Public Health Nutrition: 23(16), 2864–2869 doi:10.1017/S1368980020001147

Short Communication

Trends in sugar-sweetened beverage consumption among California children†

Amy L Beck[1,*], Suzanna Martinez[2], Anisha I Patel[3] and Alicia Fernandez[4]
[1]Department of Pediatrics, University of California San Francisco, San Francisco, CA 94158, USA: [2]Department of Epidemiology and Biostatistics, University of California San Francisco, San Francisco, CA, USA: [3]Department of Pediatrics, Stanford University School of Medicine, Atherton CA, USA: [4]Department of Medicine, University of California San Francisco, San Francisco, CA, USA

Submitted 26 December 2019: Final revision received 19 March 2020: Accepted 25 March 2020: First published online 29 June 2020

Abstract

Objective: To assess trends in consumption of soda, sweetened fruit drinks/sports drinks and any sugar-sweetened beverage (SSB) from 2013 to 2016 among all children in California aged 2–5 and 6–11 years and by racial-ethnic group.
Design: Serial cross-sectional study using the *California Health Interview Survey (CHIS)*.
Setting: CHIS is a telephone survey of households in California designed to assess population-level estimates of key health behaviours. Previous research using *CHIS* documented a decrease in SSB consumption among children in California from 2003 to 2009 coinciding with state-level policy efforts targeting child SSB consumption.
Participants: Parents of children in California aged 2–11 years (*n* 4901 in 2013–2014; *n* 3606 in 2015–2016) were surveyed about the child's consumption of soda and sweetened fruit drinks/sports drinks on the day prior.
Results: Among 2–5-year-olds, consumption of soda, sweetened fruit drinks/sports drinks and any SSB remained stable. Sweetened fruit drink/sports drink consumption was higher than soda consumption in this age group. Latino 2–5- year-olds were more likely to consume any SSB in both 2013–2014 and 2015–2016 compared with Whites. Among 6–11-year-olds, consumption of soda, sweetened fruit drinks/sports drinks and any SSB also remained stable over time. Latino and African-American 6–11-year-olds were more likely to consume an SSB in 2013–2014 compared with White children.
Conclusions: SSB consumption among children in California was unchanged from 2013 to 2016 and racial-ethnic disparities were evident. Increased policy efforts are needed to further reduce SSB consumption, particularly among children of Latino and African-American backgrounds.

Keywords
Sugar-sweetened beverages
Children
Health disparities

Sugar-sweetened beverages (SSB) contribute to a myriad of health conditions including dental caries[1,2], obesity[3-5], type 2 diabetes[6], fatty liver disease[7], hypertension[8], heart disease[9], cancer[10] and death[11]. The impact of SSB on health is evident both in adults and among children[2,3,5,8,9]. Excess sugar consumption is a global concern as are efforts to reduce SSB intake through policy-level interventions[12-14]. The WHO recommends that no more than 5 % of total energy intake comes from added sugars[12]. Both the American Academy of Pediatrics and the European Academy of Paediatrics recommend that children avoid SSB and endorse policies that restrict children's access to SSB and promote water consumption[13,14]. Previous studies have demonstrated racial-ethnic disparities in the consumption of SSB among US children[15-20]. These disparities likely contribute to higher rates of diseases among

†This article was originally published with some incorrect and incomplete referencing. This has since been updated in the online PDF and HTML versions and a correction notice has been published.

**Corresponding author:* Email Amy.Beck@ucsf.edu

racial-ethnic minorities in the USA including type 2 diabetes[21] and fatty liver disease[22]. Understanding disparities in SSB consumption and tracking trends in consumption among different racial-ethnic groups is critical for the design and evaluation of policies to reduce SSB consumption.

California is home to one-eighth of the US child population, and nearly three-quarters of those children are racial-ethnic minorities, with 52 % identifying as Latino[23]. Previous research using data from the California Health Interview Survey (CHIS), a telephone survey of California households, documented a downward trend in SSB consumption from 2003 to 2009 among California children aged 2–11 years, but also found persistently higher consumption among Latino children[17]. The decrease in SSB consumption coincided with statewide policies implemented in that time period, most notably passage of legislation to ban SSB sales in schools in 2003 and 2005[17]. Nonetheless, ongoing tracking and assessment of trends in child SSB consumption, with attention to racial-ethnic disparities, are important. From 2003 to 2012, CHIS determined child SSB consumption via a single question about consumption of soda, sweetened fruit drinks and sports drinks. Beginning in 2013, CHIS modified its approach to assessing child SSB consumption and began to ask parents two questions, one on soda and one on sweetened fruit drinks/sports drinks. In this report, we assess trends in consumption of soda, sweetened fruit drinks/sports drinks and any SSB among children in California aged 2–5 and 6–11 years from 2013 to 2016.

Methods

Data source

We analysed data on soda and sweetened fruit drink/sports drink intake from the 2013–2014 and 2015–2016 CHIS surveys. CHIS is a telephone survey of households in California and is the largest statewide health survey in the USA. The survey is designed to yield population-level estimates of surveyed health behaviours as well as estimates for major racial-ethnic groups. CHIS uses a dual frame, multi-stage sample design that includes both landlines and cell phones[24]. There are separate surveys for children (0–11 years), adolescents (12–17 years) and adults (18 years or older). For children under age 12, an adult who is knowledgeable about the child's health responds to the questions. Households are selected via a random digit dialing approach within pre-defined geographic strata. In households with multiple children under the age of 12 years, one child is randomly selected. CHIS was conducted every other year from 2001 to 2010. Since 2011, the survey has been conducted continuously over 2-year cycles. Public use data files are available for each year of the survey beginning in 2011. However, it is recommended to pool data from each 2-year cycle (i.e. 2013–2014, 2015–2016) to achieve statistically stable estimates for children's outcomes.

Measure of outcome variables

To assess children's soda intake parents were asked 'Yesterday, how many glasses or cans of soda that contain sugar, such as Coke, did your child drink? Do not include diet soda'. To assess children's sweetened fruit drink/sports drink intake parents were asked 'Yesterday, how many glasses or cans of sweetened fruit drinks, sports, or energy drinks, did your child drink?' To assess race-ethnicity, parents were first asked if their child is Latino or Hispanic. They were subsequently asked which of the following categories best described their child: Native Hawaiian, Other Pacific Islander, American Indian, Alaska Native, Asian, Black, African American or White. Based on parental responses, children are classified as Latino/Hispanic (*Latino*), non-Hispanic White (*White*), non-Hispanic Asian (*Asian*), non-Hispanic African-American (*African-American*), non-Hispanic mixed ethnicity or other ethnicity.

Analysis

We used the survey function in Stata software (version 12) and the replicate weights provided by CHIS to obtain statewide estimates for each variable of interest. For our analysis, we dichotomised consumption of soda and sweetened fruit drinks/sports drinks on the day prior to the interview into any and none. We chose to dichotomise the primary outcome to facilitate comparisons to prior research[17], and because the majority of children had not consumed an SSB on the day prior, rendering mean intake less meaningful. We also created a variable of any SSB consumption that was coded as positive if the child consumed any soda and/or any sweetened fruit drink/sports drink. We conducted separate analyses for children aged 2–5 years and children aged 6–11 years. For each age group, we determined the prevalence of consuming any soda, any sweetened fruit drinks/sports drink and any SSB among children in California in 2013–2014 and 2015–2016. We then determined consumption of any soda, any sweetened fruit drink/sports drink and any SSB among 2–5 and 6–11-year-olds in the four largest racial-ethnic groups: *Latino*, *White*, *Asian* and *African-American*. We used logistic regression to assess for differences in consumption among racial-ethnic groups and across survey years (2013–2014 *v.* 2015–2016).

Results

The 2013–2014 survey sample included 4901 children aged 2–11 years. In 2013–2014, 42 % of children were Latino, 38 % were White, 9 % were Asian, 3 % were African-American and 7 % were of another race/ethnicity or mixed race/ethnicity. The 2015–2016 survey sample included

Public Health Nutrition

Table 1 Proportion of children in California aged 2–5 years who consumed any soda, any sweetened fruit drink/sports drink and any sugar-sweetened beverage (soda or sweetened fruit drink/sports drink) in the previous 24 h in 2013–2014 and 2015–2016 by major racial-ethnic category*

	2013–2014		2015–2016	
	Proportion	95 % CI	Proportion	95 % CI
Consumed any soda				
All	0·10	0·06, 0·14	0·08	0·05, 0·13
White	0·06	0·03, 0·11	0·02	0·00, 0·07
Latino	0·11	0·07, 0·18	0·12†	0·07, 0·18
Asian	0·11	0·03, 0·37	0·10	0·02, 0·38
African-American	0·13	0·02, 0·49	0·03	0·00, 0·69
Consumed any sweetened fruit drink/sports drink				
All	0·14	0·11, 0·17	0·16	0·12, 0·21
White	0·07	0·04, 0·11	0·11	0·06, 0·20
Latino	0·17†	0·13, 0·22	0·15	0·11, 0·21
Asian	0·09	0·04, 0·23	0·20	0·06, 0·5
African-American	0·18	0·04, 0·52	0·26	0·09, 0·56
Consumed any sugar-sweetened beverage				
All	0·23	0·19, 0·28	0·22	0·18, 0·28
White	0·12	0·08, 0·18	0·12	0·07, 0·21
Latino	0·27†	0·21, 0·34	0·25†	0·19, 0·31
Asian	0·21	0·09, 0·41	0·25	0·08, 0·56
African-American	0·31	0·11, 0·62	0·29	0·09, 0·64

*Data from the California Health Interview Survey. All differences in consumption across years were non-significant. 2013–2014: Total *n* 1668, white *n* 631, Latino *n* 723, Asian *n* 141, African-American *n* 39. 2015–2016: Total *n* 1481, white *n* 475, Latino *n* 722, Asian *n* 96, African-American *n* 75.
†Consumption significantly higher than reference group (Whites) with $P < 0·05$.

3606 children. In 2015–2016, 47 % were Latino, 35 % were White, 8 % were Asian, 5 % were African-American and 5 % were of another race/ethnicity or mixed race/ethnicity. Consumption of any SSB was reported for 23 % of 2–5-year-olds in 2013–2014 and 22 % in 2015–2016 (Table 1). Latino 2–5-year-olds were more likely to consume sweetened fruit drinks/sports drinks relative to White children in 2013–2014 and were more likely to consume soda in 2015–2016. In both 2013–2014 and 2015–2016, Latino 2–5-year-olds were more likely to consume any SSB. There were no statistically significant differences in consumption for 2–5-year-olds from Asian or African American race/ethnicity relative to Whites. Comparing 2013–2014 to 2015–2016, there were no statistically significant differences in consumption of soda, sweetened fruit drinks/sports drinks or any SSB for 2–5- year-olds overall or for 2–5- year-olds in any of the four major racial-ethnic categories.

Among 6–11- year-olds, 37 % consumed an SSB in 2013–2014 and 35 % consumed an SSB in 2015–2016 (Table 2). Among Latino 6–11- year-olds, soda consumption was higher than Whites in 2013–2014 and 2015–2016 and any SSB consumption was higher in 2013–2014. Among African-American 6–11- year-olds, soda consumption, any sweetened fruit drink/sports drink consumption and any SSB consumption were higher than Whites in 2013–2014. For 6–11-years-olds, there were no statistically significant differences in consumption for Asians relative to Whites. Differences in consumption of soda, sweetened fruit drinks/sports drinks or any SSB across years (2013–2014 to 2015–2016) were not statistically significant for 6–11- year old children overall or for any of the four major racial-ethnic categories.

Discussion

We found no significant change in SSB consumption among children in California from 2013–2014 to 2015–2016. Child SSB consumption in 2013–2016 appears higher than in 2009 when 16 % of 2–5-year-olds and 33 % of 6–11-year-olds reported any SSB consumption[17]. However, this apparent increase may be due to changing from a single question on SSB consumption in 2003 to 2009 to separate questions about soda and sweetened fruit drinks/sports drinks in the 2013–2016 surveys. Regardless, there has certainly been no further decrease in SSB consumption among children in California relative to the last decade, suggesting that the impact of existing state-wide policies have reached their floor and additional measures are needed. Existing policies include legislation to ban sales of SSB in schools passed in 2003 and 2005, as well as a bill passed in 2010 that bans the provision of SSB to children in licensed childcare facilities in California[25]. In 2019, several additional measures to discourage SSB consumption were introduced in the California legislature including a sugary beverage tax, product placement restrictions and health warning labels[26]. Ultimately, none of these measures passed[26].

In addition to no overall decrease in SSB consumption, we found concerning racial-ethnic disparities. Our analysis is consistent with our previous study examining SSB intake in children in California from 2003 to 2009, which found

Table 2 Proportion of children in California aged 6–11 years who consumed any soda, any sweetened fruit drink/sports drink and any sugar-sweetened beverage (soda or sweetened fruit drink/sports drink) in the previous 24 h in 2013–2014 and 2015–2016 by major racial-ethnic category*

	2013–2014		2015–2016	
	Proportion	95 % CI	Proportion	95 % CI
Consumed any soda				
All	0·19	0·17, 0·22	0·15	0·12, 0·19
White	0·14	0·11, 0·18	0·09	0·06, 0·15
Latino	0·20†	0·17, 0·25	0·19†	0·15, 0·25
Asian	0·20	0·10, 0·36	0·13	0·05, 0·28
African-American	0·36†	0·22, 0·54	0·15	0·05, 0·35
Consumed any sweetened fruit drink/sports drink				
All	0·22	0·19, 0·25	0·25	0·21, 0·30
White	0·17	0·13, 0·21	0·22	0·14, 0·33
Latino	0·23	0·18, 0·28	0·28	0·21, 0·35
Asian	0·21	0·12, 0·35	0·21	0·10, 0·40
African-American	0·37†	0·23, 0·53	0·32	0·14, 0·58
Consumed any sugar-sweetened beverage				
All	0·37	0·33, 0·40	0·35	0·31, 0·40
White	0·29	0·24, 0·34	0·29	0·20, 0·40
Latino	0·39†	0·33, 0·44	0·40	0·33, 0·48
Asian	0·37	0·25, 0·50	0·30	0·18, 0·46
African-American	0·59†	0·43, 0·73	0·40	0·19, 0·66

*Data from the California Health Interview Survey (CHIS). All differences in consumption across years were non-significant. 2013–2014: Total *n* 3233, white *n* 1244, Latino *n* 1349, Asian *n* 302, African-American *n* 111. 2015–2016: Total *n* 2125, white *n* 796, Latino *n* 988, Asian, *n* 174, African-American *n* 97.
†Consumption significantly higher than reference group (Whites) with $P < 0·05$.

elevated consumption of SSB among Latino children relative to White children[17]. Studies conducted in Massachusetts, Oregon and New York City have also found higher consumption of SSB among both Latino and African American preschoolers relative to White children[16,20,27].

Racial-ethnic differences in SSB intake may be related to socioeconomic status. Lower income has been associated with higher SSB intake in prior studies[28], and Latino and African American children in California are more likely than White children to live in poverty[29]. Other factors that may contribute to racial-ethnic disparities in child SSB consumption include increased marketing of SSB to minorities[30], lower awareness of the health effects of SSB[31] and mistrust of local water supplies[32–34]. Qualitative studies with low-income Latino parents provide insights about beliefs and cultural factors that contribute to child intake of SSB. Key findings include that low-income Latino parents typically recognise the negative health effects of soda, but often have misconceptions about other SSB, believing, for example, that beverages labelled as 'all natural' are healthy despite added sugar[33,34]. Among Latino immigrant families, high SSB consumption may reflect SSB consumption patterns in countries of origin; Mexico, the most common country of origin of California Latino immigrants[35], has one of the highest rate of SSB consumption in the world[36].

There are a number of limitations to our study including the fact that SSB intake was determined via parental report and only asked about the day prior to the survey, which may not represent a child's typical intake. In addition, the survey does not provide data on whether beverages were consumed at home, in school, or in another setting, information which is important for determining how to best intervene to reduce child SSB intake. Strengths of our study include the population-level design and the ability to demonstrate trends in intake over time.

Notwithstanding the limitations noted above, our study has important implications. It suggests that the reduction in SSB intake among California children seen from 2003 to 2009 has plateaued and that additional policy measures are needed to address child SSB consumption. Specific policy measures that have been recently endorsed by the American Academy of Pediatrics include increasing the price of sugary beverages through excise taxes, decreasing sugary drink marketing to children and ensuring access to credible nutrition information[13]. Sugary beverage taxes have been implemented at the local level in several US cities, including four cities in California. Evaluations of sugary beverage taxes in Berkeley (California)[37,38], Philadelphia[39], Seattle[40] and Cook County, Illinois[41] have all demonstrated reductions in SSB intake to various degrees. Latin American countries have instituted multiple strategies to reduce SSB consumption[42]. A suite of efforts to reduce added sugar intake was recently implemented in Chile including front of package warning labels, restrictions on marketing to children and a ban on sales of beverages and foods exceeding a specific threshold of sugar in schools[43]. A recent evaluation of this policy package found significant reductions in purchases of SSB[43]. SSB consumption in Mexico also declined following introduction of a beverage tax[44]. Finally, given that parental knowledge[45,46] and attitudes[47] about SSB are associated with child beverage intake, statewide educational campaigns directed at

Public Health Nutrition

parents are another important avenue to reduce SSB consumption among children in California. Such efforts should be attentive to disparities and ensure that materials and campaigns are culturally and linguistically appropriate to diverse groups of parents.

Acknowledgements

Acknowledgments: None. *Financial support:* This study was supported by the Eunice Kennedy Shriver National Institute of Child Health and Human Development (1K23HD080876-01A1) and the National Heart Lung and Blood Institute (1K01HL129087-01A1). Neither NICHD nor NHLBI had any role in the design, analysis or writing of this paper. *Conflicts of interest:* None. *Authorship:* Dr A.L.B. came up with the research question, conducted the analysis and drafted the manuscript. Dr S.M. contributed to the analysis and critically reviewed the manuscript. Dr A.I.P. contributed to the analysis and critically reviewed the manuscript. Dr A.F. contributed to the manuscript and critically reviewed the manuscript. *Ethics of human subject participation:* This study was collected using publicly available data files from the California Health Interview Survey.

References

1. Warren JJ, Weber-Gasparoni K, Marshall TA *et al.* (2009) A longitudinal study of dental caries risk among very young low SES children. *Community Dent Oral Epidemiol* **37**, 116–122.
2. Evans EW, Hayes C, Palmer CA *et al.* (2013) Dietary intake and severe early childhood caries in low-income, young children. *J Acad Nutr Diet* **113**, 1057–1061.
3. DeBoer MD, Scharf RJ & Demmer RT (2013) Sugar-sweetened beverages and weight gain in 2- to 5-year-old children. *Pediatrics* **132**, 413–420.
4. Beck AL, Tschann J, Butte NF *et al.* (2014) Association of beverage consumption with obesity in Mexican American children. *Public Health Nutr* **17**, 338–344.
5. Cantoral A, Tellez-Rojo MM, Ettinger AS *et al.* (2016) Early introduction and cumulative consumption of sugar-sweetened beverages during the pre-school period and risk of obesity at 8–14 years of age. *Pediatr Obes* **11**, 68–74.
6. Malik VS, Popkin BM, Bray GA *et al.* (2010) Sugar-sweetened beverages and risk of metabolic syndrome and type 2 diabetes: a meta-analysis. *Diabetes Care* **33**, 2477–2483.
7. Nseir W, Nassar F & Assy N (2010) Soft drinks consumption and nonalcoholic fatty liver disease. *World J Gastroenterol* **16**, 2579–2588.
8. Nguyen S, Choi HK, Lustig RH *et al.* (2009) Sugar-sweetened beverages, serum uric acid, and blood pressure in adolescents. *J Pediatr* **154**, 807–813.
9. Malik VS (2017) Sugar sweetened beverages and cardiometabolic health. *Curr Opin Cardiol* **32**, 572–579.
10. Chazelas E, Srour B, Desmetz E *et al.* (2019) Sugary drink consumption and risk of cancer: results from NutriNet-sante prospective cohort. *BMJ* **366**, l2408.
11. Collin LJ, Judd S, Safford M *et al.* (2019) Association of sugary beverage consumption with mortality risk in US adults: a secondary analysis of data from the REGARDS study. *JAMA Netw Open* **2**, e193121.
12. World Health Organization (2015) *Guideline: Sugars Intake for Adults and Children*. Geneva: WHO.
13. Muth ND, Dietz WH, Magge SN *et al.* (2019) Public policies to reduce sugary drink consumption in children and adolescents. *Pediatrics* **143**. doi: 10.1542/peds.2019-0282.
14. Deren K, Weghuber D, Caroli M *et al.* (2019) Consumption of sugar-sweetened beverages in paediatric age: a position paper of the European Academy of Paediatrics and the European Childhood Obesity Group. *Ann Nutr Metab* **74**, 296–302.
15. Taveras EM, Gillman MW, Kleinman K *et al.* (2010) Racial/ethnic differences in early-life risk factors for childhood obesity. *Pediatrics* **125**, 686–695.
16. Garnett BR, Rosenberg KD & Morris DS (2013) Consumption of soda and other sugar-sweetened beverages by 2-year-olds: findings from a population-based survey. *Public Health Nutr* **16**, 1760–1767.
17. Beck AL, Patel A & Madsen K (2013) Trends in sugar-sweetened beverage and 100% fruit juice consumption among California children. *Acad Pediatr* **13**, 364–370.
18. Bleich SN, Vercammen KA, Koma JW *et al.* (2018) Trends in beverage consumption among children and adults, 2003–2014. *Obesity* **26**, 432–441.
19. Lundeen EA, Park S, Pan L *et al.* (2018) Daily intake of sugar-sweetened beverages among US adults in 9 states, by state and sociodemographic and behavioral characteristics, 2016. *Prev Chronic Dis* **15**, E154.
20. Elfassy T, Adjoian T & Lent M (2019) Sugary drink consumption among NYC children, youth, and adults: disparities persist over time, 2007–2015. *J Community Health* **44**, 297–306.
21. Dabelea D, Mayer-Davis EJ, Saydah S *et al.* (2014) Prevalence of type 1 and type 2 diabetes among children and adolescents from 2001 to 2009. *JAMA* **311**, 1778–1786.
22. Botero P, Hoy EM, Jimenez MC *et al.* (2018) Predictors of non-alcoholic liver disease in ethnically diverse overweight children and adolescents. *Curr Pediatr Rev* **14**, 130–135.
23. Kids data: data and resources about the health of children (2020). www.kidsdata.org (accessed May 2020).
24. California Health Interview Survey: Design and methods. https://healthpolicy.ucla.edu/chis/design/Pages/overview.aspx. Updated 2019 (accessed August 2019).
25. AB 2084 (2010) AB 2084 – Child Day Care Facilities: Nutrition. California Legislature.
26. Mcgreevy P (2019) How 'Big Soda' used its clout to stop 5 of 5 California laws to regulate sugary drinks. *Los Angeles Times*, 7 March 2019.
27. Taveras EM, Gillman MW, Kleinman K *et al.* (2010) Racial/ethnic differences in early-life risk factors for childhood obesity. *Pediatrics* **125**, 686–695.
28. Han E & Powell LM (2013) Consumption patterns of sugar-sweetened beverages in the United States. *J Acad Nutr Diet* **113**, 43–53.
29. Public Policy Institute of California (2019) Child Poverty in California. https://www.ppic.org/publication/child-poverty-in-california/ (accessed May 2020).
30. Harris J, Shehan C, Gross R *et al.* (2015) Food advertising targeted to Hispanic and Black youth: Contributing to Health Disparities. Report by the Rudd Center for Food Policy and Obesity, the African American Collaborative Obesity Research Network and Salud America! http://www.uconnruddcenter.org/files/Pdfs/272-7%20%20Rudd_Targeted%20Marketing%20Report_Release_081115%5B1%5D.pdf (accessed March 2020).
31. Bogart LM, Cowgill BO, Sharma AJ *et al.* (2013) Parental and home environmental facilitators of sugar-sweetened beverage consumption among overweight and obese Latino youth. *Acad Pediatr* **13**, 348–355.
32. Park S, Ayala GX, Sharkey JR *et al.* (2019) Knowledge of health conditions associated with sugar-sweetened beverage intake is low among US Hispanic adults. *Am J Health Promot* **33**, 39–47.

33. Scherzer T, Barker JC, Pollick H *et al.* (2010) Water consumption beliefs and practices in a rural Latino community: implications for fluoridation. *J Public Health Dent* **70**, 337–343.
34. Beck AL, Takayama JI, Halpern-Felsher B *et al.* (2014) Understanding how Latino parents choose beverages to serve to infants and toddlers. *Matern Child Health J* **18**, 1308–1315.
35. Johnson H & Sanchez S (2019) Just the Facts. Immigrants in California. Public Policy Institute of California. https://www.ppic.org/wp-content/uploads/jtf-immigrants-in-california.pdf (accessed May 2020).
36. World Atlas: "Countries with the highest levels of soft drink consumption." 25 April 2017. https://www.worldatlas.com/articles/countries-with-the-highest-levels-of-soft-drink-consumption.html. Updated 2017 (accessed May 2020).
37. Falbe J, Thompson HR, Becker CM *et al.* (2016) Impact of the Berkeley excise tax on sugar-sweetened beverage consumption. *Am J Public Health* **106**, 1865–1871.
38. Lee MM, Falbe J, Schillinger D *et al.* (2019) Sugar-sweetened beverage consumption 3 years after the Berkeley, California, sugar-sweetened beverage tax. *Am J Public Health* **109**, 637–639.
39. Cawley J, Frisvold D, Hill A *et al.* (2019) The impact of the Philadelphia beverage tax on purchases and consumption by adults and children. *J Health Econ* **67**, 102225.
40. Powell LM & Leider J (2020) The impact of Seattle's sweetened beverage tax on beverage prices and volume sold. *Econ Hum Biol* **37**, 100856.
41. Powell LM, Leider J & Leger PT (2020) The impact of a sweetened beverage tax on beverage volume sold in Cook County, Illinois, and its border area. *Ann Intern Med* **172**, 390–397.
42. Bergallo P, Castagnari V, Fernandez A *et al.* (2018) Regulatory initiatives to reduce sugar-sweetened beverages (SSBs) in Latin America. *PLoS One* **13**, e0205694.
43. Taillie LS, Reyes M, Colchero MA *et al.* (2020) An evaluation of Chile's law of food labeling and advertising on sugar-sweetened beverage purchases from 2015 to 2017: a before-and-after study. *PLoS Med* **17**, e1003015.
44. Colchero MA, Guerrero-Lopez CM, Molina M *et al.* (2016) Beverages sales in Mexico before and after implementation of a sugar sweetened beverage tax. *PLoS One* **11**, e0163463.
45. Goodell LS, Pierce MB, Amico KR *et al.* (2012) Parental information, motivation, and behavioral skills correlate with child sweetened beverage consumption. *J Nutr Educ Behav* **44**, 240–245.
46. SanGiovanni C, Fallar R, Green R *et al.* (2018) Parental knowledge of AAP juice guidelines is associated with parent and children's consumption of juice and sugar-sweetened beverages in an underserved population. *Clin Pediatr* **57**, 205–211.
47. Woo Baidal JA, Morel K, Nichols K *et al.* (2018) Sugar-sweetened beverage attitudes and consumption during the first 1000 days of life. *Am J Public Health* **108**, 1659–1665.

Public Health Nutrition