**Supplementary Material**

Supplemental table 1 describes the items used for calculations of food components from the food frequency questionnaire and the serving size, preparation, and doneness responses from the Computerized Heterocyclic Amines Resource for Research in Epidemiology of Disease (CHARRED) questionnaire to calculate mutagen intake. Supplemental Table 2 provides additional demographic and clinical characteristics of the study population. Supplemental Table 3 presents lifestyle characteristics by age, gender, and education level.

**Supplemental Table 1.** Individual items within the sub-components of the food frequency questionnaire (FFQ) and the Computerized Heterocyclic Amines Resource for Research in Epidemiology of Disease (CHARRED) questionnaire

**Supplemental Table 2.** Additional participant characteristics in patients with NMIBC (n = 113)

**Supplementary Table 3.** Lifestyle characteristics in patients with NMIBC by age, gender, and education level

**Supplemental Table 1.** Individual items within the sub-components of the food frequency questionnaire (FFQ) and the Computerized Heterocyclic Amines Resource for Research in Epidemiology of Disease (CHARRED) questionnaire

|  |  |
| --- | --- |
|  |  |
| **Sub-component, FFQ** | **Items** |
| *Servings/week, over past year* |  |
| Cruciferous vegetables | Broccoli, cauliflower, cabbage/coleslaw, brussels sprouts, kale/mustard greens/chard |
| Healthy fats | Avocado, oil dressing, olive oil for cooking or as condiment, peanut butter, peanuts, walnuts, other nuts |
| Processed meats | Beef or pork hot dogs, chicken or turkey hot dogs, bacon, salami/bologna/other processed meat sandwiches, other processed meats |
| Dairy | Whole milk, cream, low-carb or artificially sweetened/plain yogurt, sweetened with fruit or other flavoring yogurt, butter, cottage cheese, cream cheese, other cheese |
| Fruits | Raisins, prunes/dried plums, bananas, cantaloupe, fresh apples/pears, oranges, grapefruit, strawberries, blueberries, apricots |
| Vegetables | Tomatoes, salsa picante/taco sauce, string beans, peas/lima beans, carrots, corn, mixed/stir-fry vegetables/soup, yams/sweet potatoes, eggplant/zucchini/other summer squash, cooked spinach, raw spinach, iceberg/head lettuce, romaine/leaf lettuce, celery, peppers, raw onion, cooked onion |
| Lean protein | Beans/lentils, tofu/soy burger/miso/other soy protein, chicken/turkey sandwich/frozen dinner, other chicken/turkey without skin, lean/extra lean hamburger, shrimp/lobster/scallops, skim milk, 1 or 2% milk |
| Red meat | Regular hamburger, beef/pork/lamb sandwich or mixed dish, pork as main dish, beef/lamb as main dish |
| Alcohol | Regular beer, light beer, red wine, white wine, liquor |
| **CHARRED questionnaire** | **Items** |
| *Serving size, preparation, and doneness used to calculate Phip, Meiqx, Dimeiqx intake* |  |
|  | Hamburgers:  Serving size – small, medium, or large; medium=4 oz.  Preparation (multi-select) – pan-fried, grilled/barbequed, oven-broiled, cooked another way  Doneness – rare, medium-rare, medium, medium-well, well-done, very well-done, don’t know, did not eat  Beef steak:  Serving size – small, medium, or large; medium=4 oz.  Preparation (multi-select) – pan-fried, grilled/barbequed, oven-broiled, cooked another way  Doneness – rare, medium-rare, medium, medium-well, well-done, very well-done, don’t know, did not eat  Pork chop/ham steak:  Serving size – small, medium, or large; medium=2 chops or 4 oz.  Preparation (multi-select) – pan-fried, oven-broiled, baked/roasted, cooked another way  Doneness – – just until done, well-done, very well done, don’t know, did not eat  Bacon:  Serving size – small, medium, or large; medium=2 strips  Preparation (multi-select) – pan-fried, oven-broiled, cooked another way  Doneness – just until done, well-done or crisp, charred, don’t know, did not eat  Sausage:  Serving size – small, medium, or large; medium=2 links or patties  Preparation (multi-select) – pan-fried, grilled/barbequed, oven-broiled, cooked another way  Doneness – just until done, well-done or crisp, charred, don’t know, did not eat  Fried chicken:  Serving size – small, medium, or large; medium= 2 small pieces/1 large piece  Preparation (multi-select) – deep-fat fried or fast food, pan-fried, cooked another way  Doneness – just until done, well-done, very well-done, don’t know, did not eat  Chicken/turkey:  Serving size – small, medium, or large; medium=2 small pieces or 1 large piece  Preparation (multi-select) – baked/roasted, stewed, oven-broiled grilled/bbq, cooked another way  Doneness – just until done, well-done, very well-done, don’t know, did not eat  Gravy:  Serving size – small, medium, or large; medium=2 tablespoons  Preparation (multi-select) – made from meat drippings, store bought cans, store bough packets, made another way  *Medium well and medium rare were converted to medium* |

**Supplemental Table 2.** Additional participant characteristics in patients with NMIBC (n = 113)\*

|  |  |
| --- | --- |
| **Characteristic,**  **Median (IQR) or n (%)** |  |
| **Total** | n = 113\* |
| **Race**  African American/Black  American Indian or Alaska Native  Asian  Native Hawaiian or Other Pacific Islander  White  Other | 2 (2%)  1 (1%)  7 (6%)  1 (1%)  100 (90%)  2 (2%) |
| **Ethnicity**  Hispanic or Latinx  Mexican American, Chicano  Puerto Rican  Cuban  Another Hispanic, Latino, or Spanish Origin | 8 (7%)  3 (38%)  1 (13%)  0 (0%)  4 (50%) |
| **Marital status**  Married  Divorced/Separated  Widowed  Never married  Surviving partner of a civil partnership | 76 (67%)  19 (16%)  9 (8%)  8 (7%)  1 (1%) |
| **Living arrangement**  Alone  With spouse/partner  With other family  Senior/retirement housing or community exclusively for people age 55+ | 19 (17%)  84 (75%)  14 (13%)  3 (3%) |
| **Current work status**  Full-time  Part-time  Retired  Disabled  Unemployed | 32 (29%)  15 (13%)  56 (50%)  5 (5%)  4 (4%) |
| **History of recurrence**  Number of recurrences, n (range)  Most recent recurrence  Months from most recent recurrence, n (range)  Grade at most recent recurrence  High-grade  Low-grade  PUMLMP  UPUMP  Stage at most recent recurrence  Ta  T1  CIS  Ta with CIS  T1 with CIS  Ta, T1 and CIS | 63 (56%)  2 (0, 7)  8 (0, 140)  34 (60%)  17 (30%)  4 (7%)  2 (3%)  27 (43%)  5 (8%)  11 (17%)  6 (10%)  1 (2%)  0 (0%) |
| **Comorbidities**a  Elevated cholesterol  High blood pressure  Arthritis, rheumatism, or other conditions of the joints of bones  Other cancer  Atrial fibrillation  Diabetes mellitus  Coronary bypass, angioplasty, or stent  Myocardial infarction | 56 (51%)  48 (43%)  44 (40%)  34 (31%)  13 (12%)  10 (9%)  8 (7%)  4 (4%) |
| **Food sources/security over past year**  Ever had free/subsidized meals delivered  Always had enough money for food  Ever skipped meals or ate less due to food shortage  Mostly did own grocery shopping  Mostly prepared own meals  Frequency of home- prepared meals with grocery ingredients  Less than once per week  1-3 times per week  4-6 times per week  Daily  Frequency of home-prepared meals using meal/food service ingredients  Less than once per week  1-3 times per week  4-6 times per week  Daily  Frequency of ready-to-eat meals  Less than once per week  1-3 times per week  4-6 times per week  Daily  Frequency of eating at restaurants  Less than once per week  1-3 times per week  4-6 times per week  Daily  Frequency of eating take out from restaurants  Less than once per week  1-3 times per week  4-6 times per week  Daily  **Follows specific diet due to a health condition**  **Started survey before Bay Area Covid-19 shelter-in-place order** | 0 (0%)  101 (95%)  6 (6%)  89 (84%)  76 (72%)  7 (7%)  14 (13%)  42 (40%)  43 (41%)  86 (89%)  9 (9%)  2 (2%)  0 (0%)  71 (71%)  25 (25%)  4 (4%)  0 (0%)  47 (45%)  48 (46%)  7 (7%)  3 (3%)  78 (76%)  23 (22%)  1 (1%)  1 (1%)  19 (18%)  107 (95%) |

\*Includes all patients with clinical data who completed at least one survey. Demographic characteristics are self-reported. Clinical characteristics are extracted from medical records.

**Supplementary Table 3.** Lifestyle characteristics in patients with NMIBC by age, gender, and education level\*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Age** | | **Gender** | | **Education level** | |
|  | **<65** | **≥65** | **Male** | **Female** | **Low** | **High** |
|  | N=41 | N=72 | N=76 | N=37 | N=15 | N=98 |
| **Food Groups** |  |  |  |  |  |  |
| Vegetables, s/d | 2.9 (2.1, 4.7) | 3.9 (2.6, 5.6) | 3.5 (2.2, 4.9) | 3.9 (2.7, 5.7) | 2.9 (1.3, 3.9) | 3.7 (2.5, 5.5) |
| Cru Veg, s/d | 0.6 (0.3, 1.1) | 0.6 (0.3, 1.1) | 0.6 (0.3, 1.0) | 0.6 (0.2, 1.2) | 0.4 (0.2, 0.9) | 0.6 (0.3, 1.1) |
| Fruit, s/d | 1.4 (0.9, 3.4) | 2.2 (1.4, 3.7) | 2.1 (1.1, 3.4) | 1.9 (1.2, 3.6) | 1.1 (0.9, 2.1) | 2.4 (1.3, 3.6) |
| Lean Protein, s/d | 1.1 (0.6, 1.6) | 1.1 (0.7, 1.6) | 1.2 (0.8, 1.6) | 0.9 (0.6, 1.5) | 1.2 (0.6, 1.9) | 1.1 (0.6, 1.6) |
| Red Meat, s/d | 0.2 (0.1, 0.6) | 0.3 (0.1, 0.5) | 0.2 (0.1, 0.4) | 0.3 (0.1, 0.6) | 0.4 (0.1, 0.6) | 0.3 (0.1, 0.4) |
| Processed Meat, s/d | 0.1 (0.1, 0.4) | 0.2 (0, 0.5) | 0.3 (0, 0.4) | 0.1 (0.1, 0.5) | **0.4 (0.2, 0.9)** | **0.2 (0, 0.4)** |
| Healthy Fat, s/d | 1.6 (1.0, 2.0) | 1.7 (1.0, 2.6) | 1.6 (0.9, 2.4) | 1.6 (1.2, 2.6) | **1.1 (0.9, 1.5)** | **1.7 (1.1, 2.5)** |
| Dairy, s/d | 1.3 (0.6, 1.5) | 1.3 (0.6, 2.2) | **1.2 (0.6, 1.5)** | **1.7 (1.1, 2.7)** | 1.4 (0.4, 3.1) | 1.2 (0.6, 2.0) |
| Alcohol, s/d | 0.3 (0.1, 1.0) | 0.4 (0.1, 1.0) | **0.5 (0.1, 1.1)** | **0.2 (0, 0.9)** | 0.1 (0, 0.6) | 0.4 (0.1, 1.1) |
| Broccoli, s/d | 1.0 (0.5, 3.0) | 1.0 (1.0, 3.0) | 1.0 (1.0, 3.0) | 1.0 (0.5, 3.0) | 1.0 (0.5, 3.0) | 1.0 (1.0, 3.0) |
| Cooked, s/d | 90.0 (77.5, 100.0) | 92.5 (70.0, 100.0) | 90.0 (60.0, 100.0) | 97.5 (90.0, 100.0) | 100.0 (90.0, 100.0) | 90.0 (70.0, 100.0) |
| Uncooked, s/d | 10.0 (0.0, 22.5) | 7.5 (0.0, 30.0) | 10.0 (0.0, 40.0) | 2.5 (0.0, 10.0) | 0.0 (0.0, 10.0) | 10.0 (0.0, 30.0) |
| **Mutagens** |  |  |  |  |  |  |
| Phip, ng/g | 60.1 (12.1, 135.8) | 58.2 (5.2, 127.3) | 62.6 (4.1, 134.7) | 58.9 (13.1, 121.8) | 59.2 (5.2, 301.7) | 59.1 (11.6, 126.8) |
| Meiqx, ng/g | 8.9 (4.3, 35.9) | 9.0 (2.6, 26.1) | 9.0 (1.3, 28.5) | 9.0 (5.7, 27.5) | **33.4 (7.3, 125.1)** | **8.5 (2.6, 24.2)** |
| Dimeiqx, ng/g | 0.9 (0.2, 3.3) | 0.8 (0, 2.4) | 0.9 (0, 2.2) | 0.8 (0.3, 3.0) | 1.5 (0.4, 8.4) | 0.9 (0.2, 2.1) |
| Actual total mutagenicity, ng/g | 2360.7 (910.2, 7161.3) | 2878.1 (583.4, 5113.5) | 2520.2 (424.3, 5446.1) | 2580.9 (686.9, 5578.1) | 4339.0 (689.6, 15938.5) | 2496.4 (631.2, 5113.5) |
| Predicted total mutagenicity, ng/g | 1997.8 (894.5, 5269.7) | 2274.3 (648.7, 4690.8) | 2010.3 (491.5, 4651.2) | 2248.1 (976.7, 5327.5) | **4665.2 (988.1, 17360.2)** | **1830.2 (763.1, 4554.7)** |
| B[a]p, ng/g | 17.8 (0.4, 45.6) | 16.6 (0.4, 45.2) | 26.2 (0.2, 55.1) | 12.7 (0.4, 32.5) | 22.5 (0.1, 97.5) | 17.2 (0.4, 43.4) |
| **Supplement Use** |  |  |  |  |  |  |
| Multivitamin use, yes, % | 40.5 | 39.4 | 39.7 | 40.0 | 35.7 | 40.5 |
| Single supplement use, yes, % | **68.6** | **86.4** | 77.3 | 85.7 | 78.6 | 80.5 |
| **Physical Activity** |  |  |  |  |  |  |
| Total, MET-hr/week | 30.1 (11.7, 68.7) | 22.0 (7.1, 49.5) | 32.0 (7.5, 75.8) | 21.9 (10.0, 40.0) | **7.7 (1.8, 39.5)** | **29.2 (9.2, 56.2)** |
| Moderate-Vigorous Aerobic, MET-hr/week | **29.0 (11.6, 68.5)** | **18.1 (2.1, 48.0)** | 24.1 (3.7, 63.8) | 21.2 (6.2, 39.0) | 3.5 (0.1, 32.0) | 24.1 (7.5, 49.5) |
| Walking, hr/week | 2.5 (1.0, 5.0) | 2.5 (0.7, 5.0) | 2.5 (0.7, 5.0) | 2.5 (1.1, 5.0) | **0.7 (0.7, 2.5)** | **2.5 (1.0, 5.0)** |
| Strength Training, min/week | 1.3 (0, 63.3) | 0 (0, 60.0) | 0 (0, 73.8) | 0 (0, 22.0) | 0 (0, 120) | 0 (0, 60.0) |
| Meeting exercise recommendation, % | **85.0** | **66.7** | 71.2 | 77.8 | **42.9** | **77.9** |
| **Lifestyle score, %** | 25.0 | 23.2 | 20.6 | 30.6 | **0** | **27.4** |

\*Bolded results denotes p-values of <0.05 based on Mann-Whitney U Test or Kruskal-Wallis Test for continuous variables testing differences in the distribution of the data among the groups, and the Chi-Square test or Fisher’s Exact Test for categorical varible.