## **SUPPLEMENTAL MATERIALS**

## **“Spiritually-motivated restrictions on animal products have a limited impact on consumption of healthy plant-based foods”**

Hilary J. Bethancourt, Mario Kratz, Kathleen O’Connor

## SUPPLEMENTAL METHODS

### Aggregation and Definition of Food Group Variables

Both the MPED and NCC systems had similar definitions for servings of nuts and seeds, meat alternatives/soy products, whole grains, and refined grains. All measures of macronutrients, fiber, and total and added sugars were provided in the same units across the two nutritional analysis systems. However, the grouping of some major food groups examined in this study followed a slightly distinct process for the FR data relative to the FFQ data (See [Supplemental Table 1](#SupTable1)). One major difference between the MPED and NCC systems of generating food group estimates for FFQs and FRs, respectively, is in the way the former disaggregates components of foods into food groups (e.g., fatty meats disaggregated into lean meat and discretionary solid fat groups; ice cream disaggregated into milk and added sugar groups). The MPED variables for red meat, poultry, and processed meat, were, therefore, based on lean meat; any fat content above the “allowable” 9.28 grams per 100 grams in meat products was disaggregated into a separate discretionary solid fat variable (1), which was not incorporated in the analyses due to its inclusion of non-animal sources of solid fat (e.g., vegetable margarine and coconut oil). In contrast, The NCC variables had to be grouped manually and without disaggregation. Hence, red meat in the FR data set was defined as the combination of lean and non-lean beef, veal, lamb, and pork, excluding cold cuts, cured pork, and sausages. Poultry was defined as the combination of lean, non-lean, and fried poultry products. Processed meat was defined as the combination of cured lean and non-lean pork and lean and non-lean cold cuts and sausages. The estimates for fresh and smoked fish and shellfish were combined with the estimates of fried fish and fried shellfish produced by the NCC system to generate a comparable variable to the MPED variable for fish intake, which does not separate fish by cooking method. Similarly, to generate a comparable count of total dairy servings using the NCC data, it was necessary to combine whole, low-fat, and non-fat cup equivalents of unsweetened and sweetened milk; unsweetened, sweetened, and artificially sweetened yogurt; cheese; and dairy-based dessert products.

The serving sizes of fruit, vegetables, potatoes, and legumes are twice as large in the MPED system as they are in the NCC system. Thus, 0.5 was multiplied by the NCC variables for servings of citrus and non-citrus whole fruit (excluding fruit juices); green, orange, starchy, and other vegetables (excluding fried and non-fried potatoes); white potatoes (including friend and non-fried forms); and legumes.

Finally, the discretionary oil variable generated from the MPED system included oils from fish, nuts, seeds, liquid margarine, and added vegetable oils. As no parallel existed with the NCC data, FR estimates of saturated and trans fat intake was subtracted from the FR estimates of total fat intake in an attempt to create a variable that would be more comparable to the MPED variable than the NCC variable for oil consumption.

### MPED Equivalents Conversion to Grams

As the weight of a given MPED serving may vary depending on the water content of a given food, the conversion of an oz-eq or cup-eq serving to grams varies by food group (2). The following list provides a rough estimate of the gram-equivalent amounts of MPED servings:

* 1 oz meat or fish ~ 28 g
* 1 oz-eq dairy ~ 245 g milk or yogurt, ~48 g cheese
* 1 oz-eq eggs ~ 1 egg or 50 g
* 1 oz-eq whole or refined grains ~ 28 g
* 1 oz-eq soy products ~ 28.35 g
* 1 oz-eq legumes ~ 175 g (cooked)
* 1 oz-eq nuts and seeds ~ 15 g
* 1 cup-eq fruit, vegetable, or potatoes ~ 150 g (though the weight can vary between 50-250 grams, depending on water content)

## SUPPLEMENTAL TABLES

#### Supplemental Table 1. Variable creation based on MyPyramid Equivalents Database (MPED) 2.0 components obtained from FFQ data or Nutrition Coordinating Center (NCC) components obtained from food record data.

|  | **FFQ DATA** | | **FOOD RECORD DATA** | |
| --- | --- | --- | --- | --- |
| **Variable** | **MPED Variable Components** | **MPED Serving Size** | **NCC Variable Components** | **NCC Serving Size** |
| **Red meat** | Lean\* meat from beef, veal, pork, lamb, and game | 1 oz (cooked) | Beef  Lean beef (≤10% fat)  Veal  Lean veal (≤10% fat)  Lamb  Lean lamb (≤10% fat)  Fresh pork  Lean fresh pork (≤10% fat)  Game | 1 oz (cooked) |
| **Processed meat** | Lean\* meat from franks, sausages, luncheon meats | 1 oz (cooked) | Cured pork  Lean cured pork (≤10% fat)  Cold cuts and sausage  Lean cold cuts and sausage | 1 oz (cooked) |
| **Poultry** | Lean\* meat from chicken, poultry, and other poultry | 1 oz (cooked) | Poultry  Lean poultry (≤10% fat)  Fried chicken | 1 oz (cooked) |
| **Fish** | Lean\* meat from fish and other seafood from high and low omega-3 sources | 1 oz (cooked) | Fresh and smoked fish  Lean fresh and smoked fish  Fried fish  Shellfish  Fried shellfish | 1 oz (cooked) |
| \* Lean meat is defined in the MPED system as any meat, poultry, or fish item that contains ≤9.28 grams of fat and at least 90.72 grams of nonfat meat component per 100 grams of cooked food item. The amount of fat present above the allowable fat level of 9.28 grams per 100 grams of food item is defined as discretionary solid fat. | | | | |
| **Milk**  *NCC variable for frozen dairy desserts was multiplied by 0.5 to better approximate the MPED definition of a serving* | All fluid milk, chocolate milk, lactose-reduced milk, lactose-free milk, filled milk, dry milk, and evaporated milk (including those disaggregated from dairy-based desserts) | 1 cup-eq. (e.g., 1 cup milk, 0.5 cup evaporated milk; 1 cup frozen yogurt; 1 cup pudding made with milk; 1.5 cups ice cream) | Whole milk, plain and flavored  Reduced fat milk, plain and flavored  Low fat and fat-free milk, plain and flavored  Dry milk  Sweetened flavored milk beverages  Frozen dairy desserts  Pudding and other dairy desserts | 1 cup-eq. milk (e.g., 1 cup milk, 0.5 cup evaporated milk; 1 cup prepared dry milk)  0.5 cup ice cream; 1 cup shake  1 cup pudding made with milk |
| **Cheese** | All hard natural cheese, soft cheese, processed cheese, and cheese products | 1 cup-eq (e.g., 1.5 oz hard cheese; 0.33 cup shredded cheese; 0.5 cup ricotta cheese; 2 cups cottage cheese) | Full fat cheese  Reduced fat cheese  Low fat and fat-free cheese | 1.5 oz natural cheese  2 oz processed cheese  2 cups cottage cheese  3 cups dry curd  0.5 cup ricotta  2 oz spread cheese |
| **Yogurt** | All yogurts such as fat-free, low-fat, reduced-fat, and whole milk yogurt | 1 cup-eq (e.g., 8 oz yogurt) | Plain, sweetened, and artificially sweetened whole milk, low-fat, and fat-free yogurt | 1 cup-eq (e.g., 8 oz yogurt) |
| **Eggs** |  | 1 oz-eq (1 egg) |  | 1 large egg; 2 large egg whites; 2 large egg yokes |
| **Whole grain** | Any 100% whole grain product | 1 oz-eq (e.g., 0.5 cup pasta, rice, or cooked breakfast cereals; 28.35 g ready-to-eat cereal; 1 regular slice of whole grain bread; 0.5 English muffin; 1 small muffin; 3 cups popped popcorn; 1 small tortilla) | Any 100% whole grain product | 1 oz-eq (e.g., 0.5 cup pasta, rice, or cooked breakfast cereals; 28.35 g ready-to-eat cereal; 1 regular slice of whole grain bread; 0.5 English muffin; 1 small muffin; 3 cups popped popcorn) |
| **Refined grain** | Any cooked refined grains or products made with refined flour | 1 oz-eq (e.g., 0.5 cup pasta, rice, or cooked breakfast cereals; 28.35 g ready-to-eat cereal; 1 regular slice of whole grain bread; 0.5 English muffin; 1 small muffin; 1 small tortilla) | Any cooked refined grains or products made with refined flour | 1 oz-eq (e.g., 0.5 cup pasta, rice, or cooked breakfast cereals; 28.35 g ready-to-eat cereal; 1 regular slice of whole grain bread; 0.5 English muffin; 1 small muffin; 1 small tortilla) |
| **Legumes**  *NCC variable for legumes multiplied by 0.5 to match the MPED definition of a 1-cup eq serving* | Cooked dry beans and peas | 1 cup eq (0.25 cup cooked dry beans or peas; 0.25 cup refried beans or baked beans; 0.5 cup split pea, lentil, or bean soup; 2 Tbs hummus) | Dried beans  Lima beans  Refried beans  Beans in sauce  Beans in recipes (e.g., soup) | 0.5 cup cooked dry beans  0.5 cup refried beans  0.5 cup beans in sauce |
| **Soy products** | Soy milk  Tofu  Soy nuts | 1 oz-eq from soy products (e.g., 1 cup soy milk; 0.25 cup tofu; 0.25 cup soy nuts; 0.5 soy bean patty) | Veggie burgers  Tofu  Tempeh  TVP  Soy nuts | 0.5 oz soy nuts;  1 oz tofu, veggie burger, tempeh |
| **Nuts and seeds** | Nuts and seeds | 1 oz-eq (0.5 oz nuts or seeds; 1 Tbs nut butter) | Nuts and seeds | 0.5 oz nuts or seeds; 1 Tbs nut butter |
| **Fruit**  *NCC variables for fruit multiplied by 0.5 to match the MPED definition of a 1-cup eq serving* | Citrus fruits, melons and berries; non-citrus fruit; avocados | 1 cup-eq (e.g., 1 cup sliced or mashed fruit; 1 large piece of fruit; 0.5 cup dried fruit) | Citrus fruit  Non-citrus fruit  Avocado | 0.5 cup chopped fruit or 1 medium piece  0.25 cup dried fruit |
| **Vegetables**  *NCC variable for vegetables multiplied by 0.5 to match the MPED definition of a 1-cup eq serving* | Dark green vegetables (leafy greens and broccoli)  Orange vegetables (carrots, sweet potato, winter squash)  Starchy vegetables (peas and corn)  Other vegetables (cabbage, peppers, cucumbers, celery, cauliflower)  Tomatoes | 1 cup-eq (e.g., 1 cup chopped broccoli; 1 cup cooked greens; 2 cups raw greens; 1 cup chopped carrots; 1 cup mashed pumpkin or squash; 1 cup peas or corn; 1 cup chopped cauliflower; 1 large raw tomato) | Dark green vegetables (leafy greens and broccoli)  Deep yellow vegetables (carrots, sweet potato, winter squash)  Starchy vegetables (peas and corn)  Other vegetables (cabbage, peppers, cucumbers, celery, cauliflower)  Tomatoes | 1 cup raw leafy greens  0.5 cup cooked leafy greens or non-leafy vegetable in any form |
| **White potatoes**  *NCC variable for potatoes multiplied by 0.5 to match the MPED definition of a 1-cup eq serving* | White potatoes | 1 cup-eq (e.g., 1 cup mashed potato; 20 medium French fries) | White potatoes | 0.5 cup chopped or mashed potato |
| **Discretionary oil**  *NCC variables for saturated fats and trans fats subtracted from variable for total fat to match the MPED definition of discretionary oil* | Fats that are liquid at room temperature, including non-hydrogenated oils from plant sources, oils from fish, nuts, and seeds. |  | No equivalent variable in database. Subtracted variables for saturated fat and trans fats from variable for total fat. |  |

#### Supplemental Table 2. FFQ estimates of servings of animal- and plant-based food intake before and during Lent among a subsample of “strict” fasters (n=36). †

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **PRE-LENT** | | | | **LENT** | | | |
|  | **Servings** ‡ | | **Estimated Gram Amounts** | | **Servings** ‡\* | | **Estimated Gram Amounts** | |
|  | **Mean** | **(5th %ile, 95th %ile)** | **Mean** | **(5th %ile, 95th %ile)** | **Mean** | **(5th %ile, 95th %ile)** | **Mean** | **(5th %ile, 95th %ile)** |
| **Animal-Based Foods** |  |  |  |  |  |  |  |  |
| Total MDE Servings | 3.4 | (2.3, 4.7) |  |  | 0.4 | (0, 0.9) |  |  |
|  |  |  |  |  |  |  |  |  |
| Red Meat | 0.8 | (0.2, 2.2) | 65.8 | (16.3, 186.4) | 0.05 | (0, 0.1) | 4.08 | (0.2, 10.8) |
| Poultry | 0.5 | (0.1, 1.1) | 43.3 | (10.7, 94.3) | 0.02 | (0, 0.1) | 2.09 | (0, 9.3) |
| Processed Meat | 0.4 | (0.02, 1.0) | 20.2 | (1.4, 56.7) | 0.01 | (0, 0.1) | 0.37 | (0, 3.0) |
| Fish & Shellfish | 0.3 | (0.02, 0.7) | 24.8 | (1.5, 59.8) | 0.4 | (0.1, 1.0) | 35.9 | (7.3, 84.6) |
|  |  |  |  |  |  |  |  |  |
| Milk | 0.6 | (0.1, 1.4) | 139.8 | (34.1, 341.1) | 0.1 | (0, 0.3) | 31.7 | (1.8, 71.5) |
| Yogurt | 0.2 | (0, 0.8) | 49.5 | (0, 204.8) | 0.02 | (0, 0.1) | 3.9 | (0, 23.5) |
| Cheese | 0.5 | (0.2, 0.9) | 27.1 | (11.8, 44.6) | 0.2 | (0, 0.5) | 7.7 | (0.2, 23.5) |
| Eggs | 0.4 | (0.0, 1.2) | 42.2 | (3.7, 117.9) | 0.05 | (0, 0.2) | 4.6 | (0.3, 18.6) |
|  |  |  |  |  |  |  |  |  |
| **Plant-Based Foods** |  |  |  |  |  |  |  |  |
| Whole Grain | 1.3 | (0.0, 3.4) | 35.2 | (0.1, 95.2) | 2.2 | (0.1, 5.9) | 62.0 | (2.0, 164.4) |
| Refined Grain | 3.8 | (1.1, 6.4) | 105.8 | (31.5, 179.5) | 5.1 | (1.9, 8.7) | 143.5 | (52.9, 242.4) |
| Legumes | 0.1 | (0.03, 0.5) | 23.5 | (5.5, 79.9) | 0.4 | (0.04, 1.1) | 71.2 | (7.8, 197.8) |
| Soy Products | 0.1 | (0, 0.6) | 4.2 | (0, 18.1) | 0.7 | (0, 3.1) | 19.5 | (0.1, 85.5) |
| Nuts & Seeds | 0.9 | (0, 2.1) | 13.2 | (0.3, 31.1) | 2.3 | (0.1, 6.3) | 33.8 | (2.2, 94.1) |
| Fruit § | 0.7 | (0.1, 1.5) | 100.6 | (7.7, 229.0) | 1.3 | (0.04, 3.2) | 191.8 | (6.4, 487.1) |
| Vegetables § | 1.9 | (0.7, 5.9) | 291.0 | (106.2, 892.4) | 2.9 | (1.2, 6.6) | 435.1 | (180.5, 993.2) |
| White Potatoes | 0.4 | (0.1, 1.1) | 61.0 | (15.8, 159.9) | 0.6 | (0.1, 1.4) | 86.6 | (21.1, 210.1) |

† “Strict” fasters defined as individuals who reduced their consumption of MDE products by ≥2 servings and consumed <1 MDE serving during Lent. All food variables are standardized to 2000 kcal (8368 kJ).

‡ 1 serving of meat, poultry, or fish = 3 oz or ~84 grams; 1 serving whole or refined grains = 1 oz-eq or ~28 grams; 1 serving of soy products = 1 oz-eq or ~28 grams; 1 serving legumes = 1 cup-eq or ~175 grams (cooked); 1 serving nuts and seeds =1 oz-eq or ~ 15 grams; 1 serving fruit, vegetable, or potatoes =1 cup-eq or ~ 150 grams. Gram conversions should only be interpreted as rough estimates, as the weight of cup- and oz-equivalents of many foods can depend on their water content.

§ Excludes fruit juices; || Excludes white potatoes

#### Supplemental Table 3. FFQ estimates of energy and macronutrient intake before and during Lent among a subsample of “strict” fasters (n=36). †

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **PRE-LENT** | | **LENT** | |
|  | **Mean** | **(5th %ile, 95th %ile)** | **Mean** | **(5th %ile, 95th %ile)** |
| Energy Intake (males, kJ/day, n=18) | 8,804 | (4,800, 16,214) | 6,428 | (3,421, 11,811) |
| Energy Intake (females, kJ/day, n=18) | 7,881 | (5,118, 11,964) | 5,335 | (2,810, 10,024) |
|  |  |  |  |  |
| Protein (g) | 87.9 | (59.0, 126.2) | 64.4 | (49.7, 81.9) |
| Protein (%E) | 17.6% | (11.8%, 25.2%) | 12.9% | (9.9%, 16.4%) |
| Animal Protein (g) | 61.1 | (32.4, 94.3) | 14.2 | (3.9, 31.4) |
| Animal Protein (%E) | 12.2% | (6.5%, 18.9%) | 2.8% | (0.8%, 6.3%) |
| Vegetable Protein (g) | 26.7 | (16.4, 38.8) | 50.2 | (28.6, 67.7) |
| Vegetable Protein (%E) | 5.3% | (3.3%, 7.8%) | 10.0% | (5.7%, 13.5%) |
|  |  |  |  |  |
| Total Fat (g) | 85.3 | (58.2, 110.9) | 66.4 | (41.7, 93.3) |
| Total Fat (%E) | 38.4% | (26.2%, 49.9%) | 29.9% | (18.8%, 42.0%) |
| Saturated Fat (g) | 28.1 | (18.5, 37.6) | 14.2 | (7.2, 23.2) |
| Saturated Fat (%E) | 12.7% | (8.3%, 16.9%) | 6.4% | (3.2%, 10.5%) |
| Trans Fat (g) | 2.7 | (1.4, 4.4) | 1.4 | (0.4, 2.8) |
| Trans Fat (%E) | 1.2% | (0.6%, 2.0%) | 0.6% | (0.2%, 1.3%) |
| Monounsaturated Fat (g) | 30.9 | (19.2, 41.8) | 26.5 | (14.5, 38.9) |
| Monounsaturated Fat (%E) | 13.9% | (8.6%, 18.8%) | 11.9% | (6.5%, 17.5%) |
| Polyunsaturated Fat (g) | 18.7 | (12.1, 25.2) | 20.6 | (13.6, 31.5) |
| Polyunsaturated Fat (%E) | 8.4% | (5.4%, 11.4%) | 9.3% | (6.1%, 14.2%) |
|  |  |  |  |  |
| Carbohydrates (g) | 213.0 | (104.1, 276.0) | 290.3 | (217.1, 359.3) |
| Carbohydrate (%E) | 42.6% | (20.8%, 55.2%) | 58.1% | (43.4%, 71.9%) |
| Total Sugar (g) | 91.1 | (22.4, 150.4) | 99.5 | (63.4, 144.6) |
| Total Sugar (%E) | 18.2% | (4.5%, 30.1%) | 19.9% | (12.7%, 28.9%) |
| Added Sugar (g) | 49.8 | (7.1, 90.4) | 51.6 | (17.6, 90.9) |
| Added Sugar (%E) | 10.0% | (1.4%, 18.1%) | 10.3% | (3.5%, 18.2%) |
|  |  |  |  |  |
| Alcohol (g) | 9.8 | (0, 32.6) | 9.6 | (0, 34.4) |
|  |  |  |  |  |
| Fiber (g) | 21.4 | (12.1, 34.3) | 37.0 | (24.4, 57.9) |

† “Strict” fasters defined as individuals who reduced their consumption of MDE products by ≥2 servings and consumed <1 MDE serving during Lent (as defined by FFQ data). All nutrients in grams are standardized to 2000 kcal (8368 kJ). To convert to kcal, divide kJ by 4.184.

#### Supplemental Table 4. FFQ estimates of micronutrient intake before and during Lent among a subsample of “strict” fasters (n=36). †

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **PRE-LENT** | | **LENT** | | **RDA or AI** ‡ | **Proportion meeting or surpassing**  **RDA or AI** |
|  | **Mean** | **(5th %ile, 95th %ile)** | **Mean** | **(5th %ile, 95th %ile)** |
| Sodium (mg) | 3512.3 | (2744.6, 5092.2) | 3769.5 | (2692.9, 6075.0) | 1500 mg § | 100% |
| Potassium (mg) | 2980.4 | (1840.0, 4050.7) | 3614.8 | (2386.0, 5152.6) | 4700 mg § | 8.3% |
| Vitamin A (IU) | 11512.8 | (3739.6, 39219.8) | 14490.2 | (4497.9, 37744.4) | 900 IU (M), 700 IU (F) | 100% |
| Folate (mcg) | 469.2 | (301.7, 671.0) | 700.5 | (434.3, 1067.5) | 400 mcg | 100% |
| Vitamin B-6 (mg) | 2.0 | (1.3, 2.9) | 2.2 | (1.4, 4.1) | 1.3 mg | 100% |
| Vitamin B-12 (mcg) | 5.7 | (3.2, 10.7) | 4.0 | (1.4, 11.0) | 2.4 mcg | 69.4% |
| Vitamin C (mg) | 98.6 | (26.2, 237.9) | 154.4 | (36.4, 297.7) | 90 mg (M), 75 mg (F) | 72.2% |
| Vitamin D (IU) | 221.1 | (93.2, 454.3) | 63.6 | (13.5, 162.7) | 600 IU | 0% |
| Vitamin E (IU) | 15.1 | (9.8, 30.3) | 21.4 | (13.2, 32.3) | 22.4 IU | 36.1% |
| Vitamin K (mcg) | 212.7 | (53.4, 755.7) | 235.1 | (83.6, 846.4) | 120 mcg (M), 90 mcg (F) § | 83.3% |
| Calcium (mg) | 937.4 | (557.5, 1350.7) | 815.3 | (503.4, 1420.7) | 1000 mg | 19.4% |
| Iron (mg) | 13.5 | (9.9, 21.7) | 17.9 | (10.7, 29.4) | 8 mg (M), 18 mg (F) | 72.2% |
| Magnesium (mg) | 324.1 | (222.0, 459.3) | 446.7 | (304.3, 643.2) | 420 mg (M), 320 mg (F) | 72.2% |
| Selenium (mcg) | 126.5 | (87.4, 182.3) | 118.2 | (88.6, 167.7) | 55 mcg | 100% |
| Zinc (mg) | 12.5 | (8.8, 18.2) | 11.8 | (7.6, 17.7) | 11 mg (M), 8 mg (F) | 69.4% |

† “Strict” fasters defined as individuals who reduced their consumption of MDE products by ≥2 servings and consumed <1 MDE serving during Lent (as defined by FFQ data). All nutrients are standardized to 2000 kcal (8368 kJ).

‡ Based on sex-specific values of Recommended Dietary Allowances (RDA) or Adequate Intakes (AI) specified by the Food and Nutrition Board of the Institute of Medicine for 19-50 year-old adults (3).

§ Value is for the AI as opposed to the RDA.

#### Supplemental Table 5. Multiple linear regression results for additive change in servings of major non-MDE foods in relation to a one-serving reduction in MDE products as estimated by food record data (n=94). †

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Servings ‡** | | **Gram Estimates** | |  |
|  | **β** | **(95% CI)** | **β** | **(95% CI)** | ***p*** |
| **Fish** | 0.07 | (0.003, 0.13) | 5.60 | (0.28, 10.64) | 0.04 |
| **Whole Grain** | 0.27 | (0.10, 0.43) | 7.56 | (2.8, 12.04) | 0.002\* |
| **Refined Grain** | 0.13 | (-0.15, 0.42) | 3.64 | (-4.2, 11.76) | 0.37 |
| **Legumes** | 0.09 | (0.05, 0.12) | 15.75 | (8.75, 21) | <0.0001\* |
| **Soy Products** | 0.21 | (0.08, 0.33) | 5.88 | (2.24, 9.24) | 0.001\* |
| **Nuts & Seeds** | 0.67 | (0.38, 0.96) | 10.05 | (5.7, 14.4) | <0.0001\* |
| **Fruit** § | 0.10 | (0.03, 0.16) | 15.0 | (4.5, 24.0) | 0.004\* |
| **Vegetables** || | 0.07 | (0, 0.16) | 10.50 | (0, 24.0) | 0.13 |
| **White Potatoes** | 0.02 | (-0.02, 0.05) | 3.0 | (-3.0, 7.5) | 0.29 |

† Results from multiple linear regression models controlling for baseline MDE consumption, baseline consumption of the dependent variable of interest, baseline caloric intake, the change in calories, average METs, change in METs, age, sex, and baseline BMI; using robust standard errors. Beta coefficients represent the additive difference in each variable of interest during Lent relative to a one serving decrease in MDE products. All food variables are standardized to 2000 kcal (8368 kJ).

‡ 1 serving of fish = 3 oz or ~84 grams; 1 serving whole or refined grains = 1 oz-eq or ~28 grams; 1 serving of soy products = 1 oz-eq or ~28 grams; 1 serving legumes = 1 cup-eq or ~175 grams (cooked); 1 serving nuts and seeds =1 oz-eq or ~ 15 grams; 1 serving fruit, vegetable, or potatoes =1 cup-eq or ~ 150 grams.

§ Excluding fruit juice

|| Excluding white potatoes

\* Significant at the Bonferroni-adjusted α-level of 0.0055.

#### Supplemental Table 6. Multiple linear regression results for change in energy, macronutrients, and micronutrients in relation to a one-serving reduction in MDE products as estimated by food record data (n=94). †

|  |  |  |  |
| --- | --- | --- | --- |
|  | **β** | **(95% CI)** | ***p*** |
| Kilojoules (kJ) ‡ | -113 | (-402, 176) | 0.44 |
| ***Macronutrients*** |  |  |  |
| Protein (g) | -6.5 | (-7.9, -5.0) | <0.0001\* |
| Animal Protein (g) | -12.5 | (-14.3, -10.7) | <0.0001\* |
| Vegetable Protein (g) | 5.5 | (4.6, 6.4) | <0.0001\* |
| Total Fat (g) | -2.2 | (-3.8, -0.6) | 0.009 |
| Saturated Fat (g) | -4.0 | (-4.8, -3.2) | <0.0001\* |
| Trans Fat (g) | -0.4 | (-0.5, -0.2) | <0.0001\* |
| Monounsaturated Fat (g) | 0.2 | (-0.9, 1.3) | 0.67 |
| Polyunsaturated Fat (g) | 2.0 | (1.3, 2.7) | <0.0001\* |
| Carbohydrates (g) | 14.1 | (9.7, 18.5) | <0.0001\* |
| Total sugar (g) | -0.4 | (-3.1, 2.4) | 0.78 |
| Added sugar (g) | -1.3 | (-3.6 to 0.9) | 0.25 |
| Fiber (g) | 3.5 | (2.7, 4.3) | <0.0001\* |
| ***Micronutrients*** |  |  |  |
| Sodium (mg) | -57.6 | (-186.1, 70.8) | 0.38 |
| Potassium (mg) | 63.0 | (-2.5, 128.5) | 0.06 |
| Folate (mcg) | 34.1 | (17.9, 50.3) | <0.0001\* |
| Vitamin B-6 (mg) | -0.02 | (-0.2, 0.1) | 0.84 |
| Vitamin B-12 (mcg) | -0.6 | (-1.0, -0.3) | 0.0007\* |
| Vitamin D (IU) | -28.7 | (-49.4, -8.0) | 0.007 |
| Vitamin K (mcg) | 11.7 | (-9.4, 32.8) | 0.27 |
| Calcium (mg) | -113.7 | (-148.7, -78.7) | <0.0001\* |
| Iron (mg) | 1.0 | (0.5, 1.4) | <0.0001\* |
| Magnesium (mg) | 29.7 | (19.0, 40.4) | <0.0001\* |
| Selenium (mcg) | -7.3 | (-13.2, -1.4) | 0.02 |
| Zinc (mg) | -0.2 | (-0.8, 0.4) | 0.51 |

† Results from multiple linear regression models controlling for MDE1 score, baseline consumption of the dependent variable of interest, baseline caloric intake, the change in calories, average METs, change in METs, age, sex, and baseline BMI; using robust standard errors.Beta coefficients represent the percent difference in each nutrient relative to a one serving decrease in MDE products. All nutrients are standardized to 2000 kcal (8368 kJ). To convert to kcal, divide kJ by 4.184.

‡ Controlling for same covariates with the exception of change in calories.

\* Significant at the Bonferroni-adjusted α-level of 0.002.

#### Supplemental Table 7. Odds of meeting USDA dietary recommendations on plant-based foods in relation to a one-serving reduction in MDE products as estimated by food record data (n=94).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Food Group** | **Recommended amount per 2,000 kcal (8368 kJ)** | **Approximate gram amounts** † | **OR** ‡ | **95 % CI** | ***p*** | **Percent of "strict” MDE fasters meeting national dietary recommendations** |
| All Vegetables § | 2½ cup-eq/day | 375 g/day | 1.43 | (0.79, 2.59) | 0.23 | 38.9% |
| Dark Green Vegetables | 1½ cup-eq/week | 225 g/week | 0.94 | (0.67, 1.33) | 0.74 | 52.8% |
| Red & Orange Vegetables | 5½ cup-eq/week | 825 g/week | 1.37 | (0.83, 2.26) | 0.21 | 16.7% |
| Legumes (Beans & Peas) | 1½ cup-eq/week | 225 g/week | 2.71 | (1.19, 6.18) | 0.018 | 77.8% |
| Starchy Vegetables || | 5 cup-eq/week | 750 g/week | 1.41 | (0.66, 3.01) | 0.37 | 16.7% |
| Other Vegetables | 4 cup-eq/week | 600 g/week | 1.58 | (1.02, 2.44) | 0.04 | 66.7% |
| Fruits ¶ | 2 cup-eq/day | 300 g/day | 2.28 | (0.81, 6.44) | 0.12 | 5.6% |
| Grains |  |  |  |  |  | 44.4% |
| Whole Grains | ≥ 3 oz-eq/day | 84 g/day | 1.62 | (0.92, 2.87) | 0.10 | 13.9% |
| Refined Grains | ≤ 3 oz-eq/day | 84 g/day | 1.11 | (0.73, 1.67) | 0.63 | 38.9% |
| Nuts, Seeds, Soy Products | 5 oz-eq/week | 70 g/week nuts or  140 g/week soy products | 8.02 | (1.90, 33.84) | 0.005 | 94.4% |
| Added Sugars | <10% of total calories |  | 1.24 | (0.86, 1.79) | 0.25 | 66.7% |

† Gram conversions should only be interpreted as rough estimates, as the weight of cup- and oz-equivalents of many foods can depend on their water content.

‡ Odds ratios represent the ratio of the odds of meeting recommended intake during Lent for the given category relative to a one-serving decrease in MDE products, controlling for MDE1 score, baseline intake of each food/food group of interest, baseline caloric intake, change in calories, average METs, change in METs, age, sex, and baseline BMI.

§ Includes legumes

|| Includes white potatoes

¶ Excluding fruit juices; the variable for average METs was removed from this model in order to obtain stable ORs estimates in conditions of such a low percentage of “successes.”

## SUPPLEMENTAL FIGURES

#### Supplemental Figure 1: Participant Flow Chart

|  |  |
| --- | --- |
| Recruited and consented (n=141) |  |
|  |  |
|  | Never initiated study tasks (n=21) |
|  |  |
| Completed initial survey (n=120) |  |
|  |  |
|  | Dropped out after initial survey (n=6) |
|  |  |
| Completed baseline (pre-Lenten) tasks:  2 surveys, 1st FFQ, 1st FR (n=114) |  |
|  |  |
|  | Dropped out after baseline (pre-Lenten) tasks (n=6) Did not complete 2nd FFQ or FR (n=1) |
|  |  |
| Completed Lenten (follow-up) tasks:  3rd survey, 2nd FFQ, 2nd FR (n=107) |  |
|  |  |
|  | Excluded from FFQ analyses: - Excluded for reporting calories>5000 at baseline (n=1 male) - Excluded for reporting calories <500 (n=1 female) - Excluded for starting a weight loss program during study (n=2) - Excluded for making dietary changes at baseline for Catholic  Lent (n=1) - Excluded for changes in medication usage (n=1) |
|  |  |
| Analyses with FFQ data (n=99) |  |
|  |  |
|  | Excluded from FR analyses: - Excluded for not completing FRs in one or both collection  periods (n=4) - Excluded for <6 days of recording at baseline (n=1) |
|  |  |
| Analyses with FR data (n=94) |  |

FFQ=food frequency questionnaire; FR=food record

## SUPPLEMENTAL REFERENCES

1. Bowman SA, Friday JE Moshfegh AJ (2008) MyPyramid Equivalents Database, 2.0 for USDA survey foods, 2003-2004: documentation and user guide. *US Department of Agriculture*.

2. Bowman SA, Clemens JC, Friday JE *et al.* (2017) Food Patterns Equivalents Database 2013-14: Methodology and User Guide. U.S. Department of Agriculture; Agricultural Research Service; Beltsville Human Nutrition Research Center; Food Surveys Research Group. Beltsville, Maryland.

3. Food and Nutrition Board Nutrient Recommendations: Dietary Reference Intakes (DRI). <https://ods.od.nih.gov/Health_Information/Dietary_Reference_Intakes.aspx> (accessed May 2019)