Supplementary Table 1. Risk for total and cause-specific mortality in men by the quartiles of types of sugar (Hazard ratios (HRs) and 95% confidence intervals)

 Quartile 1 Quartile 2 Quartile 3 Quartile 4 P-trend

Total mortality

Glucose

Median, % of energy 0.9 1.4 1.9 2.9

No. of deaths 769 693 703 736

 Multivariate HR\* 　 1.0 　 1.03 (0.93, 1.15) 1.04 (0.92, 1.17) 1.23 (1.09, 1.39) 　0.005

Fructose

Median, % of energy 0.9 1.4 2.1 3.4

 No. of deaths 830 715 688 668

 Multivariate HR\* 1.0 1.04 (0.94, 1.16) 1.03 (0.92, 1.15) 1.25 (1.10, 1.41) 0.0002

Sucrose

Median, % of energy 1.5 2.4 3.3 4.9

No. of deaths 645 667 732 857

 Multivariate HR\* 1.0 1.01 (0.90, 1.13) 1.14 (1.01, 1.28) 1.26 (1.11, 1.43) <0.0001

Maltose

Median, % of energy 0.09 0.165 0.23 0.34

No. of deaths 666 698 695 842

 Multivariate HR\* 1.0 1.21 (1.08, 1.35) 1.18 (1.05, 1.32) 1.21 (1.09, 1.36) 0.008

Lactose

Median, % of energy 0.2 0.6 1.3 2.4

No. of deaths 674 612 702 913

 Multivariate HR\* 1.0 1.03 (0.92 1.16) 1.03 (0.92, 1.15) 1.09 (0.97, 1.22) 0.16

Added sugar

 Median, % of energy 1.3 2.5 4.0 6.9

No. of deaths 770 735 704 692

 Multivariate HR\* 1.0 1.03 (0.92, 1.14) 1.14 (1.02, 1.28) 1.22 (1.09, 1.37) 0.0002

Naturally occurring sugar†

Median, % of energy 2.4 3.7 4.9 7.1

No. of deaths 616 634 773 878

 Multivariate HR\* 1.0 0.99 (0.88, 1.11) 1.07 (0.95, 1.20) 1.16 (1.01, 1.33) 0.01

 Cancer mortality

 Glucose

No. of deaths 289 234 226 225

 Multivariate HR\* 1.0 0.88 (0.73, 1.05) 0.82 (0.68, 1.00) 0.92 (0.74, 1.15) 0.64

Fructose

No. of deaths 308 237 223 206

 Multivariate HR\* 1.0 0.87 (0.73, 1.05) 0.84 (0.70, 1.02) 0.94 (0.76, 1.16) 0.76

 Sucrose

No. of deaths 240 255 237 242

 Multivariate HR\* 1.0 1.03 (0.86, 1.24) 0.96 (0.79, 1.17) 0.95 (0.76, 1.19) 0.53

Maltose

No. of deaths 222 233 233 286

 Multivariate HR\* 1.0 1.20 (0.99, 1.45) 1.23 (1.01, 1.49) 1.36 (1.12, 1.65) 0.004

 Lactose

No. of deaths 250 185 247 292

 Multivariate HR\* 1.0 0.84 (0.69, 1.02) 1.00 (0.83, 1.20) 1.07 (0.88, 1.30) 0.15

Added sugar

No. of deaths 277 265 225 207

 Multivariate HR\* 1.0 1.03 (0.86, 1.22) 1.02 (0.84, 1.23) 1.02 (0.83, 1.25) 0.93

Naturally occurring sugar†

No. of deaths 227 210 270 267

 Multivariate HR\* 1.0 0.89 (0.74, 1.09) 1.05 (0.86, 1.28) 1.02 (0.81, 1.29) 0.59

Cardiovascular mortality

 Glucose

No. of deaths 196 192 176 211

 Multivariate HR\* 1.0 1.17 (0.95, 1.45) 1.06 (0.84, 1.33) 1.49 (1.17, 1.89) 0.01

 Fructose

No. of deaths 219 193 173 190

 Multivariate HR\* 1.0 1.08 (0.87, 1.33) 1.14 (0.92, 1.43) 1.31 (1.03, 1.67) 0.002

 Sucrose

No. of deaths 173 157 199 246

 Multivariate HR\* 1.0 0.90 (0.72, 1.13) 1.16 (0.92, 1.45) 1.35 (1.06, 1.72) 0.002

Maltose

No. of deaths 183 182 177 233

 Multivariate HR\* 1.0 1.14 (0.92-1.40) 1.07 (0.86, 1.33) 1.15 (0.93, 1.42) 0.32

Lactose

No. of deaths 175 167 181 252

 Multivariate HR\* 1.0 1.06 (0.86, 1.32) 1.00 (0.81, 1.25) 1.02 (0.82, 1.27) 0.97

Added sugar

No. of deaths 209 171 197 198

 Multivariate HR\* 1.0 0.89 (0.72, 1.10) 1.21 (0.98, 1.50) 1.37 (1.10, 1.71) 0.0002

 Naturally occurring sugar‡

 No. of deaths 169 171 182 253

 Multivariate HR\* 1.0 0.94 (0.75, 1.17) 0.84 (0.67, 1.07) 1.06 (0.82, 1.38) 0.45

 Non-cancer, non-cardiovascular mortality

 Glucose

No. of deaths 282 267 301 300

 Multivariate HR\* 1.0 1.12 (0.94, 1.34) 1.27 (1.06, 1.53) 1.41 (1.15, 1.71) 0.005

Fructose

No. of deaths 301 285 292 272

 Multivariate HR\* 1.0 1.18 (1.00, 1.40) 1.27 (1.06, 1.52) 1.46 (1.20, 1.77) 0.0002

 Sucrose

No. of deaths 230 255 296 369

 Multivariate HR\* 1.0 1.07 (0.89, 1.29) 1.31 (1.08, 1.58) 1.51 (1.24, 1.85) <0.0001

Maltose

No. of deaths 261 281 285 323

 Multivariate HR\* 1.0 1.24 (1.05, 1.48) 1.22 (1.02, 1.45) 1.15 (0.96, 1.37) 0.42

Lactose

No. of deaths 248 259 274 369

 Multivariate HR\* 1.0 1.20 (1.00, 1.43) 1.09 (0.91, 1.31) 1.16 (0.97, 1.40) 0.32

Added sugar

No. of deaths 283 298 282 287

 Multivariate HR\* 1.0 1.12 (0.95, 1.33) 1.22 (1.02, 1.45) 1.32 (1.10, 1.59) 0.003

Naturally occurring sugar†

No. of deaths 218 253 321 358

 Multivariate HR\* 1.0 1.13 (0.93, 1.36) 1.27 (1.05, 1.54) 1.40 (1.12, 1.74) 0.002

\*Adjusted for age, energy, height, BMI, physical activity, smoking status, alcoholic consumption, education, marrital status, histories of diabetes and hypertension, and intakes of fat, salt, dietary fiber, and coffee.

†Total sugars minus added sugars.

Supplementary Table 2. Risk for total and cause-specific mortality in women by the quartiles of types of sugar (Hazard ratios (HRs) and 95% confidence intervals)

 Quartile 1 Quartile 2 Quartile 3 Quartile 4 P-trend

Total mortality

Glucose

Median, % of energy 1.2 1.8 2.3 3.2

No. of deaths 668 597 536 637

 Multivariate HR\* 　 1.0 　 1.06 (0.94, 1.19) 0.99 (0.88, 1.13) 1.04 (0.92, 1.19) 　0.72

Fructose

Median, % of energy 1.2 1.8 2.4 3.5

 No. of deaths 704 597 569 568

 Multivariate HR\* 1.0 1.00 (0.90, 1.13) 1.01 (0.89, 1.14) 1.02 (0.90, 1.16) 0.72

Sucrose

Median, % of energy 2.4 3.6 4.6 6.3

No. of deaths 644 580 558 656

 Multivariate HR\* 1.0 0.99 (0.88, 1.12) 1.01 (0.89, 1.14) 1.12 (0.99, 1.27) 0.06

Maltose

Median, % of energy x.4 1.1 1.9 .33

No. of deaths 672 676 706 847

 Multivariate HR\* 1.0 0.97 (0.86, 1.08) 0.99 (0.88, 1.11) 0.97 (0.87, 1.09) 0.70

Lactose

Median, % of energy 0.4 1.1 1.9 3.1

No. of deaths 693 456 538 751

 Multivariate HR\* 1.0 0.84 (0.75 0.95) 0.85 (0.75, 0.96) 0.98 (0.87, 1.10) 0.84

Added sugar

 Median, % of energy 2.1 3.5 5.0 7.9

No. of deaths 770 735 704 692

 Multivariate HR\* 1.0 1.09 (0.98, 1.23) 1.09 (0.97, 1.23) 1.15 (1.03, 1.29) 0.02

Naturally occurring sugar†

Median, % of energy 3.5 5.1 6.5 8.8

No. of deaths 659 666 726 850

 Multivariate HR\* 1.0 0.92 (0.81, 1.04) 0.91 (0.80, 1.03) 0.94 (0.82, 1.09) 0.57

 Cancer mortality

 Glucose

No. of deaths 157 175 151 163

 Multivariate HR\* 1.0 1.19 (0.95, 1.49) 1.01 (0.79, 1.29) 0.93 (0.72, 1.21) 0.27

Fructose

No. of deaths 158 171 164 153

 Multivariate HR\* 1.0 1.19 (0.95, 1.48) 1.10 (0.87, 1.40) 0.97 (0.75, 1.26) 0.48

 Sucrose

No. of deaths 158 148 155 185

 Multivariate HR\* 1.0 0.98 (0.78, 1.23) 1.03 (0.81, 1.31) 1.16 (0.91, 1.48) 0.17

Maltose

No. of deaths x22 228 232 292

 Multivariate HR\* 1.0 0.94 (0.76, 1.18) 0.97 (0.77, 1.22) 1.04 (0.83, 1.30) 0.64

 Lactose

No. of deaths 179 1828 152 187

 Multivariate HR\* 1.0 0.82 (0.65, 1.04) 0.86 (0.69, 1.09) 1.00 (0.79, 1.26) 0.72

Added sugar

No. of deaths 180 160 136 170

 Multivariate HR\* 1.0 1.07 (0.86, 1.33) 0.93 (0.74, 1.17) 1.12 (0.90, 1.40) 0.41

Naturally occurring sugar†

No. of deaths 146 153 166 181

 Multivariate HR\* 1.0 1.01 (0.79, 1.28) 1.07 (0.84, 1.37) 1.00 (0.75, 1.32) 0.97

Cardiovascular mortality

 Glucose

No. of deaths 254 215 205 229

 Multivariate HR\* 1.0 1.03 (0.85, 1.24) 1.05 (0.86, 1.29) 1.06 (0.86, 1.31) 0.58

 Fructose

No. of deaths 275 222 204 202

 Multivariate HR\* 1.0 0.96 (0.80, 1.16) 0.97 (0.80, 1.19) 1.03 (0.84, 1.27) 0.70

 Sucrose

No. of deaths 254 210 207 232

 Multivariate HR\* 1.0 0.89 (0.73, 1.08) 0.96 (0.78, 1.17) 1.03 (0.84, 1.27) 0.53

Maltose

No. of deaths x86 172 185 232

 Multivariate HR\* 1.0 1.02 (0.85-1.22) 0.98 (0.81, 1.19) 0.90 (0.74, 1.09) 0.25

Lactose

No. of deaths 263 164 201 275

 Multivariate HR\* 1.0 0.86 (0.70, 1.05) 0.86 (0.70, 1.05) 0.92 (0.76, 1.12) 0.58

Added sugar

No. of deaths 209 171 197 198

 Multivariate HR\* 1.0 1.01 (0.84, 1.22) 1.12 (0.93, 1.36) 1.05 (0.87, 1.27) 0.52

 Naturally occurring sugar‡

 No. of deaths 293 193 205 212

 Multivariate HR\* 1.0 0.92 (0.75, 1.11) 0.87 (0.70, 1.07) 0.86 (0.68, 1.09) 0.22

 Non-cancer, non-cardiovascular mortality

 Glucose

No. of deaths 257 206 180 245

 Multivariate HR\* 1.0 1.00 (0.83, 1.22) 0.92 (0.74, 1.14) 1.10 (0.89, 1.35) 0.36

Fructose

No. of deaths 271 203 201 213

 Multivariate HR\* 1.0 0.93 (0.77, 1.12) 0.97 (0.80, 1.19) 1.06 (0.86, 1.31) 0.43

 Sucrose

No. of deaths 232 222 195 239

 Multivariate HR\* 1.0 1.11 (0.92, 1.35) 1.03 (0.84, 1.27) 1.17 (0.95, 1.44) 0.21

Maltose

No. of deaths xx4 275 288 323

 Multivariate HR\* 1.0 0.94 (0.78, 1.13) 1.02 (0.84, 1.23) 1.01 (0.84, 1.22) 0.78

Lactose

No. of deaths 251 164 185 288

 Multivariate HR\* 1.0 0.84 (0.69, 1.03) 0.82 (0.67, 1.01) 1.01 (0.83, 1.22) 0.64

Added sugar

No. of deaths 260 202 195 231

 Multivariate HR\* 1.0 1.22 (1.01, 1.47) 1.18 (0.97, 1.43) 1.28 (1.06, 1.54) 0.02

Naturally occurring sugar†

No. of deaths 232 204 190 262

 Multivariate HR\* 1.0 0.84 (0.69, 1.03) 0.82 (0.66, 1.02) 0.97 (0.77, 1.22) 0.95

\*Adjusted for age, energy, height, BMI, physical activity, smoking status, alcoholic consumption, education, marrital status, histories of diabetes and hypertension, menopausal status and intakeof fat, salt, dietary fiber, and coffee.

†Total sugars minus added sugars.