# **Supplementary Appendix A:** Constructing sugar density estimates

In order to measure the added sugar intake changes coinciding with the introduction of the Health Promotion Levy (HPL) in South Africa, one needs to measure not only changes in the volumes of the sugar-sweetened beverages (SSBs) consumed but also changes in the sugar density of SSBs. Nutrient densities used in the South African context are typically drawn from the South Africa Food Composition Tables (SAFCT). These however are static, and wouldn’t capture changes in sugar density that might have arisen from the beverage reformulation that the HPL was designed to incentivise. To address this deficiency, we draw on data from external sources in order to construct a dynamic measure of sugar density.

In particular, we use data from a forthcoming study (Stacey et al.) that combines detailed household expenditure data with product-level nutrient contents. The Kantar Wordpanel is a panel of households for whom purchases of fast-moving consumer goods are measured on an ongoing basis and are recorded at the barcode- or UPC-level. These purchase data were matched at the UPC-level to hand-collected data on the nutritional content of packaged foods, including SSBs, on an annual basis. For time period $t$, we construct an average sugar density across all SSB purchases (in grams of sugar per 100ml) as follows:

$$\begin{array}{c}Average Sugar Density\_{t} = \frac{\sum\_{h}^{}\sum\_{b}^{}\left(Volume\_{hbt}.SugarDensity\_{bt}\right)}{\sum\_{h}^{}\sum\_{b}^{}Volume\_{hbt}}\#\left(1\right)\end{array}$$

where: $Volume\_{hbt}$ is the volume of beverage $b$ purchased by household $h$ in period $t$; and $SugarDensity\_{bt}$ is the sugar density of beverage $b$ in period $t$. These values are presented in the table below and are depicted in Figure 1 of the main paper. We scale the SAFCT sugar density value down by the relative change in sugar density.

|  |  |  |  |
| --- | --- | --- | --- |
| Year | Average sugar density(g/100mL) | Absolute change from 2017(g/100mL) | Relative change from 2017(%) |
| 2017 | 9,903975 | 0 | 0,00% |
| 2018 | 8,75027 | 1,153705 | 11,65% |
| 2019 | 7,841866 | 2,062109 | 20,82% |

**Supplementary Appendix B:** Longitudinal changes in sugar-sweetened beverage and added sugar intakes and BMI for all study participants (n=417)

|  |  |
| --- | --- |
| **Baseline** |  |
| Sex |  |
| Male | 49 |
| Female | 51 |
| Age | 27 (15; 47) |
| Adolescents | 35 |
| Young adults | 31 |
| Middle-aged adults | 34 |
| SSBs (times/week) | 4 (1; 7) |
| SSBs (ml/d) |  179 (36; 500) |
| Sugar from SSBs (g/d) | 18 (4; 50) |
| Table sugar (g/d) | 23 (11; 42) |
| Fruit juice (ml/d) | 0 (0; 71) |
| Energy from added sugar (kJ/d) | 1035 (612; 1753) |
| % TE from added sugar | 11 (7; 15) |
| BMI (kg/m2) | 23.4 (20.0; 29.3) |
| **12 months** |  |
| SSBs (times/week) | 3 (1; 6) |
| SSBs (ml/d) | 141 (47; 250) |
| Sugar from SSBs (g/d) | 12 (4; 22) |
| Table sugar (g/d) | 25 (10; 46) |
| Fruit juice (ml/d) | 0 (0; 43) |
| Energy from added sugar (kJ/d) | 1089 (675; 1740) |
| % TE from added sugar | 11 (7; 14) |
| BMI (kg/m2) | 24.3 (20.1; 30.3) |
| ***Changes from baseline*** |  |
| SSBs (times/week) | 0 (-4; 2) |
| SSBs (ml/d) | -54 (-310; 107) |
| Sugar from SSBs (g/d) | -7 (-32; 9) |
| Table sugar (g/d) | 1 (-15; 20) |
| Energy from added sugar (kJ/d) | 14 (-525; 502) |
| % TE from added sugar | -0.3 (-4.7; 4.0) |
| BMI (kg/m2) | 0.4 (-2.5; 3.1) |
| **24 months** |  |
| SSBs (times/week) | 3 (1; 7) |
| SSBs (ml/d) | 143 (54; 286) |
| Sugar from SSBs (g/d) | 11 (4; 22) |
| Table sugar (g/d) | 20 (10; 41) |
| Fruit juice (ml/d) | 0 (0; 54) |
| Energy from added sugar (kJ/d) | 1012 (610; 1482) |
| % TE from added sugar | 10 (7; 14) |
| BMI (kg/m2) | 24.6 (20.3; 30.6) |
| ***Changes from 12 months*** |  |
| SSBs (times/week) | 0 (-2; 3) |
| SSBs (ml/d) | 0 (-96; 107) |
| Sugar from SSBs (g/d) | -1 (-10; 8) |
| Table sugar (g/d) | 0 (-17; 9) |
| Energy from added sugar (kJ/d) | -90 (-543; 322) |
| % TE from added sugar | -0.2 (-4.0; 3.7) |
| BMI (kg/m2) | 0.2 (-0.5; 1.1) |
| ***Changes from baseline*** |  |
| SSBs (times/week) | 0 (-4; 3) |
| SSBs (ml/d) | -36 (-301; 119) |
| Sugar from SSBs (g/d) | -6 (-32; 8) |
| Table sugar (g/d) | -2 (-18; 14) |
| Energy from added sugar (kJ/d) | -84 (-600; 399) |
| % TE from added sugar | -0.3 (-4.9; 3.7) |
| BMI (kg/m2) | 0.8 (-2.5; 3.6) |

Data presented as median (interquartile range) (continuous variables) or % (categorical variables). Abbreviations: BMI, body mass index (kg/m2); SSB, sugar-sweetened beverage; TE, total energy intake (kJ/d) Sugar per SSB defined as: 9.90 g/100 ml (2017); 8.75 g/100 ml (2018); 7.84 g/100 ml (2019)