**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

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|  |  |
| **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 wayDoneness – rare, medium-rare, medium, medium-well, well-done, very well-done, don’t know, did not eatBeef steak:Serving size – small, medium, or large; medium=4 oz.Preparation (multi-select) – pan-fried, grilled/barbequed, oven-broiled, cooked another wayDoneness – rare, medium-rare, medium, medium-well, well-done, very well-done, don’t know, did not eatPork 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 wayDoneness – – just until done, well-done, very well done, don’t know, did not eatBacon:Serving size – small, medium, or large; medium=2 stripsPreparation (multi-select) – pan-fried, oven-broiled, cooked another wayDoneness – just until done, well-done or crisp, charred, don’t know, did not eatSausage:Serving size – small, medium, or large; medium=2 links or pattiesPreparation (multi-select) – pan-fried, grilled/barbequed, oven-broiled, cooked another wayDoneness – just until done, well-done or crisp, charred, don’t know, did not eatFried chicken:Serving size – small, medium, or large; medium= 2 small pieces/1 large piecePreparation (multi-select) – deep-fat fried or fast food, pan-fried, cooked another wayDoneness – just until done, well-done, very well-done, don’t know, did not eatChicken/turkey:Serving size – small, medium, or large; medium=2 small pieces or 1 large piecePreparation (multi-select) – baked/roasted, stewed, oven-broiled grilled/bbq, cooked another wayDoneness – just until done, well-done, very well-done, don’t know, did not eatGravy:Serving size – small, medium, or large; medium=2 tablespoonsPreparation (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.