Community Dental Health (2019) **36,** 157–162

doi:10.1922/CDH_SpecialIssueKearns06

Transnational corporations and oral health: examples from the sugar industry

Cristin E. Kearns, DDS, MBA[1] and Richard G. Watt[2]

[1]*University of California San Francisco;* [2]*University College London*

This paper seeks to describe the political behavior of transnational corporations (TNCs) related to sugars and dental caries. The paper begins by exploring dental caries as a political issue. It then provides a brief overview of key actors (expanders--e.g. public health advocates working to make policy action on sugar likely, and containers--e.g. TNC's working to prevent policy action on sugar) and the importance of problem definition in public policy making. The paper then compares how expanders and containers frame the problem of sugars and dental caries. Based upon a policy analysis framework, categories used to frame problems include incidence, causality, severity, crisis, characteristics of the problem population, values, and solutions. These categories are discussed with application to debates about public policy solutions to the problem of dental caries. It then concludes by highlighting some tensions that remain in tackling dental caries through legislation and regulation.

Key words: *Sugars, dental caries, food industry, public policy*

Introduction: The World Health Organization and the Problem of Dental Caries

Dental caries is a contested critical health issue that has been on the World Health Organization's (WHO) formal agenda for nearly 40 years. The WHO acts as an authority on international health within the United Nations' system by providing leadership, shaping research agendas, setting norms and standards, articulating ethical and evidence-based policy options, providing technical support, and monitoring health situations (WHO, 2019). Over the last four decades, five expert committees commissioned by the WHO and Food and Agriculture Organization (FAO) have evaluated the role of sugars in dental caries and come to differing conclusions about whether sugar restrictions are necessary to reduce population caries rates. In 1979, a WHO committee acknowledged the cariogenicity of sugars, particularly when consumed in solid/sticky form between meals, but made no specific recommendations on sugar restrictions (WHO *et al.*, 1980). A 1997 WHO/FAO committee, now known to have been influenced by the food and beverage industry (Robinson, 2004), found no evidence of direct involvement of sugars in the aetiology of dental caries, and recommended that prevention programmes should focus on fluoridation and adequate oral hygiene (FAO/WHO, 1998). In 1990 (WHO Study Group on Diet Nutition and Prevention of Noncommunicable Diseases, 1990) and 2003 (Joint WHO/FAO Expert Consultation on Diet Nutrition and the Prevention of Chronic Disease, 2003), WHO/FAO committees recommended that average per capita consumption of free sugars should be limited to less than 10% of total energy based on the dental caries evidence. Partly due to vehement opposition from the food and beverage industry, the 1990 and 2003 committee recommendations were never officially endorsed as WHO policy (Norum, 2005; Sheiham and James, 2015).

In 2014, a fifth WHO expert committee advanced a quantitative limit on free sugars for the third time in the WHO's history (WHO, 2015). Again, based largely on the dental caries evidence, the committee made a strong recommendation that adults and children limit their intake of free sugars to less than 10% of total energy intake. An additional conditional recommendation suggested a further reduction to below 5%. This time, the WHO officially endorsed the committee's recommendation and published *Guideline: Sugars intake for adults and children* in 2015 (WHO, 2015). The new guideline provides a benchmark for developed countries to reduce the availability of free sugars, and for developing countries to maintain low levels of intake. The food and beverage industry, however, continues to sponsor reviews critical of policies on sugar restrictions, claiming that "guidelines on dietary sugar do not meet criteria for trustworthy recommendations and are based on low-quality evidence" (Erickson *et al.*, 2016). These criticisms have the potential to act as a barrier to guideline adoption by casting doubt on the guideline's validity (Schillinger and Kearns, 2016).

Transnational pharmaceutical, tobacco, alcohol, and food and beverage companies (TNCs) have a history of contesting health issues on the WHO's agenda when their economic interests are threatened (Stuckler *et al.*, 2016). Over the last decade, the public health community has begun characterizing corporate practices that play a substantial role in shaping health and health behavior as commercial determinants of health (Freudenberg and Galea, 2008). Lobbying to influence public health policy and legislation has been identified as one of four channels used by TNCs to negatively influence health, together with marketing, corporate social responsibility strategies, and extensive supply chains (Kickbusch *et al.*, 2016).

Correspondence to: Cristin E. Kearns, 3333 California St, Ste 265, Box #0936, San Francisco, CA 94143. Email: cristin.kearns@ucsf.edu

In this paper, we seek to shed light on TNC's influence on dental caries policy at the WHO through the lens of the public policy literature. We argue that dental caries prevention must be understood not just as a health issue, but as a contested political issue influenced by powerful vested interests.

Problem definition and public health policy

Social problems, like dental caries, become political when they can potentially be addressed by public policies, and when they are characterized by conflict (Knill and Tosun, 2012). Conflicts arise over who or what is responsible for a social problem, and based on the answer, what resolution should be attempted (Rochefort and Cobb, 1994). In policy analysis, the process of characterizing problems is known as "problem definition" (Rochefort and Cobb, 1994). Opposing sides can gain advantage through problem definition using a distinctive form of public rhetoric comprised of a habitual vocabulary (Cobb and Coughlin, 1998). One set of actors, the *expanders*, seek to frame the issue in a way that makes policy action likely, while another set, the *containers*, do the opposite.

Rochefort and Cobb identified recurrent categories of problem definition claims (Rochefort and Cobb, 1994), which were later modified by Cobb and Coughlin (1998). Table 1 summarizes Cobb and Coughlin's modified problem definition categories, noting the differences in how expanders and containers define problems.

Expanders and containers in dental health policy

Expanders in debates about dental caries at the WHO and FAO include members of the dental community who have advocated that caries cannot be resolved without national sugar restrictions (Sheiham and James, 2015). They seek to expand solutions beyond community water fluoridation, fluoridated toothpaste, improved oral hygiene, and increased access to dental services. Containers include the World Sugar Research Organisation (WSRO) and the International Life Sciences Institute (ILSI), both industry-funded groups with economic interests in sugar, trying to contain solutions to the dental caries problem to non-dietary interventions (ILSI, 2014; WSRO, 2014).

WSRO was originally founded in 1943 in New York as the Sugar Research Foundation (SRF), which became the International Sugar Research Foundation (ISRF) in 1968, then WSRO in 1978 (Kearns *et al.*, 2015). WSRO is based in London and its 36 members are primarily cane and beet sugar companies and their trade associations in 30 countries, plus the Coca-Cola Company (WSRO, 2012). WRSO's services to its members include developing a database on scientific literature on sugar, nutrition and health, commissioning academic scientific reviews and position papers defining key nutrition and health areas, and providing WSRO's position to major international agencies such as the FAO and WHO (WSRO, 2011a). WSRO has an International Non-Governmental Organisation liaison status with the FAO and has represented its members at FAO meetings. WSRO also provides its position on sugar, nutrition, and health issues to ILSI, which it considers a collaborator on "world-level" issues (WSRO, 2011a).

Table 1. Categories which determine how a policy problem can be framed by expanders and containers (Cobb and Coughlin, 1998)

Problem Definition Category	*Category Description*	*Expander Position*	*Container Position*
Incidence (Prevalence)	How many people are affected by the problem?	Demonstrates that large numbers of individuals are harmed	Provides contrary statistical evidence
Causality	What caused the problem?	Allocates blame to factors and/or actors that have caused the problem	Denies that a problem exists or that the problem is minor and can be solved by the private sector without government intervention
Severity	Intrusive impact on the lives of individuals. Is it getting worse?	Claims the problem causes misery for those affected and the problem is worsening with time	Claims the problem does not seriously impinge on most people and the problem is not getting worse
Crisis	Urgency of problem	Labels the problem as a crisis	Denies that a crisis exists
Problem Population	Characteristics of the problem population	Describes the problem population as helpless, vulnerable, deserving to be helped	Claims the problem population is not utilizing existing resources or taking action to improve their lives
Appeal to Fundamental Values		Links position to values that produce a strong emotional attachment	Links position to values that produce a strong emotional attachment
Solutions		Claims the policy solution is affordable, adaptable, and acceptable	Claims the solution costs too much, is impractical for government to accomplish, public will oppose or be indifferent

ILSI is an industry-funded organization founded in 1978 in Washington DC by the Heinz Foundation, Coca-Cola, Pepsi-Cola, General Foods, Kraft and Procter and Gamble (Boseley, 2003). ILSI has become a global organization, now affiliated with 16 independently incorporated regional or country-specific branches in Argentina, Brasil, Europe, China, India, Japan, Korea, Mesoamerica, Mexico, Middle East, North America, North Andean (Ecuador, Venezuela, and Colombia), South Africa, South Andean (Chile, Bolivia, and Peru), Southeast Asian Region and Taiwan (ILSI Research Foundation, 2017). ILSI members are companies from the food, agricultural, chemical, pharmaceutical and supporting industries (ILSI, 2018) whose tactics have been to position experts at conferences and FAO/WHO food policy committees, and to publish monographs, journals, and technical briefs (Boseley, 2003). ILSI has had non-governmental status with the WHO from 1987 (WHO, 2017) through at least 2013 (WHO, 2013) and it maintains specialized consultative status with the FAO (FAO, 2014).

WSRO recognised that sugar damages teeth and that the dental community favored restricting sugar to resolve caries as early as 1950 (Kearns *et al.*, 2015). To protect the sugar industry in the 1960s and 1970s, SRF/ISRF sponsored a research programme and cultivated relationships with dental leaders at the National Institute of Dental Research to promote non-dietary solutions to dental caries (Kearns *et al.*, 2015). An investigative report conducted by the British Broadcasting Corporation's Panorama programme revealed that the WSRO and ILSI donated US$60,000 and nominated experts to take part in a 1998 WHO/FAO expert consultation on carbohydrates that found no evidence of a direct involvement of sugars in the aetiology of dental caries (Robinson, 2004). According to *The Guardian*, a British newspaper, other committee members felt pressured "not to say anything bad about sugar" and felt the final report made it appear "you could eat sugar with impunity" (Boseley, 2004). Both WSRO and ILSI used the 1998 report to criticize the 2003 report that included quantitative sugar restrictions, which ultimately failed to be adopted by the WHO/FAO (Boseley, 2004).

Dental caries problem definition claims made by expanders and containers

In this section we compare the expander position with the container position by contrasting Sheiham's 2001 and 2003 commentaries (Sheiham, 2001; Sheiham and James, 2015) and the WHO 2015 sugars guideline (WHO, 2015) with ILSI's 2009 Monograph: *Oral and Dental Health* (van Loveren, 2009), WSRO's 2011 position statement on dental caries (WSRO, 2011a), and both organizations' 2014 public comments on the WHO draft sugars guideline (ILSI, 2014; WSRO, 2014).

Incidence/Prevalence

On the question of how many people are affected by dental caries, containers argue that the extent of the problem is decreasing. ILSI and WSRO point to dental caries prevalence rates in 12-year olds in European countries (calculated as the DMFT index which measures lifetime experience of dental caries in permanent dentition). ILSI notes in its 2009 monograph that:

"In the 1970s and early 1980s, caries prevalence was high with up to eight teeth of the dentitions of the 12-year-olds affected. At the turn of the 21st century in Western European countries, only one tooth on average was affected by caries in this age group" (van Loveren, 2009).

Citing the prevalence of caries free 12-year-olds in Germany (Micheelis and Schiffner, 2006), ILSI further states that Western European population had "a high proportion of children having a dentition free from caries" (van Loveren, 2009). WSRO cites statistics from UK National Children's Dental Health Surveys in 2003 (Office of National Statistics, 2003) and 2009 (Fuller *et al.*, 2011) showing "that the average DMFT in children at the standard assessment age of 12 has fallen (from 4.8 in the pre-fluoride toothpaste era) to 0.7," and that approximately 70% of adults under the age of 35 were caries free, respectively (WSRO, 2014). WSRO characterizes this data as evidence of "enormous improvements" in caries rates of both adults and children (WSRO, 2014).

Expanders acknowledge that "great improvements in prevention and treatment of dental diseases have occurred in the past decades," but emphasize that "problems still persist" (WHO, 2015). Expanders argue that caries is not just a disease of childhood and frame the problem of dental caries from a "life course" perspective (Sheiham and James, 2015). Dental caries epidemiology that considers biological, social, behavioral, and environmental factors acting upon the dentition throughout life shows that new caries occurs at a relatively constant rate across the lifespan (Broadbent *et al.*, 2008; 2013). Utilizing group-based trajectory analysis, these data suggest that caries preventive measures are necessary at all stages of the life, meaning that a 12-year-old that is caries free may not stay that way. Expanders characterize the problem of dental caries as "cumulative, tracking from childhood to adulthood" (WHO, 2015) and argue "that the conquest of caries has been greatly exaggerated" (Sheiham and James, 2015).

Causality

Containers argue that sugar intake cannot be solely blamed for dental caries because caries is a multi-factorial infectious disease. WSRO's 2011 position statement asserts that:

"The presence of bacteria and fermentable carbohydrates are not the sole factors which can affect dental caries. Other factors include the innate susceptibility of tooth surfaces, frequency of eating, intrinsic properties of the foodstuff affecting food clearance, oral hygiene practices, fluoride availability, genetic factors, and salivary flow and composition" (WSRO, 2011b).

In contrast, expanders have re-framed dental caries as a diet-mediated non-communicable chronic disease, and free sugars as the necessary dietary cause of caries (Sheiham and James, 2015; WHO, 2015). Sheiham and James argue that framing dental caries as a multi-factorial infectious disease "muddies our understanding and misdirects policy" away from national sugar restrictions (Sheiham and James, 2015).

Containers claim that the amount of sugar available in the food supply has no relationship to caries prevalence in 12-year-olds. ILSI argues that in European populations with declining caries, the population sugar supply remained stable (van Loveren, 2009). Therefore, according to ILSI, "One of the most important factors for the lower prevalence of caries in children and adolescents is the increased awareness of dental health and of regular oral hygiene measures with daily use of fluoride toothpaste" (van Loveren, 2009). Both ILSI and WSRO cite a 1994 ecological study, funded by WSRO member, The Sugar Bureau, (Woodward and Walker, 1994) examining the data on dental caries amongst 12-year-old children and sugar consumption of the total population for 90 countries as further evidence that factors other than sugar consumption, such as other aspects of the diet, exposure to fluoride, and genetic effects, must be taken into account when seeking to explain variations in caries prevalence, and when making recommendations for caries control (van Loveren, 2009; WSRO, 2011b). WSRO also cites a similar 1999 study, also funded by The Sugar Bureau (Ruxton *et al.*, 1999), to corroborate the first study (WSRO, 2014). Expanders note statistical shortcomings in both studies, and question their conclusions (Sheiham, 2001). More recently, expanders point to a WHO-commissioned systematic review (Moynihan and Kelly, 2014), described by Sheiham and James as the "most comprehensive systematic review ever conducted on sugars and dental caries using rigorous methods," as unequivocal evidence of a large effect size for the impact of sugars intake on dental caries (Sheiham and James, 2015). In retort, both WSRO and ILSI criticized the systematic review for identifying no randomized controlled interventions studies, relying too heavily on observational and epidemiological studies, misinterpreting evidence by failing to focus on the correct variables – frequency of consumption of fermentable sugars and starches, for confusing the weaker protective effect of fluoride in water supplies with the much more effective application of fluoride in toothpaste, and for basing the recommendation to further limit free sugars intake to less than 5% total energy intake on very low quality evidence (ILSI, 2014; WSRO, 2014). WSRO also notes that committee reviews at the European Food Safety Authority in 2010 and the U.S. Institute of Medicine in 2002 found insufficient evidence to set an upper limit for total or added sugar. Finally, WSRO cites the Vipeholm study, a classic caries study at Sweden's Vipeholm hospital for the mentally handicapped carried out between 1946 – 1951 (Krasse, 2001), to support their argument that "the amount of sugars has no material effect on caries risk, whereas frequency has a strong effect" (WSRO, 2014).

Severity

Expanders argue that dental diseases affect individuals by causing pain, anxiety, functional limitation (including poor school attendance and performance in children) and social handicap through tooth loss (WHO, 2015). To convey the impact of dental caries on the lives of individuals, expanders point to recent calculations of disability adjusted life-years (DALYs) quantifying the global burden of dental caries (Kassebaum *et al.*, 2015; Marcenes *et al.*, 2013; Sheiham and James, 2015). The DALY metric is a population health summary measure calculated as the sum of Years of Life Lost due to premature mortality in the population and the Years Lost due to Disability for people living with a health condition and its consequences. It provides a single standardized measure by which to compare the effects of all fatal and non-fatal diseases, injuries, and risk factors on population health. DALYs due to untreated caries increased between 1990 and 2010, mainly due to population growth and aging (Marcenes *et al.*, 2013). Out of 291 diseases and injuries evaluated, untreated caries in permanent teeth was the most prevalent condition globally, with a prevalence of 35% for all ages combined (Marcenes *et al.*, 2013). Containers indirectly address the severity of dental caries by minimizing the extent of the problem.

Crisis

Expanders magnify the importance of dental caries by tying it to the cost crisis in health care (Sheiham, 2001; Sheiham and James, 2015). The 2015 WHO Sugars guideline notes that the high cost of dental caries treatment consumes 5-10% of health-care budgets in high-income countries and would exceed the entire health care budget for children in most lower income countries (WHO, 2015).

Containers shift the focus of the cost crisis argument to the need to ensure that only evidence-based solutions are implemented. In its 2014 comments on the WHO sugars guideline, ILSI states:

"Given that national governments worldwide are stretched to meet the health care needs of their populations, it seems important to provide guidance in which there is considerable confidence to avoid wasting valuable resources on implementing actions that will not result in effective outcomes" (ILSI, 2014).

Characteristics of the Problem Population

Containers, in addition to claiming that the size of the dental caries problem is decreasing, also argue that caries is limited to a small portion of the population (van Loveren, 2009). Therefore, reducing sugars intakes for the whole population would only benefit a minority with high caries prevalence. ILSI's 2009 monograph argues that "the importance of making fluoride toothpaste available to all, irrespective of the socio-economic status, and motivating people to use it daily are key factors in further reducing the prevalence of caries globally" (van Loveren, 2009). Expanders emphasize that a caries-free dentition is not a good predictor of zero caries incidence thereafter, and that most of the caries increases occur in the majority (Sheiham, 2001).

Crucial values

Expanders appeal to quality of life ideals, through assessments of the burden on dental caries, and the right to affordable health care through assessments of the high cost of dental treatment. Containers claim that singling out free sugars from other potentially cariogenic carbohydrates is discriminatory. They emphasize individualism, arguing that solutions to dental caries should focus on personal and behavioral factors influencing the development of dental caries (van Loveren, 2009).

Solutions

Containers claim that the adoption of policies to encourage a low sugars diet for dental caries prevention would be expensive, ineffective, and even damaging to the public because sugar would likely be replaced with unhealthy fats (WSRO, 2011b, 2014). Instead, WSRO's 2011 position statement argues that "Efforts to prevent dental caries should focus on achieving adequate oral hygiene practices with fluoride toothpaste as this has proven to provide a much greater reduction in caries experience," and that "Dietary advice for the reduction of dental caries risk should focus on limiting frequency of exposure to all fermentable carbohydrates" (WSRO, 2011b).

Expanders argue that dental caries will not be resolved without drastic national reductions in sugars intakes (Sheiham and James, 2015). They point to evidence that dental caries still progresses in populations exposed to fluoride, that there are no known adverse effects of reducing sugar consumption, and that implementing sugar restrictions are likely to be associated with long-term costs saving in health care in countries (WHO, 2015).

Resolving the Problem of Sugar and Dental Caries in 2019 and Beyond

Part of the explanation for the inertia of the WHO to endorse national sugar restrictions as a solution to dental caries can be seen in the strategic actions of WSRO and ILSI who have sought to contain the issue over the last 40 years. Through a variety of tactics from debating statistics, sponsoring conflicting studies, influencing committees, and tying their position to crucial societal values, the containers have worked to delay corrective action in terms of sugar intake. An analysis of the 2015 WHO sugars guideline process found that the final guideline was not influenced by the sugar industry (Stuckler *et al.*, 2016). However, as countries decide whether to adopt and translate the WHO sugars guideline into policy and practice, it is a likely possibility that containers will continue to advance the arguments described here to prevent adoption. Both WSRO and ILSI are globally networked organizations funded by TNCs with significant financial resources with a history of influence that is only beginning to be understood (Greenhalgh, 2019a, 2019b; Maani Hessari *et al.*, 2019). To improve dental health, public health advocates must become more skilled at recognizing and understanding problem definition claims about sugar and dental caries made by powerful vested interests and be prepared to counter them. Additionally, conflicts of interest in dental research and oral health policy should be further scrutinized and policies and procedures developed to ensure that corporate interests do not supersede public health goals.

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