**Geisinger Rural Aging Study (GRAS)**

**Metadata document**

**September 19, 2024**

**Study PI**: Dr. Christopher Still, Geisinger

**Collaborators**: Dr. Gordon Jensen, University of Vermont, Diane Mitchell, Penn State University, Xiang Gao, Penn State University

**Data Team**: G. Craig Wood, Biostatistician, Geisinger, Michael Cook-Stahl, Data Intern, Geisinger and Bloomsburg University

**Funding agency**: USDA

**Document contents**

* Project summary
* Data domains
  + Study Cohort
  + Baseline and Wave 1 questionnaires
  + Diet quality screening questionnaire (DQSQ)
  + Electronic medical record (EMR)
* Other data / resources
  + GRAS sub-studies
  + MyCode study
  + COVID data
* Supplemental data reports
  + Enrollment report (race/ethnicity/sex)
  + Year of birth
  + Time until death
  + EMR encounters
  + EMR follow-up time
  + EMR laboratory results
  + Alcohol and tobacco use
  + Weight, height, and vitals
  + Overlap between data domains
* Data sharing process
* GRAS publication list

# Section 1: Project Summary

The Geisinger Rural Aging Study (GRAS) was initiated between 1994-99 as a longitudinal study of health outcomes in relation to nutritional status among 21,645 individuals ≥65-years of age. At the time of initiation, the participants were recruited from within the Geisinger Health System service area located in about 25 counties of north central and easter Pennsylvania. Active participant data collection is complete but passive data collected through the Electronic Health Record continues for those surviving. Prior patient reported data were collected at baseline and at a rescreening visit occurring 3-4-years after the baseline, using questionnaires that encompass multiple domains of nutrition risk. Our investigations have found high prevalence of poor quality diets, obesity, and ill health. Low diet quality as revealed by our Diet Quality Screening Questionnaire (DQSQ) is associated with outcomes measured within our electronic medical record (low body mass index, increased co-morbidity, and increased mortality risk). The GRAS dataset currently spans more than two decades including patient reported data, clinical data captured within an electronic medical record, and includes novel sub-cohorts such as the oldest old (≥85 years) and centenarians (≥100 years).

**Section 2a: Study Cohort**

The study cohort includes 21,645 unique individuals. This file represents the master list of the GRAS study participants along with several key indicators for presence/absence of data within the remaining data files.

|  |  |  |  |
| --- | --- | --- | --- |
| **Cohort** | | | |
| **File description:** This file includes one row per participant | | **Total Patients: 21,645** | |
| **Name** | **Description** | **Format** | **Values** |
| GRAS\_ID | Unique identifier to link various files | INT |  |
| BASELINEQ | Indicator for whether baseline questionnaire data are available | INT | 1=YES (N=21,448)  0=NO |
| FOLLOWUPQ | Indicator for whether baseline questionnaire data are available | INT | 1=YES (N=12,881)  0=NO |
| DQSQ | Indicator for whether the DQSQ questionnaire data are available | INT | 1=YES (N=4009)  0=NO |
| EMRANY | Indicator for whether there was any EMR data available | INT | 1=YES (N=21,046)  0=NO |
| EMR2years | Indicator for whether the EMR data has 2+ years and 3+ weight measurements | INT | 1=YES (N=12,000)  0=NO |
| MYCODE\_YN | Indicator for whether the participant is in the MYCODE study | INT | 1=YES (N=2311)  0=NO |
| MYCODE\_genomics | Indicator for whether the participant has genomic data from the MYCODE study | INT | 1=YES (N=1990)  0=NO |
| MYCODE\_serum | Count of number of banked serum from the MYCODE study | INT | N=1850 with 1+ |
| COVID | Indicator for whether the participant had a positive COVID test from Geisinger | INT | 1=YES (n=331)  0=NO |
| CENTENARIAN | Indicator for whether the participant lived to 100 years old | INT | 0=NO  1=YES (n=184)  2=Alive and <100  3=Unknown |

**Section 2b: Baseline and Follow-up questionnaire data**

This section includes descriptions of the baseline and follow-up questionnaires, the data dictionaries for these questionnaires, and frequency tables. These data were collected directly from the GRAS participants. This section is divided into three parts including the baseline questionnaire, the follow-up questionnaire, and the frequency tables.

**Baseline questionnaire**: A baseline questionnaire was collected from GRAS study participants between September 1994 through April 1999. This questionnaire included basic demographic data, a variety of clinical parameters, and a variety of questions related to weight change, depression, medication use, eating habits, alcohol, household status, and need for assistance in everyday task. Of the 21,645 GRAS participants, there were 21,448 that completed the baseline questionnaire.

|  |  |  |  |
| --- | --- | --- | --- |
| **BASELINE QUESTIONNAIRE** | | | |
| **File description:** This file includes one row per participant | | **Total Patients: 21,448** | |
| **Name** | **Description** | **Format** | **Values** |
| GRAS\_ID | Unique identifier to link various files | INT |  |
| B\_YEAR | Year when survey returned | INT |  |
| B\_HEIGH | Self-reported height | INT | Inches |
| B\_WGHT | Self-reported weight | INT | Pounds |
| B\_NHEIG | Height measured by a nurse | INT | Inches |
| B\_NWEIG | Weight measured by a nurse | INT | Pounds |
| B\_LST10 | Have lost 10 pounds in the past 6 months | INT | 0=No, 1=Yes |
| B\_GND10 | Have gained 10 or more pounds in the past 6 months | INT | 0=No, 1=Yes |
| B\_DEPRE | Feel depressed | INT | 0=No, 1=Yes |
| B\_DRUGS | Use 3 or more prescription drugs, over-the-counter medications, and/or vitamin/mineral supplements daily | INT | 0=No, 1=Yes |
| B\_ENOU | Do not have enough food to eat each day | INT | 0=No, 1=Yes |
| B\_EATAL | Usually eat alone | INT | 0=No, 1=Yes |
| B\_FASTI | Do not eat anything on one or more days each month | INT | 0=No, 1=Yes |
| B\_APPE | Have poor appetite | INT | 0=No, 1=Yes |
| B\_SPDIE | Am on a special diet | INT | 0=No, 1=Yes |
| B\_VEGGI | Eat vegetables two or fewer times daily | INT | 0=No, 1=Yes |
| B\_MILK | Eat milk or milk products once or not at all daily | INT | 0=No, 1=Yes |
| B\_FRUIT | Eat fruit or drinks fruit juice once or not at all daily | INT | 0=No, 1=Yes |
| B\_BREAD | Eat breads, cereals, pasta, rice, or other grains five or fewer times daily | INT | 0=No, 1=Yes |
| B\_CHEW | Have difficulty chewing or swallowing | INT | 0=No, 1=Yes |
| B\_ALCOH | Have more than one alcoholic drink per day (if woman); more than two drinks per day (if man) | INT | 0=No, 1=Yes |
| B\_PAIN | Have pain in mouth, teeth, or gums | INT | 0=No, 1=Yes |
| B\_INCOM | Live on an income of less than $6000 per year (per individual in the household) | INT | 0=No, 1=Yes |
| B\_LIVAL | Live alone | INT | 0=No, 1=Yes |
| B\_HOUSB | Am housebound | INT | 0=No, 1=Yes |
| B\_SECUR | Am concerned about home security | INT | 0=No, 1=Yes |
| B\_HEAT | Live in a home with inadequate heating or cooling | INT | 0=No, 1=Yes |
| B\_STOVE | Do not have a stove and/or refrigerator | INT | 0=No, 1=Yes |
| B\_MONEY | Am unable or prefer not to spend money on food (less than $25-$30 per person) | INT | 0=No, 1=Yes |
| B\_BATHI | Usually need assistance with: Bathing | INT | 0=No, 1=Yes |
| B\_DRESS | Usually need assistance with: Dressing | INT | 0=No, 1=Yes |
| B\_GROOM | Usually need assistance with: Grooming | INT | 0=No, 1=Yes |
| B\_TOILE | Usually need assistance with: Toileting | INT | 0=No, 1=Yes |
| B\_EATIN | Usually need assistance with: Eating | INT | 0=No, 1=Yes |
| B\_WALKI | Usually need assistance with: Walking or moving about | INT | 0=No, 1=Yes |
| B\_TRAVE | Usually need assistance with: Traveling (outside the home) | INT | 0=No, 1=Yes |
| B\_PREPF | Usually need assistance with: Preparing food | INT | 0=No, 1=Yes |
| B\_SHOPF | Usually need assistance with: Shopping for food or other necessities | INT | 0=No, 1=Yes |

**Follow-up questionnaire**: The Follow-up questionnaire (also referred to as Wave 1 within the study team) was subsequently collected between June 1999 and February 2003. This questionnaire included some overlapping items from the baseline questionnaire (e.g. weight, height, weight change, depression, medication use, many of the eating habits questions, household status, and need for assistance in everyday tasks). It also included several additional items on movement around their home and town, travel, health status and co-morbidity status. There were 12,881 completed the follow-up questionnaire.

|  |  |  |  |
| --- | --- | --- | --- |
| **Follow-up QUESTIONNAIRE** | | | |
| **File description:** This file includes one row per participant | | **Total Patients: 12,881** | |
| **Name** | **Description** | **Format** | **Values** |
| GRAS\_ID | Unique identifier to link various files | INT |  |
| W1\_year | Year when survey returned | INT |  |
| W1\_HEIGH | Self-reported height | INT | Inches |
| W1\_WGHT | Self-reported weight | INT | Pounds |
| W1\_LST10 | Have lost 10 pounds in the past 6 months | INT | 0=No, 1=Yes |
| W1\_GND10 | Have gained 10 or more pounds in the past 6 months | INT | 0=No, 1=Yes |
| W1\_DEPRE | Feel depressed | INT | 0=No, 1=Yes |
| W1\_DRUGS | Use 3 or more prescription drugs, over-the-counter medications, and/or vitamin/mineral supplements daily | INT | 0=No, 1=Yes |
| W1\_ENOU | Do not have enough food to eat each day | INT | 0=No, 1=Yes |
| W1\_EATAL | Usually eat alone | INT | 0=No, 1=Yes |
| W1\_FASTI | Do not eat anything on one or more days each month | INT | 0=No, 1=Yes |
| W1\_APPE | Have poor appetite | INT | 0=No, 1=Yes |
| W1\_SPDIE | Am on a special diet | INT | 0=No, 1=Yes |
| W1\_VEGGI | Eat vegetables two or fewer times daily | INT | 0=No, 1=Yes |
| W1\_MILK | Eat milk or milk products once or not at all daily | INT | 0=No, 1=Yes |
| W1\_FRUIT | Eat fruit or drinks fruit juice once or not at all daily | INT | 0=No, 1=Yes |
| W1\_BREAD | Eat breads, cereals, pasta, rice, or other grains five or fewer times daily | INT | 0=No, 1=Yes |
| W1\_CHEW | Have difficulty chewing or swallowing | INT | 0=No, 1=Yes |
| W1\_ALCOH | Have more than one alcoholic drink per day (if woman); more than two drinks per day (if man) | INT | 0=No, 1=Yes |
| W1\_PAIN | Have pain in mouth, teeth, or gums | INT | 0=No, 1=Yes |
| W1\_INCOM | Live on an income of less than $6000 per year (per individual in the household) | INT | 0=No, 1=Yes |
| W1\_LIVAL | Live alone | INT | 0=No, 1=Yes |
| W1\_HOUSB | Am housebound | INT | 0=No, 1=Yes |
| W1\_SECUR | Am concerned about home security | INT | 0=No, 1=Yes |
| W1\_HEAT | Live in a home with inadequate heating or cooling | INT | 0=No, 1=Yes |
| W1\_STOVE | Do not have a stove and/or refrigerator | INT | 0=No, 1=Yes |
| W1\_MONEY | Am unable or prefer not to spend money on food (less than $25-$30 per person) | INT | 0=No, 1=Yes |
| W1\_BATHI | Usually need assistance with: Bathing | INT | 0=No, 1=Yes |
| W1\_DRESS | Usually need assistance with: Dressing | INT | 0=No, 1=Yes |
| W1\_GROOM | Usually need assistance with: Grooming | INT | 0=No, 1=Yes |
| W1\_TOILE | Usually need assistance with: Toileting | INT | 0=No, 1=Yes |
| W1\_EATIN | Usually need assistance with: Eating | INT | 0=No, 1=Yes |
| W1\_WALKI | Usually need assistance with: Walking or moving about | INT | 0=No, 1=Yes |
| W1\_TRAVE | Usually need assistance with: Traveling (outside the home) | INT | 0=No, 1=Yes |
| W1\_PREPF | Usually need assistance with: Preparing food | INT | 0=No, 1=Yes |
| W1\_SHOPF | Usually need assistance with: Shopping for food or other necessities | INT | 0=No, 1=Yes |
| W1\_OTHRM | During the past four weeks, have you been to other rooms in your home besides the room where you sleep | INT | 1=YES, 2=NO, 8=Don’t know |
| W1\_LSQ1B | In the last four weeks, how often have you been to other rooms of your home besides the room you sleep | INT | 1=<once a week, 2=1-3 times a week, 3=4-6 times a week, 4=Daily |
| W1\_LSQ1C | Did you use a cane, … to get to other rooms in your home besides the room where you sleep | INT | 1=YES, 2=NO, 3=Did not get to another room 8=Don’t know |
| W1\_LSQ1D | Did you need help from another person to get to other rooms in your home besides the room where you sleep | INT | 1=YES, 2=NO, 3=Did not get to another room 8=Don’t know |
| W1\_OUTSI | During the past four weeks, have you been to an area outside your home such as a porch, deck or patio | INT | 1=YES, 2=NO, 8=Don’t know |
| W1\_LSQ2B | In the last four weeks, how often have you been to an area outside your home | INT | 1=<once a week, 2=1-3 times a week, 3=4-6 times a week, 4=Daily |
| W1\_LSQ2C | Did you use a cane, … to get to an area outside your home? | INT | 1=YES, 2=NO, 3=Did not get outside my home, 8=Don’t know |
| W1\_LSQ2D | Did you need help from another person to go to an area outside your home? | INT | 1=YES, 2=NO, 3=Did not get outside my home, 8=Don’t know |
| W1\_NEIGH | During the past four weeks, have you been to places in your neighborhood other than your own yard | INT | 1=YES, 2=NO, 8=Don’t know |
| W1\_LSQ3B | In the last four weeks, how often have you been to places in your neighborhood other than your home | INT | 1=<once a week, 2=1-3 times a week, 3=4-6 times a week, 4=Daily |
| W1\_LSQ3C | Did you use a cane, … to get to places in your neighborhood? | INT | 1=YES, 2=NO, 3=Did not get outside my property, 8=Don’t know |
| W1\_LSQ3D | Did you need help from another person to get to places in your neighborhood? | INT | 1=YES, 2=NO, 3=Did not get outside my property, 8=Don’t know |
| W1\_TOWN | During the past four weeks, have you been to places outside your neighborhood but within your town? | INT | 1=YES, 2=NO, 8=Don’t know |
| W1\_LSQ4B | In the last four weeks, how often have you been to places outside your neighborhood but within your town? | INT | 1=<once a week, 2=1-3 times a week, 3=4-6 times a week, 4=Daily |
| W1\_LSQ4C | Did you use a cane, .. To get to places outside your neighborhood but within your town? | INT | 1=YES, 2=NO, 3=Did not get outside my neighborhood, 8=Don’t know |
| W1\_LSQ4D | Did you need help from another person to get to places outside your neighborhood but within your town | INT | 1=YES, 2=NO, 3=Did not get outside my neighborhood, 8=Don’t know |
| W1\_FAR | During the past four weeks, have you been to places outside your town? | INT | 1=YES, 2=NO, 8=Don’t know |
| W1\_LSQ5B | In the last four weeks, how often have you been to places outside your town | INT | 1=<once a week, 2=1-3 times a week, 3=4-6 times a week, 4=Daily |
| W1\_LSQ5C | Did you use a cane, … to get to places outside your town? | INT | 1=YES, 2=NO, 3=Did not get outside my town, 8=Don’t know |
| W1\_LSQ5D | Did you need help from another person to get to places outside your town? | INT | 1=YES, 2=NO, 3=Did not get outside my town, 8=Don’t know |
| W1\_WALKE | How did you get there: I walked | INT | 0=NO, 1=YES |
| W1\_DROVE | How did you get there: I drove | INT | 0=NO, 1=YES |
| W1\_PUBLI | How did you get there: I used public transportation (taxi, bus, train, plane) | INT | 0=NO, 1=YES |
| W1\_RODE | How did you get there: I rode with someone else | INT | 0=NO, 1=YES |
| W1\_HOFAR | What is the farthest you've been away from home in the last four weeks? | INT | Miles |
| W1\_HEALT | In general, would you say your health is: | INT | 1 = Excellent  2 = Very Good  3 = Good  4 = Fair  5 = Poor |
| W1\_HOSPI | In the previous 12 months, have you stayed overnight as a patient in a hospital? | INT | 1 = Not at all  2 = One time  3 = Two or three times  4 = More than three times |
| W1\_CLINI | In the previous 12 months, how many times did you visit a physician or clinic? | INT | 1 = Not at all  2 = One time  3 = Two or three times  4 = Four to six times  5 = More than 6 times |
| W1\_BLOOD | In the previous 12 months, how many times did you have blood drawn for medical tests? | INT | 1 = Not at all  2 = One time  3 = Two or three times  4 = Four to six times  5 = More than 6 times |
| W1\_DIAB | In the previous 12 months, did you have diabetes? | INT | 1 = Yes  2 = No |
| W1\_CAD | Have you ever had: Coronary heart disease? | INT | 1 = Yes  2 = No |
| W1\_ANGIN | Have you ever had: Angina pectoris? | INT | 1 = Yes  2 = No |
| W1\_MI | Have you ever had: A myocardial infarction? | INT | 1 = Yes  2 = No |
| W1\_OTHMI | Have you ever had: Any other heart attack? | INT | 1 = Yes  2 = No |
| W1\_HELP | Is there a friend, relative or neighbor who would take care of you for a few days, if necessary? | INT | 1 = Yes  2 = No |
| W1\_BREAT | Currently receiving medical treatment for: Breathing problems | INT | 0=No, 1=Yes |
| W1\_HTN | Currently receiving medical treatment for: High blood pressure | INT | 0=No, 1=Yes |
| W1\_HEART | Currently receiving medical treatment for: Heart problems | INT | 0=No, 1=Yes |
| W1\_URINA | Currently receiving medical treatment for: Urinary problems | INT | 0=No, 1=Yes |
| W1\_ARTHR | Currently receiving medical treatment for: Arthritis | INT | 0=No, 1=Yes |
| W1\_MENTA | Currently receiving medical treatment for: Mental problems | INT | 0=No, 1=Yes |
| W1\_ANKLE | Currently receiving medical treatment for: Ankle / leg swelling | INT | 0=No, 1=Yes |
| W1\_CANCR | Currently receiving medical treatment for: Cancer | INT | 0=No, 1=Yes |
| W1\_LIVEW | Do you live: | INT | 1 = Alone  2 = With spouse  3 = With a son or daughter  4 = With other family  5 = Other |
| W1\_LIVEI | Do you live in: | INT | 1 = An independent house, apartment…  2 = An assisted-living apartment  3 = A nursing home  4 = Other |
| W1\_MEDIC | Are you currently receiving Medical Assistance or Medicaid? | INT | 1=Yes, 2=No, 8=Don’t know |
| W1\_MEDS | How many different prescription medications do you take? | INT | Number of medications |
| W1\_EYES | How is your eyesight? | INT | 1 = Excellent  2 = Good  3 = Fair  4 = Poor  5 = None |
| W1\_SAD | Do you often feel sad or blue? | INT | 1=Yes, 2=No |

**Frequency tables**: The pages below include sets of frequency tables for responses to questionnaire items at baseline and Follow-up.

The baseline questionnaire included data for self-reported weight and height and included nurse visits for about half of the study participants. The table below compares baseline to self-report and provides the distribution of BMI within the cohort.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | **Baseline Self-reported** | **Baseline Nurse measured as home visit** | **Difference (self – nurse)** |
| Height | N | 20,074 | 9947 | 8985 |
|  | Mean (SD) | 65.92 (3.94) | 65.21 (3.92) | 0.62 (1.60) |
| Weight | N | 19,603 | 10,263 | 8,909 |
|  | Mean (SD) | 170 (35.4) | 173 (37.0) | -2.6 (8.1) |
| BMI | N | 19,311 | 9,903 | 8,464 |
|  | Mean (SD) | 27.4 (5.0) | 28.6 (5.4) | -.96 (2.0) |
| BMI category | Underweight (<18.5) | 1.4% | 1.1% | +0.3% |
|  | Normal (18-5-24.9) | 30.8% | 24.3% | +6.5% |
|  | Overweight (25-29.9) | 42.1% | 41.0% | +1.1% |
|  | Obese (30+) | 25.7% | 33.6% | -7.9% |

Summary of responses to baseline and Follow-up questions (subset of questions that were in common between the two sets of questionnaires)

|  |  |  |
| --- | --- | --- |
| **Responded YES to:** | **Baseline (n=21448)** | **Follow-up (n=12881)** |
| Lost 10 Pounds in past 6 months | 8.43% (n=1809) | 11.61% (n=1497) |
| Gained 10 or more pounds in past 6 months | 7.81% (n=1675) | 8.22% (n=1059) |
| Feel depressed | 3.57% (n=766) | 7.66% (n=988) |
| Use >3 Medications | 48.81% (n=10468) | 67.37% (n=8685) |
| Do Not Have Enough Food to Eat Everyday | 7.37% (n=1580) | 9.63% (n=1240) |
| Usually Eat Alone | 19.95% (n=4279) | 23.16% (n=2985) |
| Fast for One or More Days a Month | 0.78% (n=167) | 0.95% (n=123) |
| Poor Appetite | 2.69% (n=576) | 3.83% (n=493) |
| On a Special Diet | 7.66% (n=1643) | 7.4% (n=954) |
| Eat Vegetables Two Times or Less a Day | 55.58% (n=11921) | 60.59% (n=7805) |
| Consume Milk Products Once Daily or Less | 55.49% (n=11901) | 63.64% (n=8197) |
| Consume Fruit Products Once Daily or Less | 56.37% (n=12091) | 63.45% (n=8173) |
| Eat Grain Products Five or Fewer Times a Day | 63.96% (n=13719) | 69.23% (n=8918) |
| Have Difficulty Chewing or Swallowing | 3.49% (n=748) | 4.09% (n=527) |
| Consume Alcoholic Drinks Daily | 3.4% (n=730) | 3.77% (n=486) |
| Have Pain in Mouth, teeth, or gums | 2.21% (n=474) | 2.2% (n=283) |
| Live on Income Less Than 6000$ yr (per person) | 8.03% (n=1722) | 7.72% (n=995) |
| Live Alone | 22.31% (n=4785) | 26.29% (n=3387) |
| Housebound | 0.66% (n=142) | 1.38% (n=178) |
| Concerned About Home Security | 1.49% (n=319) | 2.46% (n=317) |
| Inadequate Heating or Cooling in Home | 3.81% (n=818) | 5.92% (n=762) |
| No Stove or Refrigerator | 1.31% (n=282) | 1.49% (n=192) |
| Unable to Spend Money on Food | 1.99% (n=426) | 3.17% (n=408) |
| **Usually or always need assistance with:** |  |  |
| Bathing | 2.4% (n=515) | 3.18% (n=409) |
| Dressing | 1.54% (n=331) | 2.04% (n=263) |
| Grooming | 1.07% (n=229) | 1.3% (n=167) |
| Toileting | 0.79% (n=169) | 0.87% (n=112) |
| Eating | 0.41% (n=88) | 0.54% (n=69) |
| Walking | 2.64% (n=566) | 3.8% (n=489) |
| Traveling (Outside of Home) | 5.95% (n=1277) | 7.43% (n=957) |
| Preparing Food | 2.79% (n=599) | 3.66% (n=471) |
| Shopping for food or other necessities | 5.34% (n=1145) | 7.48% (n=964) |

Additional items added in Follow-up questionnaire.

|  |  |  |
| --- | --- | --- |
| Question 1 |  |  |
| Been in Other Rooms Than Bedroom | Yes, %(n)  No, %(n)  Unsure, %(n) | 97.73% (n=11949)  2.26% (n=276)  0.02% (n=2) |
| How Often | < 1 per week, %(n)  1-3 per week, %(n)  4-6 per week, %(n)  Daily, %(n) | 0.75% (n=46)  3.85% (n=237)  70.72% (n=4349)  24.68% (n=1518) |
| Do You Use a Cane | Yes, %(n)  No, %(n)  Did Not Go to Another Room, %(n)  Unsure, %(n) | 7.69% (n=898)  92.16% (n=10766)  0.12% (n=14)  0.03% (n=4) |
| Did You Need Help from Someone | Yes, %(n)  No, %(n)  Did Not Go to Another Room, %(n) | 1.27% (n=151)  98.62% (n=11723)  0.11% (n=13) |

|  |  |  |
| --- | --- | --- |
| Question 2 |  |  |
| Have You Been Outside | Yes, %(n)  No, %(n)  Unsure, %(n) | 98.49% (n=12033)  1.47% (n=180)  0.03% (n=4) |
| How Often | < 1 per week, %(n)  1-3 per week, %(n)  4-6 per week, %(n)  Daily, %(n) | 6.12% (n=379)  5.89% (n=365)  64.34% (n=3984)  23.64% (n=1464) |
| Did you use a Cane | Yes, %(n)  No, %(n) | 9.79% (n=1156)  90.07% (n=10633) |
| Did You Need Help from Someone | Yes, %(n)  No, %(n)  Did Not Go Outside, %(n)  Unsure, %(n) | 3.9% (n=466)  95.98% (n=11457)  0.1% (n=12)  0.02% (n=2) |

|  |  |  |
| --- | --- | --- |
| Question 3 |  |  |
| Have You Been Somewhere in Your Neighborhood Other than Your Home | Yes, %(n)  No, %(n)  Unsure, %(n) | 94.59% (n=11540)  5.35% (n=653)  0.06% (n=7) |
| How Often | < 1 per week, %(n)  1-3 per week, %(n)  4-6 per week, %(n)  Daily, %(n) | 17.43% (n=1041)  16.46% (n=983)  49.47% (n=2955)  16.64% (n=994) |
| Did you use a Cane | Yes, %(n)  No, %(n) | 8.87% (n=1037)  89.8% (n=10500) |
| Did You Need Help from Someone | Yes, %(n)  No, %(n)  Did Not Go Outside, %(n)  Unsure, %(n) | 4.99% (n=591)  93.75% (n=11106)  1.24% (n=147)  0.02% (n=2) |

|  |  |  |
| --- | --- | --- |
| Question 4 |  |  |
| Have you been outside of your neighborhood, But in your Town | Yes, %(n)  No, %(n)  Unsure, %(n) | 96.92% (n=11691)  3.03% (n=366)  0.05% (n=6) |
| How Often | < 1 per week, %(n)  1-3 per week, %(n)  4-6 per week, %(n)  Daily, %(n) | 24.13% (n=1444)  24.11% (n=1443)  38.86% (n=2326)  12.9% (n=772) |
| Did you use a Cane | Yes, %(n)  No, %(n) | 9.63% (n=1120)  89.69% (n=10434) |
| Did You Need Help from Someone | Yes, %(n)  No, %(n)  Did Not Go Outside, %(n)  Unsure, %(n) | 7.52% (n=889)  91.76% (n=10841)  0.69% (n=81)  0.03% (n=3) |

|  |  |  |
| --- | --- | --- |
| Question 5 |  |  |
| Have you Been Outside of Your Town | Yes, %(n)  No, %(n)  Unsure, %(n) | 92.56% (n=11183)  7.42% (n=896)  0.02% (n=3) |
| How Often | < 1 per week, %(n)  1-3 per week, %(n)  4-6 per week, %(n)  Daily, %(n) | 47.47% (n=2716)  26.41% (n=1511)  19.35% (n=1107)  6.78% (n=388) |
| Did you use a Cane | Yes, %(n)  No, %(n) | 8.49% (n=976)  90.16% (n=10365) |
| Did You Need Help from Someone | Yes, %(n)  No, %(n)  Did Not Go Outside, %(n)  Unsure, %(n) | 8.93% (n=1043)  89.61% (n=10466)  1.45% (n=169)  0.02% (n=2) |
| How did You Get There: |  |  |
| Walked | Yes, %(n) | 17.5% (n=578) |
| Drove | Yes, %(n) | 80.12% (n=4059) |
| Public Transportation | Yes, %(n) | 11.22% (n=359) |
| Rode With Someone | Yes, %(n) | 52.61% (n=2167) |
| Farthest Away from Home in past Month | <20 Miles, %(n)  20-50, %(n)  50-100, %(n)  100-200, %(n)  >200, %(n) | 61.06% (n=7865)  10.24% (n=1319)  9.47% (n=1220)  8.69% (n=1119)  10.54% (n=1358) |

|  |  |  |
| --- | --- | --- |
| Question 6: In the Last Year: |  |  |
| How many Times have you stayed overnight at a hospital | None, %(n)  Once, %(n)  2-3 Times, %(n)  >3 Times, %(n) | 83.11% (n=10022)  12.22% (n=1473)  3.59% (n=433)  1.08% (n=130) |
| How many Times have you visited a physician or clinic | None, %(n)  Once, %(n)  2-3 Times, %(n)  4-6 Times, %(n)  >6 Times, %(n) | 3.19% (n=392)  10.48% (n=1286)  41.47% (n=5090)  28.52% (n=3501)  16.34% (n=2006) |
| How many Times have you Had Blood Drawn | None, %(n)  Once, %(n)  2-3 Times, %(n)  4-6 Times, %(n)  >6 Times, %(n) | 9.67% (n=623)  28.48% (n=1834)  38.73% (n=2494)  11.96% (n=770)  11.16% (n=719) |
| Did you have diabetes | Yes, %(n) | 17.21% (n=2042) |

|  |  |  |
| --- | --- | --- |
| Question 7: Have you ever had: |  |  |
| Coronary Heart Disease | Yes, %(n) | 18.29% (n=1934) |
| Angina pectoris | Yes, %(n) | 11.04% (n=1075) |
| Myocardial Infraction | Yes, %(n) | 4.98% (n=463) |
| Heart Attack | Yes, %(n) | 8.28% (n=814) |

|  |  |  |
| --- | --- | --- |
| Question 8: Is there someone that would take care of you if necessary | Yes, %(n) | 91.29% (n=10789) |

|  |  |  |
| --- | --- | --- |
| Question 9: Conditions Currently Receiving treatment for: |  |  |
| Breathing Problems | Yes, %(n) | 12.16% (n=1566) |
| High Blood Pressure | Yes, %(n) | 48.88% (n=6296) |
| Heart Problems | Yes, %(n) | 23.41% (n=3015) |
| Urinary Problems | Yes, %(n) | 11.89% (n=1532) |
| Arthritis | Yes, %(n) | 25.63% (n=3302) |
| Mental Problems | Yes, %(n) | 1.82% (n=235) |
| Ankle/Leg Swelling | Yes, %(n) | 11.4% (n=1468) |
| Cancer | Yes, %(n) | 4.98% (n=641) |

|  |  |  |
| --- | --- | --- |
| Question 10: |  |  |
| Do You Live | Alone, %(n)  With Spouse, %(n)  With Their Kid, %(n)  Other Family, %(n)  Other, %(n) | 27.42% (n=3475)  63.68% (n=8072)  5.51% (n=698)  1.8% (n=228)  1.59% (n=202) |
| Do You Live in | Independent House or Apartment, %(n)  Assisted-Living, %(n)  Nursing Home, %(n)  Other, %(n) | 99.22% (n=12398)  0.55% (n=69)  0.04% (n=5)  0.19% (n=24) |
| Currently Receiving Medical Assistance or Medicaid | Yes, %(n)  No, %(n)  Unsure, %(n) | 20.51% (n=2404)  77.1% (n=9038)  2.4% (n=281) |
| How many different Prescription medications do you take | 0, %(n)  3 or less, %(n)  4-6, %(n)  More than 6, %(n) | 10.16% (n=1309)  45.49% (n=5859)  27.81% (n=3582)  10.51% (n=1354) |
| How is your eyesight | Excellent, %(n)  Good, %(n)  Fair, %(n)  Poor, %(n)  None, %(n) | 13.45% (n=1699)  58.52% (n=7394)  23.27% (n=2941)  4.65% (n=587)  0.12% (n=15) |
| Do you often Feel sad | Yes, %(n) | 21.34% (n=2562) |

**Section 2c: DQSQ data**

The Diet Quality Screening questionnaire was administered within a follow-up questionnaire to a sub-cohort of GRAS participants in 2009-2010. This questionnaire included the DQSQ along with a variety of other questions including items related to weight/height/ weight change, current medications, education, smoking, alcohol, dietary habits, weight loss methods/attempts, household status, need for assistance in everyday tasks, health status and co-morbidity status. The DQSQ includes 25 questions at the end of the questionnaire. The questions are scored individually, and the scores are combined to create an overall diet quality score ranging from 0 (unhealthy) to 100 (healthy). These data were available for 4009 participants. The data dictionary including the variable description, formatting, and DQSQ item level scoring are included below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **DQSQ QUESTIONNAIRE** | | | | |
| **File description:** This file includes one row per participant | | | **Total Patients: 4009** | |
| **Name** | **Description** | **Values** | | **DQSQ scoring** |
| GRAS\_ID | Unique identifier to link various files |  | |  |
| W3\_AGE | Age | Years | |  |
| W3\_MALE | gender | 1= male 2= female | |  |
| W3\_RACE | race | 1 = white 2 = non-Hispanic Black 3= Mexican American 4=other | |  |
| W3\_HTFT | Self-reported height in feet | feet | |  |
| W3\_HTIN | Self-reported height in inches | inches | |  |
| W3\_WTLS | Have lost weight during the last 6 months | 0=No, 1=Yes | |  |
| W3\_LGT10 | Have gained 10 or more pounds in the past 6 months | 0=No, 1=Yes | |  |
| W3\_LLT10 | Weight loss between 5 and 10 lbs. | 0=No, 1=Yes | |  |
| W3\_NOWTL | No weight loss | 0=No, 1=Yes | |  |
| W3\_GND | Have gained weight during the last 6 months | 0=No, 1=Yes | |  |
| W3\_GND10 | Have gained 10 or more pounds in the past 6 months | 0=No, 1=Yes | |  |
| W3\_GLT10 | Weight gained between 5 and 10 lbs. | 0=No, 1=Yes | |  |
| W3\_NOWGN | No weight gained | 0=No, 1=Yes | |  |
| W3\_DRUGS | Use 3 or more prescription drugs per day | 0=No, 1=Yes | |  |
| W3\_DRDEP | Take anti-depressant medication prescribed by a doctor | 0=No, 1=Yes | |  |
| W3\_DRDIU | Take a diuretic (water pill) prescribed by a doctor | 0=No, 1=Yes | |  |
| W3\_MULTI | Take a daily multivitamin supplement | 0=No, 1=Yes | |  |
| W3\_HERB | Use herbal or other dietary supplements | 0=No, 1=Yes | |  |
| W3\_EDUC | What is the highest grade or year of school you completed? | 1 = Grade 1-8 2 =Grade 9-11 3 = 12 or GED 4 = College or 2 yrs. or tech school 5 = College 4 yrs. 6 = Graduate degree | |  |
| W3\_SMOKE | Do you smoke cigarettes every day, some days, or not at all? | 1 = Yes 2 = No 3 = Do not know | |  |
| W3\_ACTIVITY | During the past month, other than any regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening or walking - for exercise? | 1= everyday 2= some days 3= not at all | |  |
| W3\_ENOU | Do not have enough food to eat each day | 0 = No, 1 = Yes | |  |
| W3\_WORRY | Often worry whether there will be enough food to eat | 0 = No, 1 = Yes | |  |
| W3\_EATAL | Usually eat alone | 0 = No, 1 = Yes | |  |
| W3\_SKIPB | Frequently skip breakfast altogether | 0 = No, 1 = Yes | |  |
| W3\_FASTI | Do not eat anything on one or more days each month | 0 = No, 1 = Yes | |  |
| W3\_APPE | Food intake has declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties. | 0 = No, 1 = Yes | |  |
| W3\_ALCOH | Have more than one alcoholic drink per day (if woman); more than two drinks per day (if man) | 0 = No, 1 = Yes | |  |
| W3\_CHEW | Have difficulty chewing or swallowing | 0 = No, 1 = Yes | |  |
| W3\_PAIN | Have pain in mouth, teeth, or gums | 0 = No, 1 = Yes | |  |
| W3\_SELF | Self-prescribed weight loss diet | 0 = No, 1 = Yes | |  |
| W3\_DOCTO | Doctor-prescribed weight loss diet | 0 = No, 1 = Yes | |  |
| W3\_DIETI | Received dietitian counseling | 0 = No, 1 = Yes | |  |
| W3\_CUTCA | Focus is on cutting calories | 0 = No, 1 = Yes | |  |
| W3\_LESFA | Focus is on eating less fat | 0 = No, 1 = Yes | |  |
| W3\_LESCA | focus is on eating less carbohydrates | 0 = No, 1 = Yes | |  |
| W3\_WLMED | Approach includes weight loss supplements or medications | 0 = No, 1 = Yes | |  |
| W3\_PHYAC | Approach includes increased physical activity /exercise | 0 = No, 1 = Yes | |  |
| W3\_OTWRD | Other weight reduction diet | 0 = No, 1 = Yes | |  |
| W3\_INCOM | Live on an income of less than $6000 per year (per individual in the household) | 0 = No, 1 = Yes | |  |
| W3\_HOUSB | You are housebound | 0 = No, 1 = Yes | |  |
| W3\_BED | Bed or chair bound (unable to get out of bed or chair without assistance) | 0 = No, 1 = Yes | |  |
| W3\_HOMEBD | Able to get out of bed or chair, but not out of home. | 0 = No, 1 = Yes | |  |
| W3\_ASSIST | Able to go outside home with assistance. | 0 = No, 1 = Yes | |  |
| W3\_ASSDE | Use an assistance device in daily activities (cane, walker or wheelchair) | 0 = No, 1 = Yes | |  |
| W3\_HELP | Have no one to provide assistance or care at home if needed | 0 = No, 1 = Yes | |  |
| W3\_STAIR | Must go up / down a flight of stairs in daily activities | 0 = No, 1 = Yes | |  |
| W3\_SECURE | You are concerned about home security | 0 = No, 1 = Yes | |  |
| W3\_HEAT | Live in a home with inadequate heating or cooling | 0 = No, 1 = Yes | |  |
| W3\_STOVE | Do not have a stove and/or refrigerator | 0 = No, 1 = Yes | |  |
| W3\_MONEY | Am unable or prefer not to spend money on food (less than $25-$30 per person) | 0 = No, 1 = Yes | |  |
| W3\_LES4H | Watch TV: Less than 4 hours daily | 0 = No, 1 = Yes | |  |
| W3\_MOR4H | Watch TV: 4 or more hours daily | 0 = No, 1 = Yes | |  |
| W3\_SNACK | Watch TV: While eating snacks each day | 0 = No, 1 = Yes | |  |
| W3\_MEAL | Watch TV: While eating at least one meal each day | 0 = No, 1 = Yes | |  |
| W3\_LIVEW | Do you live: | 1 = Alone 2 = With spouse 3 = With a son or daughter 4 = With other family member 5 = Other | |  |
| W3\_LIVEI | Do you live in: | 1 = a house, apartment condominium or mobile home 2 = An assisted-living apartment or boarding and care home 3= A nursing home 4 = Other | |  |
| W3\_BATHI | Usually or always need assistance with: Bathing | 0 = No, 1 = Yes | |  |
| W3\_DRESS | Usually or always need assistance with: Dressing | 0 = No, 1 = Yes | |  |
| W3\_GROOM | Usually or always need assistance with: Grooming | 0 = No, 1 = Yes | |  |
| W3\_TOILE | Usually or always need assistance with: Toileting | 0 = No, 1 = Yes | |  |
| W3\_EATIN | Usually or always need assistance with: Eating | 0 = No, 1 = Yes | |  |
| W3\_WALKI | Usually or always need assistance with: Walking or moving about | 0 = No, 1 = Yes | |  |
| W3\_BED | Usually or always need assistance with: Getting out of bed or chair | 0 = No, 1 = Yes | |  |
| W3\_TRAVE | Usually or always need assistance with: Traveling (outside the home) | 0 = No, 1 = Yes | |  |
| W3\_PREPF | Usually or always need assistance with: Preparing food | 0 = No, 1 = Yes | |  |
| W3\_SHOPF | Usually or always need assistance with: Shopping for food or other necessities | 0 = No, 1 = Yes | |  |
| W3\_HEALT | In general, would you say your health is: | 1 = Excellent 2 =Very Good 3 = Good 4 = Fair 5= Poor 6 = Not sure | |  |
| W3\_HOSPI | In the previous 12 months, have you stayed overnight as a patient in a hospital? | 1 = Not at all 2 = One Time 3 = Two or three times 4 = More than three times | |  |
| W3\_CLINI | In the previous 12 months, how many times did you visit a physician or clinic? | 1 = Not at all 2 = One Time 3 = Two or three times 4 = Four to six times 5 = More than 6 times | |  |
| W3\_FALLS | In the past year, have you experienced one or more falls? | 1 = Yes 2 = No 3 = not sure | |  |
| W3\_FADOC | If yes, did any require seeing a doctor? | 1 = Yes 2 = No | |  |
| W3\_FAHOS | If yes, did any require admission to a hospital? | 1 = Yes 2 = No | |  |
| W3\_DIAB | Diabetes or borderline diabetes | 0 = No, 1 = Yes | |  |
| W3\_HCHOL | High blood cholesterol or fats | 0 = No, 1 = Yes | |  |
| W3\_HTN | High blood pressure (hypertension) | 0 = No, 1 = Yes | |  |
| W3\_BREAT | Lung disease or breathing problems | 0 = No, 1 = Yes | |  |
| W3\_ARTHR | Arthritis of the knee or knee replacement surgery | 0 = No, 1 = Yes | |  |
| W3\_ANKLE | Fluid (edema) in your legs, ankle, or feet | 0 = No, 1 = Yes | |  |
| W3\_URINA | Urinary problems | 0 = No, 1 = Yes | |  |
| W3\_MENTA | Mental health problems | 0 = No, 1 = Yes | |  |
| W3\_CANCR | Cancer | 0 = No, 1 = Yes | |  |
| W3\_DEMENT | Dementia or Alzheimer's | 0 = No, 1 = Yes | |  |
| W3\_CAD | Have you ever had: Coronary heart disease | 0 = No, 1 = Yes | |  |
| W3\_CHF | Have you ever had: Coronary heart failure (CHF) | 0 = No, 1 = Yes | |  |
| W3\_ANGIN | Have you ever had: Angina pectoris | 0 = No, 1 = Yes | |  |
| W3\_MI | Have you ever had: A myocardial infarction (MI) | 0 = No, 1 = Yes | |  |
| W3\_FEEL | Feel depressed, sad, downhearted, "in the dumps", or blue. | 0 = No, 1 = Yes | |  |
| W3\_TIRED | Feel tired, worn out, and lacking in energy. | 0 = No, 1 = Yes | |  |
| W3\_WEIGHT | Do you consider yourself to be (check one): | 1 = Underweight for my height and age 2 = Desirable weight for my height and age 3 = Overweight for my height and age 4 = Not sure | |  |
| W3\_WTGNYRS | Select the option that best describes your rate of weight gain over the years: | 1 = I have been overweight since childhood (before age 18 years). 2 = I gained most of my excess weight in middle age (30-50) 3 = I have gained most of my excess weight since age 50 years. 4 = I have a history of weight swings many times over the years ("yo-yo"). 5 = None apply to me | |  |
| W3\_FAM | Select the option that best describes your family: | 1 = I have siblings, parents, or grandparents who are or were overweight or obese. 2 = I do not have family members who are or were overweight or obese. | |  |
| W3\_DQS1 | How often do you usually eat fruit as a snack? | 1 = never 2 = < 1 time per week 3 = 1 or 2 times per week 4 = 3 or more times per week | | 0  2  4  5 |
| W3\_DQS2 | How often do you usually eat whole grain breads? | 1= never 2 = < 1 time per week 3 = 1 or 2 times per week 4 = 3 or more times per week | | 0  0  3  5 |
| W3\_DQS3 | How often do you usually eat whole grain cereals? | 1 = never 2 = < 1 time per week 3 = 1 or 2 times per week 4 = 3 or more times per week | | 0  0  3  5 |
| W3\_DQS4 | How often do you usually eat candy or chocolate? | 1= 3 or more times per week 2 = 1 or 2 times per week 3 = < 1 time per week 4 = Never | | 0  2  3  4 |
| W3\_DQS5 | How often do you usually eat crackers, pretzels, chips, or popcorn? | 1 = 3 or more times per week 2 = 1 or 2 times per week 3 = < 1 time per week 4 = Never | | 0  2  3  4 |
| W3\_DQS6 | How often do you eat cakes or pies? | 1= 3 or more times per week 2 = 1 or 2 times per week 3 = < 1 time per week 4 = Never | | 0  2  3  4 |
| W3\_DQS7 | How often do you eat cookies? | 1 = 3 or more times per week 2 = 1 or 2 times per week 3 = < 1 time per week 4 = Never | | 0  2  3  4 |
| W3\_DQS8 | How often do you eat ice cream? | 1= 3 or more times per week 2 = 1 or 2 times per week 3 = < 1 time per week 4 = Never | | 0  2  3  4 |
| W3\_DQS9 | How often do you eat cold cuts, hot dogs, lunch meats or deli meats? | 1 = 3 or more times per week 2 = 1 or 2 times per week 3 = < 1 time per week 4 = Never | | 0  0  3  5 |
| W3\_DQS10 | How often do you eat bacon or sausage? | 1 = 3 or more times per week 2 = 1 or 2 times per week 3 = < 1 time per week 4 = Never | | 0  3  5  5 |
| W3\_DQS11 | How often do you eat carrots, sweet potatoes, broccoli, or spinach? | 1 = never 2 = < 1 time per week 3 = 1 or 2 times per week 4 = 3 or more times per week | | 0  2  6  8 |
| W3\_DQS12 | How often do you eat fruit (not including juice)? Please include fresh, canned or frozen fruit. | 1 = never 2 = < 1 time per week 3 = 1 or 2 times per week 4 = 3 to 5 times per week 5 = Every day or almost every day | | 0  0  2  4  5 |
| W3\_DQS13 | How often do you eat hot or cold breakfast cereal? | 1 = never 2 = < 1 time per week 3 = 1 or 2 times per week 4 = 3 to 5 times per week 5 = Every day or almost every day | | 0  1  3  4  5 |
| W3\_DQS14 | How often do you drink some kind of juice at breakfast? | 1 = never 2 = < 1 time per week 3 = 1 or 2 times per week 4 = 3 to 5 times per week 5 = Every day or almost every day | | 0  0  2  4  5 |
| W3\_DQS15 | How often do you eat chicken or turkey? | 1 = never 2 = < 1 time per week 3 = 1 or 2 times per week 4 = 3 to 5 times per week 5 = Every day or almost every day | | 0  0  2  4  5 |
| W3\_DQS16 | How often do you drink a glass of milk? | 1 = never 2 = < 1 time per week 3 = 1 or 2 times per week 4 = 3 to 5 times per week 5 = Every day or almost every day 6 = more than once per day | | 0  0  1  3  4  5 |
| W3\_DQS17 | Do you usually add fat butter, margarine or oil) to potatoes and other vegetables? | 1 = yes 2 = no | | 0  1 |
| W3\_DQS18 | Do you usually add butter or margarine to foods like bread, rolls, or biscuits? | 1 = yes 2 = no | | 0  1 |
| W3\_DQS19 | Do you use gravy (when available) at meals? | 1 = yes 2 = no | | 0  1 |
| W3\_DQS20 | Do you usually add sugar or honey to sweeten your coffee or tea? | 1 = yes 2 = no | | 0  1 |
| W3\_DQS21 | How often do you eat fish or seafood that is not fried? | 1 = never 2 = < 1 time per week 3 = Once per week 4 = more than once per week | | 0  1  3  5 |
| W3\_DQS22 | How many servings of milk, cheese, or yogurt do you usually eat each day? | 1 = none 2 = one 3 = two or more | | 0  3  5 |
| W3\_DQS23 | Do you usually drink wine, beer, or other alcoholic beverages? | 1 = yes 2 = no | | 0  1 |
| W3\_DQS24 | How many different vegetable servings do you usually have at your main meal of the day? | 1 = none 2 = one 3 = two 4 = 3 or more | | 0  1  5  7 |
| W3\_DQS25 | Which of the following best describes your nutritional supplement use? | 1 = I don't use supplements 2 = I use a multivit/mineral prep 3 = I use other supplements  4 = don't know | | 0  5  0  0 |
| DQSQtotal | Total score for DQSQ by summing the DQSQ item level scoring (scoring for each item located in the last column of the data dictionary) | NUMERIC range from 0 (unhealthy) to 100 (healthy) | |  |

**Section 2d: Electronic Medical Record Data**

The Geisinger Electronic Medical record (EMR) was used to supplement data for GRAS participants. The EMR was introduced in 1996 and was fully implanted by 2001 and is limited to GRAS participants seeking care within Geisinger Health System. Data from this section were generated based on standard of care (i.e. health indication) and not for study purposes. Medical record numbers, names and birth dates were used to match EMR data with baseline GRAS data and confirm identify. The data dictionaries for each EMR data type are included below.

|  |  |  |  |
| --- | --- | --- | --- |
| **GRAS Demographic file** | | | |
| **File description:** This file includes one row per patient | | **Total Patients: 21046** | |
| **Name** | **Description** | **Format** | **Values** |
| GRAS\_ID | Unique identifier to link various files | INT |  |
| Birth\_date | Masked date of birth | DATE | dd/mm/yyyy |
| Death\_date | Masked date of death | DATE | dd/mm/yyyy |
| Sex | Sex | TEXT | Male, Female |
| Race1 | Race recorded in EHR | TEXT | White, Black, Pacific Islander, American Indian, Asian, Other, Unknown |
| Race2 | Race recorded in EHR | TEXT | White, Black, Pacific Islander, American Indian, Asian, Other, Unknown |
| Race3 | Race recorded in EHR | TEXT | White, Black, Pacific Islander, American Indian, Asian, Other, Unknown |
| Race4 | Race recorded in EHR | TEXT | White, Black, Pacific Islander, American Indian, Asian, Other, Unknown |
| Race5 | Race recorded in EHR | TEXT | White, Black, Pacific Islander, American Indian, Asian, Other, Unknown |
| Ethnic\_group | Ethnicity recorded in EHR | TEXT | Hispanic, Non-Hispanic |

|  |  |  |  |
| --- | --- | --- | --- |
| **GRAS Encounter Diagnosis** | | | |
| **File description:** This file includes one row per diagnosis | | **Total Patients: 15481** | |
| **Name** | **Description** | **Format** | **Values** |
| GRAS\_ID | Unique identifier to link various files | INT |  |
| Contact\_date | Masked Date of patient encounter/diagnosis | DATE | dd/mm/yyyy |
| Dx\_id | Diagnosis identifier | TEXT | e.g. ICD10 code |
| Enc\_type | Type of encounter visit with diagnosis | TEXT | Office Visit, Appointment, Documentation, etc. |

|  |  |  |  |
| --- | --- | --- | --- |
| **GRAS Med Order** | | | |
| **File description:** This file includes one row per medication | | **Total Patients:** | |
| **Name** | **Description** | **Format** | **Values** |
| GRAS\_ID | Unique identifier to link various files | INT |  |
| Ordering\_date | Masked date of encounter | DATE | dd/mm/yyyy |
| Medication\_id | Medication Identifier | INT |  |
| Medication\_name | Name of Medication | TEXT | ZOCOR 20 MG OR TABS, COZAAR 50 MG OR TABS, etc.. |
| Dx\_id | Diagnosis associated with medication order | TEXT |  |
| Department\_name | Name of Department that ordered the medication | TEXT | PEDS DANVILLE, ACTA BLOOMSBURG, etc.. |

|  |  |  |  |
| --- | --- | --- | --- |
| **GRAS Medication Reconciliation** | | | |
| **File description:** This file includes one row per medication | | **Total Patients:** | |
| **Name** | **Description** | **Format** | **Values** |
| GRAS\_ID | Unique identifier to link various files | INT |  |
| Contact\_date | Masked date of encounter | DATE | dd/mm/yyyy |
| Is\_active\_yn | Active Medication Flag | TEXT | Y/N |
| Medication\_id | Medication Identifier | INT |  |
| Medication\_name | Name of Medication | TEXT | ZOCOR 20 MG OR TABS, COZAAR 50 MG OR TABS, etc.. |

|  |  |  |  |
| --- | --- | --- | --- |
| **GRAS Problem List** | | | |
| **File description:** This file includes one row per diagnosis | | **Total Patients:** | |
| **Name** | **Description** | **Format** | **Values** |
| GRAS\_ID | Unique identifier to link various files | INT |  |
| Dx\_id | Diagnosis identifier | TEXT | e.g. ICD10 |
| Date\_of\_entry | Masked date when diagnosis entered on problem list | DATE | dd/mm/yyyy |
| Noted\_date | Masked date when diagnosis was first noted (can be prior to entry date) | DATE | dd/mm/yyyy |
| Resolved\_date | Masked date diagnosis resolved | DATE | dd/mm/yyyy |
| Status | Status of diagnosis | TEXT | Active, Resolved |

|  |  |  |  |
| --- | --- | --- | --- |
| **GRAS Labs** | | | |
| **File description:** This file includes one row per Lab Result | | **Total Patients:** | |
| **Name** | **Description** | **Format** | **Values** |
| GRAS\_ID | Unique identifier to link various files | INT |  |
| Contact\_date | Masked date of encounter | DATE | dd/mm/yyyy |
| Ordering\_date | Masked date of encounter | DATE | dd/mm/yyyy |
| Ordering\_mode | Mode of Order | TEXT | Outpatient, Inpatient, etc. |
| Component\_name | Name of Lab | TEXT | MONOS, MCH, etc. |
| Result\_time | Time of lab result | DATE | dd/mmm/yyyy HH:MM:SS |
| Numeric\_value | Numeric lab result | DEC | e.g. 5.9 |
| Text\_value | Lab result that may include text | TEXT | e.g. “5.9” or “abnormal” |
| Reference\_unit | Unit of measure | TEXT | e.g. fL |
| Result\_flag | Lab Result relative to reference unit | TEXT | High, Low, etc. |

|  |  |  |  |
| --- | --- | --- | --- |
| **GRAS Social History** | | | |
| **File description:** This file includes one row per patient history update | | **Total Patients:** | |
| **Name** | **Description** | **Format** | **Values** |
| GRAS\_ID | Unique identifier to link various files | INT |  |
| Contact\_date | Masked date of response | DATE | dd/mm/yyyy |
| Is\_alcohol\_user | Use of Alcohol Flag | TEXT | Yes, No, Not Asked |
| Alcohol\_oz\_per\_week | Alcohol consumption per week in ounces | TEXT |  |
| Alcohol\_drinks\_wk | Alcohol consumption per week | TEXT |  |
| Drink\_type | Type of Alcoholic Drink | TEXT |  |
| Is\_tobacco\_user | Use of Tobacco Flag | TEXT | Yes, Quit, No, ect. |
| Tobacco\_pak\_per\_dy | How many packs per day | TEXT |  |
| Tobacco\_used\_years | How many years using tobacco | TEXT |  |
| Cigarettes\_yn | Cigarette Use Flag | TEXT | Y/N |
| Pipes\_yn | Pipe Use Flag | TEXT | Y/N |
| Cigars\_yn | Cigar Use Flag | TEXT | Y/N |
| Snuff\_yn | Snuff Use Flag | TEXT | Y/N |
| Chew\_yn | Chew Use Flag | TEXT | Y/N |

|  |  |  |  |
| --- | --- | --- | --- |
| **GRAS Vitals** | | | |
| **File description:** This file includes one row per encounter | | **Total Patients:** | |
| **Name** | **Description** | **Format** | **Values** |
| GRAS\_ID | Unique identifier to link various files | INT |  |
| Contact\_date | Masked date of measurements | DATE | dd/mm/yyyy |
| Bp\_systolic | Systolic Blood Pressure | DEC |  |
| Bp\_diastolic | Diastolic Blood Pressure | DEC |  |
| Temperature | Temperature | DEC |  |
| Pulse | Pulse | DEC |  |
| Height\_in | Height in inches | DEC |  |
| Weight\_lb | Weight in pounds | DEC |  |

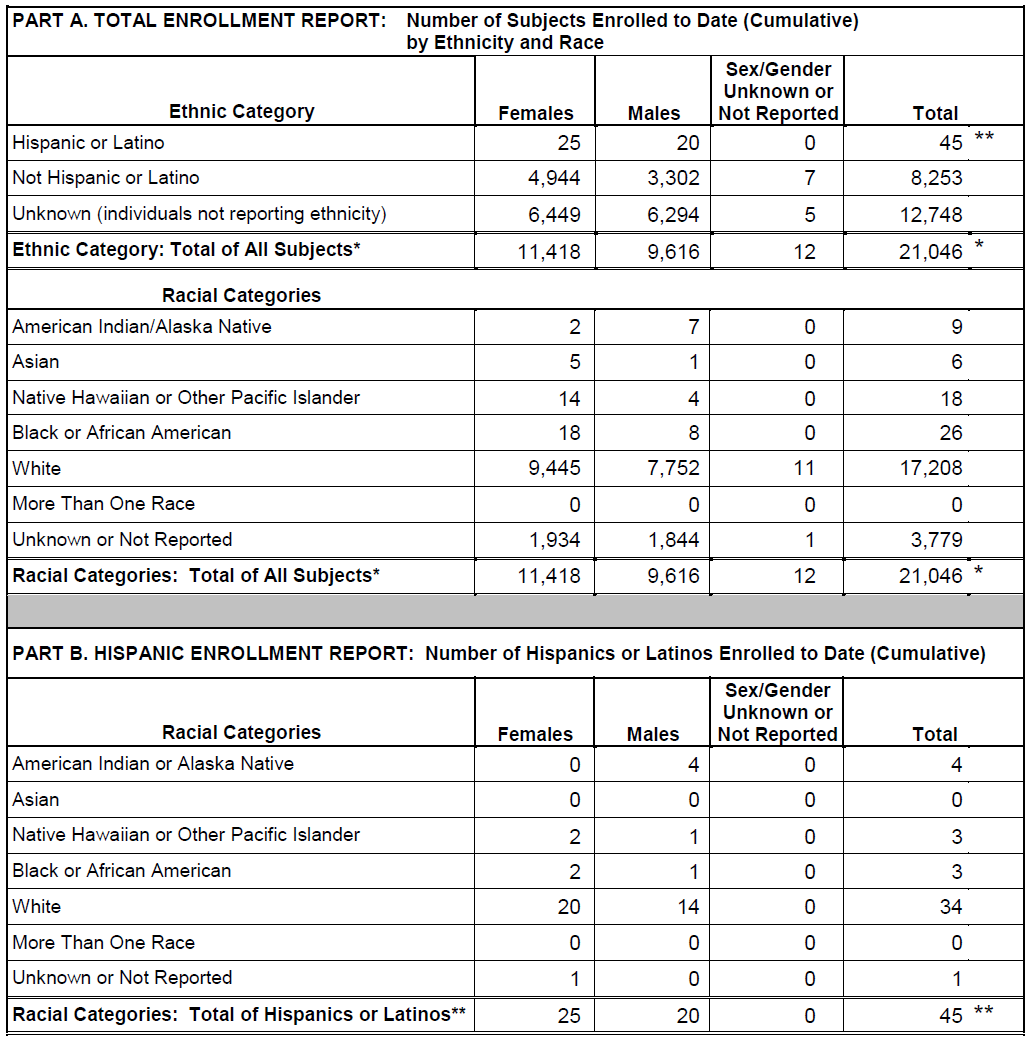
|  |  |  |  |
| --- | --- | --- | --- |
| **GRAS Procedures** | | | |
| **File description:** This file includes one row per procedure | | **Total Patients:** | |
| **Name** | **Description** | **Format** | **Values** |
| GRAS\_ID | Unique identifier to link various files | INT |  |
| Contact\_date | Masked date of procedure | DATE | dd/mm/yyyy |
| CPT\_code | CPT code for procedure | TEXT |  |
| PROC\_NAME | Name of procedure | TEXT |  |
| DEPARTMENT\_NAME | Department that ordered procedure | TEXT |  |
| ORDERING\_MODE | Inpatient/Outpatient | TEXT |  |
| ORDER\_STATUS | Status of order = COMPLETED or SENT | TEXT |  |

**Section 3: Other data / resources**

* + GRAS sub-studies. The GRAS included serval smaller sub-studies that involved more comprehensive diet assessments. Data availability from these sub-studies are variable and require further investigation. Note that they are not overlapping populations (i.e. those in sub-study 1 are not in sub-study 2) and each included a separate IRB approval and consent form. A brief overview of each is included below.
    1. FFQ and DST development (references #14, #16, #17, #22)
       - Years 1997-1998
       - n=179
       - mean age=74.5
       - Home visits including questionnaires, anthropometrics, blood, diet (5 telephone diet recalls)
    2. Senior Health in Pennsylvanian study (SHIP) study included the validation of FFQ and DST (references #23, #24)
       - Years 2004-2005
       - n=206
       - mean age=78.5
       - Clinic visits with questionnaires, anthropometrics, blood, diet.
    3. SHIP2 (references #39, #41):
       - Years 2015-2017
       - n=122
       - mean age 85.9
       - Telephone questionnaires including DST and 3 telephone diet recalls
  + MyCode Biobank. The MyCode study is a separate research study that includes with Geisinger patients consented for biobanking of blood/serum (>275,000 consented). These samples are available for future use in separately revied/approved research studies. The MyCode study targeted the Geisinger primary care population and selected disease cohorts. Blood is collected from those that consent into the study by taking an additional sample drawn at time of clinically indicated blood draw. The MyCode blood sample(s) are stored in biobank. Genomic sequencing has been completed in about 175k consent patients and has been used for translation back to clinical care (screening for high risk/treatable diseases). The MyCode Governing Board serves as the primary oversight body for MyCode, and reviews and approves/disapproves requests to use MyCode participant samples and/or data and requests to return research findings. Upon approval, the custody of the samples is transferred from MyCode to the requesting investigator, including protection of identifiers from health information according to regulatory restrictions and IRB approvals. **For the GRAS study**, there currently are N=2311 that are also consented in MyCode, of which about N=1990 have sequenced genomic data and serum stored in the MyCode biobank. These samples and resulting data from MyCode can be linked back to the GRAS study using a data broker process (i.e. an independent data analyst that has full access to both databases). This process, which has been used for many other studies, allows the linkage of the genomic data from MyCode to the dietary and clinical data from GRAS.
  + COVID data. There were 331 individuals that had a positive COVID-19 test of which 70 died within one month of the positive result. However, quality information on vaccine status is not available.

**Section 4: Supplemental data reports**

Enrollment report (race/ethnicity/sex)



Year of birth

|  |  |  |  |
| --- | --- | --- | --- |
| **Birth Year** | **Frequency** | **Percent** | **Cumulative Percent** |
| **1900** | 5 | 0.02 | 0.02 |
| **1901** | 6 | 0.03 | 0.05 |
| **1902** | 16 | 0.08 | 0.13 |
| **1903** | 16 | 0.08 | 0.2 |
| **1904** | 37 | 0.18 | 0.38 |
| **1905** | 34 | 0.16 | 0.54 |
| **1906** | 35 | 0.17 | 0.71 |
| **1907** | 58 | 0.28 | 0.98 |
| **1908** | 90 | 0.43 | 1.41 |
| **1909** | 103 | 0.49 | 1.9 |
| **1910** | 156 | 0.74 | 2.64 |
| **1911** | 138 | 0.66 | 3.3 |
| **1912** | 203 | 0.96 | 4.26 |
| **1913** | 246 | 1.17 | 5.43 |
| **1914** | 290 | 1.38 | 6.81 |
| **1915** | 356 | 1.69 | 8.5 |
| **1916** | 397 | 1.89 | 10.39 |
| **1917** | 515 | 2.45 | 12.83 |
| **1918** | 541 | 2.57 | 15.4 |
| **1919** | 615 | 2.92 | 18.33 |
| **1920** | 744 | 3.54 | 21.86 |
| **1921** | 863 | 4.1 | 25.96 |
| **1922** | 876 | 4.16 | 30.12 |
| **1923** | 960 | 4.56 | 34.69 |
| **1924** | 1054 | 5.01 | 39.69 |
| **1925** | 1125 | 5.35 | 45.04 |
| **1926** | 1160 | 5.51 | 50.55 |
| **1927** | 1418 | 6.74 | 57.29 |
| **1928** | 1361 | 6.47 | 63.76 |
| **1929** | 1441 | 6.85 | 70.6 |
| **1930** | 1495 | 7.1 | 77.71 |
| **1931** | 1400 | 6.65 | 84.36 |
| **1932** | 1271 | 6.04 | 90.4 |
| **1933** | 1810 | 8.6 | 99 |
| **1934** | 211 | 1 | 100 |
| **Total** | 21,046 | 100 | 100 |

Time until death

EMR encounters

Count of people # with 1+ encounter: 15481

|  |  |  |
| --- | --- | --- |
| Count of encounters per person: | Median [IQR]  Range [Min Max] | 63 [18 144]  [1, 1396] |

EMR follow-up time

|  |  |  |
| --- | --- | --- |
| Time from first to last encounter in years: | Mean (SD)  Median [IQR]  Range [Min Max] | 9.66 (6.86)  8.87 [3.59 15.31]  [0, 22.19] |

EMR laboratory results: Top 20 most common labs

|  |  |
| --- | --- |
| **Lab type** | **# with at least one result** |
| CREATININE | 14761 |
| BUN | 14705 |
| POTASSIUM | 14705 |
| GLUCOSE | 14700 |
| SODIUM | 14662 |
| CHLORIDE | 14662 |
| CO2 | 14662 |
| CALCIUM | 14631 |
| HGB | 14407 |
| HCT | 14396 |
| WBC | 14368 |
| RBC | 14367 |
| MCV | 14367 |
| PLATELET COUNT | 14367 |
| MCH | 14364 |
| MCHC | 14364 |
| RDW | 14363 |
| MPV | 14349 |
| ALT | 13437 |
| AST | 13339 |

Alcohol and tobacco use

|  |  |  |
| --- | --- | --- |
| **Ever Used Alcohol** | **Frequency** | **Percent** |
|
| **No** | 7858 | 53.63% |
| **Yes** | 4354 | 29.71% |
| **Not Asked** | 2441 | 16.66% |

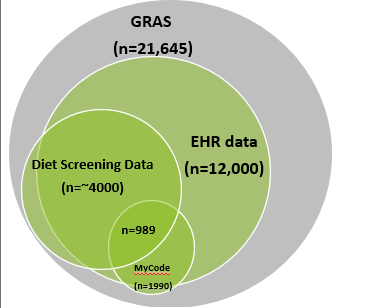
|  |  |  |
| --- | --- | --- |
| **Ever Used Tobacco** | **Frequency** | **Percent** |
|
| **No** | 11686 | 79.75% |
| **Yes** | 1814 | 12.38% |
| **Not Asked** | 1153 | 7.87% |

Weight, height, and vitals

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Ever Had a value in EMR:** | **Median (IQR) # measures per person (if they had at least one)** | **Median (IQR) years between first and last measure (if they had at least one)** |
| SBP | n=14743 | 37 [11 78] | 10.87 [6.13 16.49] |
| DBP | n=14743 | 37 [11 78] | 10.87 [6.13 16.49] |
| Temperature | n=13654 | 26 [7 59] | 9.5 [4.57 15.34] |
| Pulse | n=14243 | 32 [9 70] | 10.22 [5.44 15.82] |
| Height | n=12010 | 10 [3 24] | 7.44 [2.24 13.34] |
| Weight | n=14489 | 34 [10 72] | 10.67 [5.86 16.32] |

Overlap between data domains:

In progress, here is a quick example



**Section 5: GRAS Publication List**

**Geisinger Rural Aging Study (GRAS) Publications (1997-2021)**

1. Friedmann JM, Jensen GL, Wright HS, McCamish MA. Predicting early nonelective hospital readmission in nutritionally compromised older adults. Am J. Clin Nutr 65:1714-1720, 1997.
2. Jensen GL, Kita K, Fish J, Heydt D, Frey C. Nutrition risk screening characteristics of rural older persons: Relation to functional limitations and health care charges. Am J Clin Nutr 66:819-828, 1997.
3. Jensen GL, Rogers JZ. Obesity in older persons. J Am Diet Assoc 98: 1308-11, 1998.
4. Taylor-Davis S, Wright HS, Warland R, Jensen GL, Achterberg C, Sayer A, Shannon S, Willis S. Responses of older adults to theory-based nutrition newsletters. J Am Diet Assoc, 100: 654-64, 2000.
5. Friedmann J, Elasy T, Jensen GL. The relationship between body mass index and self-reported functional limitation among older adults: a gender difference. J Am Geriatr Soc, 49: 398-403, 2001.
6. Jensen GL, Friedmann J, Coleman CD, Wright HS. Screening for hospitalization and nutritional risks among community dwelling older persons. Am J Clin Nutr, 74: 201-5, 2001.
7. Jensen GL, Friedmann J. Obesity is associated with functional decline among community dwelling older persons. J Am Geriatr Soc, 50: 918-23, 2002.
8. Seale JL, Klein G, Friedmann J, Jensen GL, Mitchell D, Wright HS. Energy expenditure by doubly labeled water, activity records and diet records in the rural elderly. Nutrition 18: 568-73, 2002.
9. Apovian CM, Frey CM, Wood CG, Rogers JZ, Jensen GL. Body mass index (BMI) and physical function in older women. Obesity Research, Obesity Research 10: 740-7, 2002.
10. Taylor‐Davis, S., Smiciklas‐Wright, H., Davis, A. C., Jensen, G. L., & Mitchell, D. C. (1998). Time and cost for recruiting older adults. *Journal of the American Geriatrics Society*, *46*(6), 753-757.
11. Mitchell, D.C., Smiciklas-Wright, H., Friedmann, J.A., & Jensen, J.L. (2002). Dietary intake by the Nutrition Screening Initiative is a sensitive but not a specific indicator of nutrition risk in older adults. *Journal of the American dietetic association*, 102(6):842-844.
12. Seale, J. L., Klein, G., Friedmann, J., Jensen, G. L., Mitchell, D. C., & Smiciklas-Wright, H. (2002). Energy expenditure measured by doubly labeled water, activity recall, and diet records in the rural elderly. *Nutrition*, *18*(7-8), 568-573.
13. Ledikwe, J.H., Smiciklas-Wright, H., Mitchell, D.C., Jensen, G.L., Friedmann, J.M., & Still, C.S. (2003) Nutrition risk assessment and obesity: a gender difference. *American Journal of Clinical Nutrition*, 77:551-8.
14. Ledikwe, J. H., Smiciklas‐Wright, H., Mitchell, D. C., Miller, C. K., & Jensen, G. L. (2004). Dietary patterns of rural older adults are associated with weight and nutritional status. *Journal of the American Geriatrics Society*, *52*(4), 589-595.
15. Smiciklas-Wright, H., Mitchell, D. C., & Tucker, K. L. (2004). Association of weight status with dietary patterns in older adults. *Topics in Clinical Nutrition*, *19*(3), 193-199.
16. Lancaster, K. J., Smiciklas-Wright, H., Weitzel, L. B., Mitchell, D. C., Friedmann, J. M., & Jensen, G. L. (2004). Hypertension-related dietary patterns of rural older adults. *Preventive medicine*, *38*(6), 812-818.
17. Davis, M. S., Miller, C. K., & Mitchell, D. C. (2004). More favorable dietary patterns are associated with lower glycemic load in older adults. *Journal of the American Dietetic Association*, *104*(12), 1828-1835.
18. Bailey, R. L., Ledikwe, J. H., Smiciklas-Wright, H., Mitchell, D. C., & Jensen, G. L. (2004). Persistent oral health problems associated with comorbidity and impaired diet quality in older adults. *Journal of the American Dietetic Association*, *104*(8), 1273-1276.
19. Jensen GL, Roy MA, Buchanan AE, Berg M. Weight loss intervention for obese older women: Improvements in performance and function. Obesity Res 12: 1814-20, 2004.
20. Jensen GL, Silver HJ, Roy MA, Callahan E, Still C, Dupont W. Obesity is a risk factor for reporting homebound status among community dwelling older persons. Obesity 14: 509-17, 2006.
21. Jensen GL. Obesity among older persons: screening for risk of adverse outcomes. Journal of Nutrition, Health and Aging 10: 510-22, 2006.
22. Bailey, R. L., Gutschall, M. D., Mitchell, D. C., Miller, C. K., Lawrence, F. R., & Smiciklas-Wright, H. (2006). Comparative strategies for using cluster analysis to assess dietary patterns. *Journal of the American Dietetic Association*, *106*(8), 1194-1200.
23. Bailey, R. L., Mitchell, D. C., Miller, C. K., Still, C. D., Jensen, G. L., Tucker, K. L., & Smiciklas-Wright, H. (2007). A dietary screening questionnaire identifies dietary patterns in older adults. *The Journal of Nutrition*, *137*(2), 421-426.
24. Bailey, R. L., Mitchell, D. C., Miller, C., & Smiciklas-Wright, H. (2007). Assessing the effect of underreporting energy intake on dietary patterns and weight status. *Journal of the American Dietetic Association*, *107*(1), 64-71.
25. Hsiao, P. Y., Jensen, G. L., Hartman, T. J., Mitchell, D. C., Nickols-Richardson, S. M., & Coffman, D. L. (2011). Food intake patterns and body mass index in older adults: a review of the epidemiological evidence. *Journal of Nutrition in Gerontology and Geriatrics*, *30*(3), 204-224.
26. Mitchell, D. C., Tucker, K. L., Maras, J., Lawrence, F. R., Smiciklas-Wright, H., Jensen, G. L., Still, C.D. Hartman, T. J. (2012). Relative validity of the geisinger rural aging study food frequency questionnaire. *The Journal of nutrition, health & aging*, *16*(7), 667-672.
27. Hsiao, P. Y., Mitchell, D. C., Coffman, D. L., Allman, R. M., Locher, J. L., Sawyer, P., Jensen, G. L., & Hartman, T. J. (2013). Dietary patterns and diet quality among diverse older adults: the University of Alabama at Birmingham Study of Aging. *The Journal of Nutrition, Health & Aging*, *17*(1), 19-25.
28. Ford, D., Hartman, T., Still, C., Wood, C., Mitchell, D. C., Hsiao, P. Y., Bailey, R., Smiciklas-Wright, H., Coffman, D. L., & Jensen, G. L. (2013). Diet-related practices and BMI are associated with diet quality in older adults. Public Health Nutrition, 1-5. ISBN/ISSN #/Case #/DOI #: 1368-9800
29. Hsiao, P. Y., Mitchell, D. C., Coffman, D. L., Wood, G. C., Hartman, T. J., Still, C., & Jensen, G. L. (2013). Dietary patterns and relationship to obesity-related health outcomes and mortality in adults 75 years of age or greater. *The Journal of Nutrition, Health & Aging*, *17*(6), 566-572.
30. Ford, D. W., Hartman, T. J., Still, C., Wood, C., Mitchell, D. C., Erickson, P., Bailey, R., Smiciklas-Wright, H., Coffman, D.L. Jensen, G. L. (2014). Body mass index, poor diet quality, and health-related quality of life are associated with mortality in rural older adults. *Journal of Nutrition in Gerontology and Geriatrics*, *33*(1), 23-34.
31. Hsiao, P. Y., Mitchell, D. C., Coffman, D. L., Wood, G. C., Hartman, T. J., Still, C., & Jensen, G. L. (2013). Dietary patterns and relationship to obesity-related health outcomes and mortality in adults 75 years of age or greater. *The Journal of Nutrition, Health & Aging*, *17*(6), 566-572.
32. Ford, D. W., Jensen, G. L., Still, C., Wood, C., Mitchell, D. C., Erickson, P., Smiciklas-Wright, H., Coffman, D. L. & Hartman, T. J. (2014). The associations between diet quality, body mass index (BMI) and health and activity limitation index (HALex) in the Geisinger Rural Aging Study (GRAS). *The Journal of Nutrition, Health & Aging*, *18*(2), 167-170.
33. Hsiao, P. Y., Mitchell, D. C., Wood, G. C., Jensen, G. L., Still, C. D., & Hartman, T. J. (2014). The Association of Dietary Patterns and Weight Change in Rural Older Adults 75 Years and Older. *Journal of Nutrition in Gerontology and Geriatrics*, *33*(4), 357-375.
34. Ford, D. W., Hartman, T. J., Still, C., Wood, C., Mitchell, D. C., Bailey, R.,  Smiciklas-Wright, H., Coffman, D.L. Jensen, G. L. (2014). Diet Quality and Body Mass Index Are Associated with Health Care Resource Use in Rural Older Adults. *Journal of the Academy of Nutrition and Dietetics*, 114(12), 1932-1938.
35. Cheng, F. W., Gao, X., Mitchell, D. C., Wood, C., Rolston, D. D., Still, C. D., & Jensen, G. L. (2016). Metabolic health status and the obesity paradox in older adults. *Journal of nutrition in gerontology and geriatrics*, *35*(3), 161-176.
36. Cheng, F. W., Gao, X., Mitchell, D. C., Wood, C., Still, C. D., Rolston, D., & Jensen, G. L. (2016). Body mass index and all‐cause mortality among older adults. *Obesity*, *24*(10), 2232-2239.
37. Cheng, F. W., Gao, X., Bao, L., Mitchell, D. C., Wood, C., Sliwinski, M. J., Smiciklas‐Wright, H., Still, C.D., Rolston, D.D. Jensen, G. L. (2017). Obesity as a risk factor for developing functional limitation among older adults: A conditional inference tree analysis. *Obesity*, *25*(7), 1263-1269.
38. Liu, Y. H., Gao, X., Mitchell, D. C., Wood, G. C., Still, C. D., & Jensen, G. L. (2019). Diet Quality Is Associated With Mortality in Adults Aged 80 Years and Older: A Prospective Study. *Journal of the American Geriatrics Society*, *67*(10), 2180-2185.
39. Liu, Y. H., Gao, X., Mitchell, D. C., Wood, G. C., Bailey, R. K., Still, C. D., & Jensen, G. L. (2019). Validation of a diet quality screening tool for use in the oldest old. *Journal of nutrition in gerontology and geriatrics*, *38*(2), 196-204.
40. Liu, Y. H., Gao, X., Na, M., Kris-Etherton, P. M., Mitchell, D. C., & Jensen, G. L. (2020). Dietary pattern, diet quality, and dementia: A systematic review and meta-analysis of prospective cohort studies. *Journal of Alzheimer's Disease*, (Preprint), 1-18.
41. Davis, B., Liu, Y. H., Stampley, J., Wood, G. C., Mitchell, D. C., Jensen, G. L., ... & Irving, B. A. (2021). The Association between Poor Diet Quality, Physical Fatigability and Physical Function in the Oldest-Old from the Geisinger Rural Aging Study. *Geriatrics*, *6*(2), 41
42. Liu, Y. H., Jensen, G. L., Na, M., Mitchell, D. C., Craig Wood, G., Still, C. D., & Gao, X. (2021). Diet Quality and Risk of Parkinson’s Disease: A Prospective Study and Meta-Analysis. *Journal of Parkinson's Disease*, (Preprint), 1-11.
43. Flores, A. C., Jensen, G. L., Mitchell, D. C., Na, M., Wood, G. C., Still, C. D., & Gao, X. (2023). Prospective Study of Diet Quality and the Risk of Dementia in the Oldest Old. *Nutrients*, *15*(5), 1282.