
Prevalence of high alanine aminotransferase (ALT) and aspartate aminotransferase (AST) among adults ages 20 years and older, by sex and race-ethnicity using NHANES 2013-2016

**Cancer Outcomes**
Age adjusted incidence of female breast cancer in the U.S. using SEER 2016
Age adjusted breast cancer mortality in the U.S. using SEER 2016
Age adjusted incidence of colon and rectal cancer in the U.S., by sex using SEER 2016
Age adjusted colon and rectal cancer mortality in the U.S., by sex using SEER 2016
Age adjusted incidence of esophageal cancer in the U.S., by sex using SEER 2016
Age adjusted esophageal cancer mortality in the U.S., by sex using SEER 2016
Age adjusted incidence of prostate cancer in the U.S. using SEER 2016
Age adjusted prostate cancer mortality in the U.S. using SEER 2016
Age adjusted incidence of larynx cancer in the U.S., by sex using SEER 2016
Age adjusted larynx cancer mortality in the U.S., by sex using SEER 2016
Age adjusted incidence of lung cancer in the U.S., by sex using SEER 2016
Age adjusted lung cancer mortality in the U.S., by sex using SEER 2016
Age adjusted incidence of oral cavity and pharynx cancer in the U.S., by sex using SEER 2016
Age adjusted oral cavity and pharynx cancer mortality in the U.S., by sex using SEER 2016
Age adjusted incidence of pancreatic cancer in the U.S., by sex using SEER 2016
Age adjusted pancreatic cancer mortality in the U.S., by sex using SEER 2016
Age adjusted incidence of endometrial cancer in the U.S., by sex using SEER 2016
Age adjusted endometrial cancer mortality in the U.S., by sex using SEER 2016
Age adjusted incidence of liver cancer in the U.S., by sex using SEER 2016
Age adjusted liver cancer mortality in the U.S., by sex using SEER 2016

Question: Prevalence of nutrition-related chronic health conditions.
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<tr>
<th>Pregnant Women</th>
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<td>Prevalence of gestational diabetes in the U.S. 2012-2016 using NVSS</td>
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<td>Prevalence of pregnancy-induced hypertension (including preeclampsia or toxemia) among pregnant women in the U.S. using the Pregnancy Risk Assessment Monitoring System, 2017</td>
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<th>Older Adults</th>
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<td>Prevalence of reduced muscle strength in older adults in the U.S., ages 60 years and older, NHANES 2013-2014</td>
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<td>Prevalence of osteoporosis or low bone mass at the femur neck or lumbar spine among older adults in the U.S., ages 65 years and older, NHANES 2009-2014</td>
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ANALYSIS RESULTS

This protocol will be updated with the links to the methods and results for each analysis used to describe and evaluate food group and nutrient intakes after the analytic plan has been finalized and implemented.