

Project Title: Food marketing targeted to kids: a collaborative and policy-oriented study in Argentina, Bolivia, Guatemala and Peru.

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Synthesis: The concept “foodscape” (Brembeck & Johansson) depicts the different environments where food can be found, to which children are exposed to. Food and beverage marketing is considered one of the factors that promote unhealthy eating environments, and in many cases is oriented to children and adolescents. In this collaborative research project, we aim to examine different sources of food marketing influence on children, to increase the knowledge about food marketing and provide evidence to promote policy changes to reduce child obesity. Five aims have been developed in Guatemala. **Aim 1, to assess the representation of gender in food and beverage advertising in bodegas around public schools;** for this aim we developed an instrument to assess gender in printed media. We evaluated 200 ads from Guatemala and Peru, the most common advertisement found (51%) was for sweetened sugar beverages (SSB). In Guatemala 36% of the ads had a male as a main character, whereas only 14% of the ads from Peru. In Guatemala 22% of main characters were male animated characters. Most celebrities that appeared in the ads were male (9 of 13 ads). Visual orientation of the ads was male in 27% of the ads in Guatemala and 17% in Peru. For **Aim 2 of the project, To determine the strategies used by the food and beverage industry to place point-of-sale advertising and other marketing strategies in bodegas around public schools,** we conducted, 30 in-depth interviews in Guatemala City (15) and Chisec (15). According to our findings, store proprietors and UPFs distributors develop a companionship relationship where they negotiate promotions, information, product placement, stocking and POS advertisement. The food and beverage industry have established a successful relationship with proprietors to guarantee UPF availability and advertising in corner stores in urban and rural Guatemala. Considering that proprietors in Guatemala are unlikely to promote and support the availability and advertising of healthy foods, healthcare policymakers and should take into account this relationship when designing, planning and implementing UPF regulations in Guatemala and elsewhere. To further explore the concept of foodscape we *compared the Food Retail Environment Index between three neighborhoods of different socioeconomic status in Guatemala (Aim 3).* We identified 280 corner stores in the City and 204 in Chisec. Corner store density was higher in the middle- urban and low-SES rural areas; fast food restaurant density was higher in the high-SES urban area. Using the RFEI cutoff 3.79, all surveyed neighborhoods were classified as food swamps. The highest RFEI were found in the middle-SES urban and low-SES rural areas. For **Aim 4, to determine the relationship between the food and beverage industry and schools in Guatemala City,** we conducted 20 interviews with school principals exploring the following themes: products from the industry the school sells, management of the store, knowledge on laws for feeding students and history of the relationship between school and industry. The results found can be interpreted through the concept of school commercialization that Molnar & García used to describe the phenomenon of the food and beverage industry using the schools as a point-of-sale and marketing enclave. The concept can also be applied to the phenomena found in Guatemala because the industries try to colonize a space that is meant to educate students in order to influence their dietary habits.

Due to the pandemic COVID-19 and its possible contribution to the unhealthy food environment we sought to **design and validate a methodology for monitoring and evaluating the internet marketing of multinational fast food chains in response to the COVID-19 pandemic (Aim 5).** Two phases of this aim have been developed, first a random sample of posts were analyzed qualitatively to examine COVID-19 related content. In the second stage, a quantitative content analysis tool will be developed based on the existing literature and on the qualitative results obtained during the first stage, in order to analyze the entire sample of posts extracted from the Facebook pages of the selected brands. The new tool will be validated with data in the four countries and the overall research process will be reported for future use.

Outputs:

- For Aim 1, Lucila Rozas from Peru and Sophia Mus, wrote a manuscript which will be submitted to the Journal of Critical Public Health. This process has been guided by Peter Busse and Joaquin Barnoya.
- Aim 2 of the project, Aiken Chew wrote a manuscript alongside Dr. Barnoya, Dr. Peter Roloff and Sophia Mus. This manuscript was submitted to the Journal of Environmental Nutrition and Hunger.
- For aim 3 of the project, a manuscript was successfully submitted to the CDC Preventing Chronic Disease Journal that has a section called GIS Snapshots. This article was published and is available at: https://www.cdc.gov/Pcd/issues/2020/20_0029.htm

Outcomes:

- Project management and administration has been a continuous learning experience for Sophia Mus, under the guidance of Joaquin Barnoya. Through this project, Sophia Mus also learned to guide and coordinate teams through the various objectives of the project. Working with more experienced colleagues, has broaden SM's network. Sophia also strengthen her writing skills through the preparation of IDRC's reports and through the process of manuscript writing and development. A process guided by Joaquin Barnoya and Peter Busse. Additionally, Sophia reinforced her qualitative skills through Aim 1 and 5 of the project.
- Aiken Chew improved his interview abilities through aim's 2 and 4 of the project. Aiken also had the opportunity of increasing his qualitative skills by improving his coding abilities and learning to use Deedoose Software. Aiken Chew, improved his writing skills and learned how to submit manuscripts in peered reviewed journals, while expanding his network with more experienced collaborators (Joaquin Barnoya, Alyssa Moran and Peter Roholoff). Lucia Sierra, a recent anthropology graduate, improved her interviewing and transcription skills. Through this process she also learned the basics of coding and using Deedoose Software.

Research Problem:

Childhood obesity has alarmingly increased during the last few years representing one of the most common NCD risk factors, and one of the growing problems in the global public health agenda (Sánchez, et. el, 2010) . The increased prevalence has been documented in Latin America.

In Guatemala, the increasing presence of food marketing is notoriously designed to influence children's consumption habits and increase demand. One powerful marketing technique that often receives less attention than others (e.g., television) is point-of-sale (POS). In Guatemala, an IDRC funded study found that marketing on snack food packages is a key strategy to target children by influencing taste and preferences (Letona, Chacon, Roberto, & Barnoya, 2014). This study also found that child-oriented snacks are available in all stores inside and around schools, and the most common types were savory snacks, pastries, cookies, and sugarsweetened beverages (Chacon, Letona, & Barnoya, 2013). Marketing on snack food packages is a key strategy to target children inside and around schools (Chacon, Letona, Villamor, & Barnoya, 2015). Cartoon and spokes characters, raffles, premium offers, and health claims appearing on packaging are all used to attract children's attention, influence preferences, and improve taste (Chacon et al., 2013; Letona et al., 2014). Despite the evidence, child-oriented food advertising has not yet been regulated in Guatemala. Furthermore, little is known about other components, like the different impact points of POS might have depending on gender in LMICs like Guatemala. In this regard, young females have been found to be more vulnerable to food advertising on television compared to men (Anschutz, Engels, van der Zwaluw, & Van Strien, 2011). In addition, to the best of our knowledge there is no evidence on how bodegas owners are persuaded by the food and beverage industry to place POS advertising on their premises.

The conceptual framework guiding our project is rooted in the concept "foodscape" (Brembeck & Johansson, 2010). Brembeck and Johansson (2010) propose that a "foodscape is the sum of all the places where food and eating are actualised in one way or another: at home, in school, at restaurants and cafés, in shops, in advertising, on TV and the Internet etc." (p. 800). However, these foodscapes are sources of tension for children and adolescents, as they have to make sense of mixed signals sent by their environment. Thus, and following the theoretical framework (Story, Neumark-Sztainer, & French, 2002) that guided research by Banna and her colleagues (2016), we similarly understand these influences emerging from four levels: an individual level (e.g., individual attitudes), a social level (e.g., friends and family), a physical environmental level (e.g., the school setting) and a societal level (e.g., the media or countrywide regulation).

Given the different foodscapes that children encounter at each of the four levels, we will generate evidence to support policies. Our project objectives will respond to the policy needs of each country by attending to the different levels at which children and adolescents experience influence.

Objectives

General: to examine different sources of food marketing influence on children, to increase the knowledge about marketing of food products and provide evidence to promote policy changes to reduce child obesity.

Specific:

1. To assess the representation of gender in food and beverage advertising in bodegas around public schools
2. To determine the strategies used by the food and beverage industry to place point-of-sale advertising and other marketing strategies in bodegas around public schools
3. To compare the Food Retail Environment Index between three neighborhoods of different socioeconomic status in Guatemala

4. To determine the relationship between the food and beverage industry and schools in Guatemala City
5. To design and validate a methodology for monitoring and evaluating the internet marketing of multinational fast food chains in response to the COVID-19 pandemic.

Research Findings:

Obj 1. To assess the representation of gender in food and beverage advertising in bodegas around public schools, for this shared objective between Guatemala and Peru 100 advertising ads were analyzed by country to assess the representation of gender. The 200 ads were evaluated and analyzed by DUO, a marketing agency.

We first discussed what food products and beverages would be included in the evaluation of the advertisement. This discussion was based on two previous research projects that evaluated different aspects of child- oriented advertisement: "Analysis of advertising in the multimedia environment of children and adolescents in Peru" conducted by Peter Busse and "Child-oriented marketing techniques in snack food packages in Guatemala" conducted by Joaquín Barnoya. Both studies categorize food products and beverages, we selected 9 categories, and excluded meat, bread/pasta/rice, fruit and vegetables, sauces and pizza fast-food restaurants.

Guided by prior research (Chacon, Letona, and Barnoya 2013; Gallo, Barrett, and Lake 2014; Tester et al. 2011), four areas of 400m-radius around public and private schools were selected in Lima and Guatemala City. Research assistants visited each one and marked all corner stores on a map with the aid of mobile phones and a Global Positioning System (GPS) device. Based on food and beverage categories commonly advertised in corner stores (Busse 2018; Chacon et al. 2013), we trained research assistants to take individual pictures of each food and beverage print advertisement in the selected corner stores. A priori, we decided to collect photographs of 100 print ads in each city, which resulted in a total sample of 200 photographs of unique print ads.

For the analysis of gender representation in print ads, a marketing consultancy firm from Guatemala (DUO Marcas) was hired, due to their expertise in advertising and graphic design. In addition, our team in Guatemala has previous experience working with this firm (Chacon, Benson, and Barnoya 2018). This analysis was guided and revised by the researchers: First, the research team and DUO Publicidad discussed a preliminary version of the coding instrument—DUO Publicidad identified variables for the analysis based on their expertise around gender advertising. Additional variables were proposed by the research team considering previous studies on gender and tobacco advertising. (Bansal, John, and Ling 2005; Childs and Maher 2003; Matthes, Prieler, and Adam 2016; Toll and Ling 2005) The final instrument included 17 variables to assess the gender representation of food and beverage print advertisements (Table 1). Furthermore, two other general information variables (country of provenance and school segment) were included in the final quantitative database. Thus, a total of 19 variables were used to record information about the food and beverage print ads.

Table 1: Data collection Instrument for gender orientation in printed media	
Variable	Definition
Brand	Name or symbol on a product that shows that it was made by a particular company, and that it cannot be used by other companies without permission (ie, Cheerios, a brand of General Mills, Iphone, an Apple brand).
Product category	- Eggs and dairy - Cereal

	<ul style="list-style-type: none"> - Bread and pastry - Salty snacks - Instant-prepared food or frozen food - Candy - Sugar sweetened beverages - Water - Ice cream
General communication concept	Describe what kind of message the graphic piece seeks to transmit in general. For example: promote X product with people who play sports and seek to improve their health and physical appearance.
Color	Background color or more frequent color used on the ad. What does the color transmit in the context of the poster?
Product representation	Graphic representation of the product on the poster, analyze if the design of the package is gender oriented. If the shape of the container or label shows gender representation, for example the photograph of a man or a woman.
Environment/ activity featured	Environment or scenario represented on the poster: school, home, work, beach, gym etc. What the environment / scenario says in terms of gender For example: a. track with formula 1 cars (focused on adventurous men) b. catwalk with a fashion show (oriented to modern women) c. stage of an electronic music concert (aimed at social and energetic men and women)
Number and gender of the persons shown in the ad	Describe the number of persons shown in the ad and their gender
Health claim	A " health claim " by definition has two essential components: (1) a substance (whether a food, food component, or dietary ingredient) and (2) a disease or health-related condition, (for example, "adequate calcium throughout life may reduce the risk of osteoporosis"). It can also be represented as a health-related endorsement from a national or international professional health association (I.e., pediatric association of Guatemala). Nutrient content claims describe the level of a nutrient in the product, using terms such as free, high, and low, or they compare the level of a nutrient in a food to that of another food, using terms such as more, reduced, and lite. Structure/function claims may describe the role of a nutrient or dietary ingredient intended to affect the normal structure or function of the human body, for example, "calcium builds strong bones." In addition, they may characterize the means by which a nutrient or dietary ingredient acts to maintain such structure or function, for example, "fiber maintains bowel regularity," or "antioxidants maintain cell integrity." General well-being claims describe general well-being from consumption of a nutrient or dietary ingredient Evaluate if the health claim gender oriented.
Values/emotional appeal	Something (such as a principle or quality) intrinsically valuable or desirable. Ideas suggesting improvement/ approval: beauty, relaxation, women's liberation, scape, success, wealth, independence, self-confidence, freedom, adventure
Gender of main character	Gender of the character or person that is the center of attention
Role model/ public figure	Describe if there is a public figure or role model in the ad and evaluate if it is oriented to males, females or both.
Public to which it is visually directed	Gender to which the general design of the poster belongs in visual terms with a clarification of the reason for the gender
Focal point	Describe the area of greatest interest, where attention is focused. It can be a color, a shape, a typeface or any other element that stands out from the rest and is the center of greatest interest.
Typography	Define the typography style according to gender Example: it is a predominantly masculine typography, with thick strokes, it transmits strength and solidity.

Scales	Explain if there is a set of sizes across the different design elements and how it affects according to gender. Example: the male character is placed relatively larger than the woman to give it a greater prominence.
Shapes	Describe the type of shapes that predominate in design and relate them to gender. Example: the package shows wavy and soft shapes that in appearance represent feminine curves.
Contrast	Explain if there are clearly different design elements (big and small, light and dark) to create visual interest. Example: The female character looks brighter and more radiant compared to the male character who is not in a very bright position.

Findings:

Sugar sweetened beverages (SSB) was the category most commonly advertised overall (51%), showing a higher percentage in Guatemala (61%) than Peru (41%). Of the total number of SSB print ads, 25% were for energy drinks. In contrast, print ads for water were rare in the sample, with only 12% in Peru and 4% in Guatemala (see Table 2).

Table 2. Product category in the 200 evaluated ads from Guatemala and Perú n=200

	n	%
Sugar sweetened beverages	102	51
Candy	20	10
Dairy	19	9.5
Water	16	8
Salty Snacks	13	6.5
Ice cream	10	5
Bread and pastry	9	4.5
Instant prepared food	4	2
Cereals	3	1.5
Others	4	2

The analysis showed that 20% of the total sample of 200 ads (100 for each country) exhibited some gender orientation, which was assigned to at least one of the following variables: number and gender of the persons shown in the ad, gender of the main character, product representation and public to which the ad is visually oriented.

For the variable “number and gender of persons in the ad”, ads with no persons displayed (77% in Guatemala and 81% from Peru) were classified as neutral, whereas ads with female orientation (ads showing women predominantly) was 10% in both cities. Male targeted ads for this variable were more frequently found in Guatemala (13%) than Peru (9%) (Table 3).

Table 3. Gender representation results, comparison by country*

Variable	Neutral		Female		Male	
	Guatemala n=100	Perú n=100	Guatemala n=100	Perú n=100	Guatemala n=100	Perú n=100
Product representation	78	87	2	5	20	8
Number and gender of the persons shown in the ad	77	81	10	10	13	9
Gender of the main character	52	74	12	12	36	14
Public to which the ad is visually oriented	60	70	13	13	27	17

*Cell numbers indicate frequencies and percentages by country.

A total of 48% ads from Guatemala and 26% from Peru presented a main character that was either animated (i.e. a cartoon character) or a person. Therefore, the variable “gender of main character” was assessed for these ads. Results show that male orientation for this variable was also greater for Guatemala (36%) compared to Perú (14%), whereas female orientation was equal in both cities (Table 3).

The use of animated characters was found in over a quarter of the ads (28%) in Guatemala, most of which were male oriented (22 of 28 ads). Of these, 8 ads made use of spokes characters whose gender is already assigned. In the other cases (20 ads), male representation was assigned because the character displayed features considered to be male, such as clothing, activities (i.e. male dominated sports), physical characteristics and personality (strength, attitude). Peru depicted animated characters less frequently (9 of the 26 ads).

In Peru, the use of human characters was 17% and 20% in Guatemala. Male characters, usually athletes, appeared in energy drink ads, followed by other SSB (i.e. sodas), and were displayed most frequently in sports related activities. Female main characters were commonly shown displaying or consuming the featured product, usually SSB (i.e. sodas, powdered drinks) or other types of products (yogurt, milk, oatmeal, bottled tea) and in outdoors contexts. In Peru, only two ads displayed women doing sports and in the work place. Celebrities (famous actors or athletes) as main characters were found in nine ads in Guatemala (5 were male). In Peru, only four ads displayed celebrities as main characters, all of whom were males.

Graphic elements (e.g., character portrayal, typography, setting, color, scale) were used to assess the gender orientation of the variables “product representation” and “public to which the ad is visually oriented”. Regarding product representation, 20% in Guatemala and 8% in Peru were male oriented, whereas female oriented ads were 2% and 5% in each country respectively.

Visual orientation of the ads was male oriented in 27% of the ads in Guatemala and 17% for Peru, while female orientation was the same in each country (Table 3). In the male oriented ads, the character (human

or animated) was depicted both in a photograph in the ad and in the package of the product. In contrast to female oriented ads, male oriented ads were typically coupled with typographies, colors and design elements that supported the concept of male gender representation due to their associated characteristics to men (i.e. bold, rudeness, sharp). In female oriented ads, women were frequently shown holding or consuming the product.

Obj 2. To determine the strategies used by the food and beverage industry to deliver product and place point-of-sale (POS) advertising in corner stores, we conducted 30 interviews with store proprietors. The main finding is that proprietors and distributors develop a companionship where they negotiate promotions, information, product placement, stocking and POS advertisement. Some proprietors in Guatemala see unlikely to promote the consumption of healthy products, we believe that healthcare policymakers must design, plan and regulate food environments from UPF based on this relationship of proprietor and distributor.

Context and study design

This is an exploratory qualitative study of corner store proprietors in Guatemala, their relationships with food and beverage industry representatives or distributors, and the decisions around POS advertisements. Although there is no consensus definition of corner stores, Ayala (2017) defines them as “conveniently located to one’s home, school and/or workplace and with sufficient product varieties to complete a fill-in or quick, single meal shopping trip” (p.2). In Guatemala, these are typically small, single-owner establishments, often located as a store-front within the primary residence or shared space with another business (e.g., parking lot, repair shop). Linguistically, in Guatemalan Spanish they are known as *tiendas* (corner stores) whereas larger grocery stores are called *bodegas*, *despensas*, or *supermercados*. In this study, we therefore restricted ourselves to *corner stores*.

Given our existing data on the importance of corner stores as a site for UPF purchasing in both urban and rural and indigenous and nonindigenous communities, we conducted this study in two locations. As an urban site we chose Zone 1 of the capital city, Guatemala City (population of 46, 215 inhabitants, 91% non-indigenous) . This site was chosen because it is a typical middle-income neighborhood, characterized by petty commerce and large-scale in-migration from all over Guatemala. Zone 1 is also the political, cultural and historic center of the City.

As a rural site, we chose Chisec, in the northern province of Alta Verapaz, which is mainly an agricultural community that grows maize, cardamom and African palm. The municipality center has 10,146 inhabitants, mostly Q’eqchi’ Maya (88%). Chisec is similar to other rural, indigenous communities where the presence of UPF is rapidly increasing. In addition, our team has previous experience working with this community and one of the authors (A.C.) is fluent in Q’eqchi’ language, facilitating field work.

Participant Selection

Stores were purposively selected based on two criteria. First, as crime in both sites is significant, areas with known safety concerns were avoided. Second, this study is part of a larger one to understand the food environment around public elementary and secondary schools. Therefore, stores located within walking distance (5-10 min) of schools were preferentially invited. A sample size of 15 interviews in each community was planned, based on the team’s prior experience researching similar topics with store proprietors in other communities, where thematic saturation was reached after 10-15 interviews.

Store proprietors were sequentially invited face-to-face to participate. When the store owner was not available at the time of the team's visit, the next store was approached until the desired sample size was obtained. In the Zone 1 site, 151 stores were approached and 136 refused to participate. In Chisec, 20 were invited and 5 refused. The main reasons for refusal were safety (stores are frequently vandalized by gangs and were suspicious of unknown persons asking questions) and time constraints. All interviews were conducted at the store during normal business hours in Spanish. Every time a customer showed up, the interview was paused and then resumed.

Interview Process

We developed an interview guide with seven sections: (1) general store information; (2) store history and organization; (3) approach by the food and beverage industry; (4) how POS advertising is placed; (5) financial relationship with the industry; (6) perceived advertising effects on consumption (7) corner stores influence on dietary behaviors. The guide was based on a literature review and developed in collaboration with others who have previously worked with stores in Guatemala and Perú. The interview was pilot tested and revised in collaboration with one store owner. After obtaining consent, all interviews were audio recorded.

All interviews were conducted by A.C., an anthropologist with a master's degree in Local Comparative Development Studies. No members of the team had any prior relationship with the participants. Signed informed consent explaining objectives of the study, voluntary participation, confidentiality and anonymity was obtained from all participants. The study's protocol, informed consent and interview guide were approved by the Comité de Ética, Facultad de Medicina, Universidad Francisco Marroquín, Hospital Universitario Esperanza, Guatemala, C.A. (CE/FM-UFM003-19). During the interviews, field notes were taken and included information such as stores'-built environment, number of customers purchasing or interaction between proprietor and distributor. Field notes are used to complement information. Interviews lasted between 25-60 minutes and were subsequently transcribed verbatim by an advanced anthropology student from the Del Valle University. Transcripts were not returned to participants. In total, we interviewed 15 store proprietors in each site.

Coding process

We coded the interviews with Dedoose qualitative software using an inductive analysis approach. AC coded all 30 transcripts to develop the initial codebook with 72 codes. JB, SM and AC discussed the relative code frequencies that were reduced to 28 codes. After developing the final codebook, all transcripts were double-coded by the anthropology student and A.C. Then, we calculated a kappa score of 0.71, which is categorized as a "good", "moderate" or "substantial" agreement in social science research (McHugh 2012). Themes emerging from the clustering of codes were discussed with the research team. Quotations are identified by respondents' gender, age and site (urban or rural). Participants did not provide feedback on the findings. We reached theoretical data saturation at the end of the coding process since participants' responses were not providing any new data or variation.

Results

Qualitative themes were clustered around motivations and origins of corner store proprietorship; advertising strategies and product placement; influence of advertising on consumers' choices; relationships between distributors and store proprietors; and perceived role in promoting healthy choices. These themes are discussed below.

Profile of corner stores and participants

Corner stores and their proprietors are ubiquitous in Guatemalan territory and come in different configurations and profiles. Corner stores that had been opened for a median of 8 in the urban and 5 years in the rural area. On average, they were opened 14 hours per day. Most respondents were males in their thirties (Appendix A).

When discussing the origins of the store, most proprietors (27/30, 90%) noted that this was due to a family tradition and that they grew up knowing the business. *<<...I love business because since I was a kid, my mom had a little shop. I grew up in the store in San José Pinula... since I was born, she already had the store... imagine that.>> (Male, 68, urban setting)* Another important reason, particularly among female proprietors, was to contribute to the household income. For example:

<<My family since a long time, since before the armed conflict, have been merchants. My parents were some of the first merchants in the municipality of Chisec. From those times on, I came with my mom for vacations to support her on the business. When I got married, I was in the house and my husband went to work in the bakery. I realized that the house was in a visible and commercial area, so I decided to install a corner store to generate extra income and support the family...>> (Women, 35, rural setting) Owning a store enabled several women to raise money for household expenses when they otherwise would not have access to cash flow. It also helped to lower the costs of family expenses when those could be sourced through the store.

Stores were also thought of as part of a larger family subsistence economy, particularly in Chisec, where store revenues were mostly used to cover daily household expenses. Any small savings were spent on other high-priority items (e.g., school tuition). In Chisec, whatever is left from the earnings is added to those from growing maize, squash and beans. *<<...we are poor people; my parents didn't have resources. I wanted to study when I was a child, but I had no option. I sold soda drinks when I was 14 years old in the park... I had \$33 saved and I started a corner store because there was no other option. With the little earnings of the corner store I support my family...>> (Male, 28, rural setting)*

Advertising strategies and product placement

Proprietors highlighted that distributors were the point contact person and primary communication channel with the food and beverage industry suppliers. They mentioned that distributors do the following activities: identify new corner stores and establish contact with proprietors, offer products and discounts, take orders and supply products, suggest the quantity of product to buy and new products, offer and place advertisement, offer shelves or refrigerators to place their products and sometimes organize them, guarantee that their products are visible, check other brands' products are not in their shelves or refrigerators and ask how the competition is doing.

According to proprietors, the distributors safeguard that UPF from their brand must be clearly and easily visible or “in the line of sight” of the customer: <<...the best way of selling is having the product on sight. I notice when I place a juice in the refrigerator outside, and it sells more than when is inside.>> (Male, 37, urban setting) In Chisec, proprietors are grateful they receive equipment to organize UPFs:<<...to exhibit and promoting, making it visible. In the case of Big Cola, they give you a rack and people can see it>> (Female, 23, rural setting) As seen through field observations, stores are design so that adults tend to see directly at snacks and beverages, while children are at the level of candies and chocolates behind the glass counter.

According to respondents, this is one of the reasons distributors provide the display racks and refrigerators that were found in most (23, 77%) stores. Racks and refrigerators have the advantage that UPF are readily available for the consumer to grab. <<Those racks are from the industry. They offer it for the exhibition. It is being displayed and it looks nice and organized.>> (Female, 42, urban setting) Likewise, a narrative from Chisec also shows how the racks help to organize UPF by price: <<They gave the racks to place the products when I started buying with them. A few days ago, Tortrix left a rack and it is in order of price: on the top \$0.13 products and on the bottom \$0.19 products.>> (Female, 22, rural setting)

Industry refrigerators used to be behind bars, inside the store, to avoid products from getting stolen. Currently, they are placed at the customers reach. <<Fridges are placed there [outside the counter] because they are on sight for the people, anyone can take the product they want, not what we offer.>> (Male 30, urban setting) Also, this equipment is easily available for the proprietors: <<...coke offered me a 5 door refrigerator as is an advantage to them to offer the product. I just had to give a copy of my ID, information from the store and at the next day I had the cooling camera>> (Female, 23, rural setting) On the other hand, placing UPF from other brands on racks and refrigerators provided by the industry may sometimes lead to conflict with the distributor. Respondents said that distributors get mad as they expect only their own brands to be displayed in the equipment they provided.

Another advertising strategy that the store proprietors acknowledge is having an assorted store with multiple UPFs as this makes them more competitive compared to other stores. Customers are attracted to stores that are filled with UPF and where people converge. <<...there are stores that sell more and some that sell few products and this is because the first is filled with plenty of products, then attention is drawn to the people. They come and ask and they find product, they see around and take more products. Maybe they go to other stores and they don't find the product they are looking for, so they never return to that store. >> (Male, 23, rural setting)

Respondents also note that product advertising is useful to identify a store and to promote new UPF products. According to them, advertising that informs on UPF is essential and the best combination is when the industry gives introductory discounts for new products – it is a way to get customers hooked. <<When it is about new products, of course you need advertising to show it to the public, it helps to show it to the people. It is very attractive to the children – especially in the case of little toys and figures.>> (Female, 35, rural setting).

Most (27, 90%) respondents confirm that distributors always ask for permission to place POS advertising. There was no consensus among proprietors, but distributors usually placed ads every other month. Distributors know that due to respect they have to do so and if they don't, the proprietors will take away the poster or the material they placed. <<I get mad if they don't ask me permission because it is my establishment. Ads don't really contribute to the store, but the companies want to take possession of the

space. *If they come politely and ask, I will let them place the ad.>> (Male, 37, urban setting)* This is the same dynamic in Chisec: *<<Distributors ask to place the ads. They come and say: “we bring this quality product, we give it to you to try it, do you allow us to place a poster” and most people say “yes...”.>> (Male, 30, rural setting)* Interestingly, some respondents point out that ads do not necessarily influence customers' choice since they already have in mind what they will purchase as if they had a favorite UPF.

Advertising influence

According to most (27, 90%) respondents, purchasing patterns differ by age. Children and adolescents buy UPF based on lower price and usually can only afford candies and snacks (price range observed: \$0.06-\$0.8). Adults usually buy more expensive UPF such as soft/energy drinks (price range observed: \$0.27-\$1.6) or cooking ingredients (e.g., sugar, oil, soups, etc.) in comparison with children. *<<The difference is that children buy sweets, gums and snacks. Adults buy energy drinks, alcoholic beverages or cooking products. Children buy cheaper products.>> (Female, 30, rural setting)* Likewise, a respondent from the city: *<<I have seen adults buying snacks, cookies and sodas. They do it because of our economy, because they can't afford chicken or beef and if you don't have money, you get by with snacks and sodas. Children prefer sweets like chocolates.>> (Male, 37, urban setting)*

Proprietors confirmed that strategies like using cartoons' characters or toys are effective to reach children. They claim that children also buy according to the package or toy inside the product and specifically request them from their parents. *<<...Kids want to buy snacks because of the toys or stickers, not for the flavor, just because the product's image.>> (Male, 37, urban setting)* In the rural setting, proprietors have the same perception: *<<It is very attractive specially for children. In the case of toys or drawings with the shape of a dragon, they will ask for it. They don't see the flavor just the images of the dragon.>> (Female, 35, rural setting)* We asked the proprietors if they thought women and men purchased different UPF products; however, no gender differences were mentioned.

Distributors' mediating role

According to proprietors, each distributor has a set delivery routes that lasts between 3 to 6 months before they rotate them. This means that they might develop a relationship with proprietors. We observed that distributors (accompanied by a security guard) typically travel in a small truck with the company's logo. Some wear a company's uniform whereas others don't and travel in a small unbranded truck to avoid extortion in certain neighborhoods. Each distributor usually visits each store once or twice a week. This schedule enables them to actively suggest and sell more product to proprietors so the corner store is always stocked (another advertising strategy as previously mentioned). This means that most store proprietors do not have their own inventory, relying instead on distributors to make stocking suggestions. *<<Well, the distributor comes and makes an inventory of their company's products. Then, they tell us how much we are missing, the quantity, and we analyze if we have the means to pay.>> (Male, 60, urban setting)* This is a shared practice in Chisec: *<<I don't have a record of products. When distributors come, I tell the boys [distributors] to tell me how much is needed and I see if I can purchase more or not.>> (Male, 31, rural setting)* Proprietors emphasize that having an inventory requires time and some discipline which is hard to achieve. This opens the door for the distributors to access the decision-making processes including like what and how much to purchase. *<<It is difficult to keep an inventory; I haven't done it yet*

because it requires commitment. I am selling without keeping control, I just see that the products don't get lost.>> (Female, 30, rural setting)

The relationship between the distributor and proprietors aspires to be strictly commercial and transactional. However, they might develop a closer relationship, which is acknowledged when the proprietor receives discounts, bonuses or when they communicate through text messages or phone calls. <<...most of us are friends, we are friends besides our provider-client relationship. Well, I have made good friendships outside of that. I consider them my friends and they consider me a friend. I will not tell you all but, I have a good relationship with the majority.>> (Male, 37, urban setting) In Chisec, these closer relationships are explained in the following way: <<Is better to establish friendship with them [distributor], because they will tell me than within 15 days certain product will come cheap or with promotions, so they say: "I recommend you to buy later". Is better being direct, it suits me better>> (Female, 30, rural setting) In addition, most distributors offered spontaneous discounts or free products during their visits. Proprietors perceived this as an integral part of the negotiation with the distributor (26/30, 86%). For example, one proprietor remarked: <<You buy a box of Gatorade and they give you three bottles for free, that is a bonus. Then, this helps you to earn some money.>> (Male, 48, urban setting) In the city, bonuses are frequent since stores sell more UPF. In Chisec, even though there are plenty of stores, not all sell the same amount as in the city to access bonuses. Instead the distributor pushes the proprietor to purchase other products. This is the general experience in Chisec: <<I have conversations with some of them [distributors]. I tell them I don't want more product, but they are insistent and show me their UPF catalogue. At the end, I end up purchasing UPF I didn't want, but its o.k.>> (Female, 30, rural setting) If the proprietor develops a closer relationship with the distributor, it might be more likely that the latter offers a bonus or information tips independently from the setting.

Warehouses' role

Another way corner stores stock UPF product is from the warehouses. These buy UPF directly from the industry in bulk and therefore get lower prices. Some proprietors feel that the distributor will rather sell products in large quantities to the warehouse than to corner store. <<What they ask you first is where do you come from. I say "from a store" and they tell you "go with the big warehouses, they are in charge of re-distributing here.>> (Male, 34, rural setting)

At the urban and rural settings, proprietors assess the advantages and disadvantages of buying directly from the industry compared to the warehouse. When buying directly from the industry, products will be delivered to the store and they can return them if damaged or expired. However, sometimes is more expensive compared to the warehouse. <<With the warehouse it might be cheaper the product, but we have to account for fuel and faulty product like a snack's broken bag that don't have change. However, sometimes the difference from buying between the warehouse and the distributor might be substantial>> (Male, 37, urban setting) Proprietors might access credit or discounts if they have a good relationship with the warehouse owner. Expired or damaged products cannot be returned at the warehouse. In addition, some proprietors perceive the warehouses as competition. <<When I buy with the industry I pay in cash at the moment, but in the warehouse, they help us with credits of \$67 and once we sell the product we can go and pay back...>> (Male, 31, rural setting) In general, stocking the corner store has been the traditional role of the distributor, however, the warehouse variant is gaining some traction in the UPF supply.

Are corner stores allies to promote healthy products?

When asked about shifting product lines towards fresh foods or less processed options, the major challenges identified were shelf life, price and customers preference. Healthy products (e.g., fruits and vegetables) tended to be perishable, so they have to sell fast and also often were more expensive. In addition, they have additional logistical challenges including weighing at the POS, which takes additional time and limits the ability to attend several customers at the same time. Furthermore, proprietors mentioned some healthy products need to be kept in an expensive refrigerator. Those provided by the UPF industry cannot be used to store healthy products because is prohibited by the distributor. Furthermore, this are kept at the minimum cooling capacity to keep costs low. <<*It is a big challenge. I would like to sell coconut water from my plot of land. But natural coconut water is \$0.53 and is less in amount, people will not want to buy and prefer products worth \$0.13 even though it affects their health.*>> (Male, 30, rural setting) Another opinion from zone 1 on healthy products: <<*They [healthy products] are perishable. I don't dare to buy them because I have to keep them refrigerated. These products don't move and in order to sell them they need to be fresh*>> (Female, 42, urban setting)

Respondents also perceive that customers already have strong perceptions about what a corner store should sell, and it does not include healthy products. Customers come looking for specific UPF items and if the store doesn't have them, they will simply go to another one and the proprietor will lose business. <<*...the consumer purchases what he wants. I might tell him that is bad for his health, but either way if he wants the product, I won't close his options. It represents an income for me. I, simply, give the product he asks for, but it is not that I am forcing him, he is asking for it.*>> (Female, 35, rural setting) Likewise a respondent from the city:<<*The challenge is finding people that want healthy products. Besides, those products are pricy and people buy what is cheaper*>> (Female, 19, urban setting)

During the interviews, we also asked proprietors if a health-warning label on the nutritional content or health consequences of UPF would be useful to reduce consumption. According to them, customers will not be aware, similar to the label in alcoholic beverages or cigarette packs. <<*People don't care about that [labels], I'll give you an example. Alcoholic beverages have a label and people know how to read and are professionals, but they keep consuming it.*>> (Male, 34, rural setting) Labelling wouldn't work since customers search for UPF due to lower price and are considered ready-to-eat food.

According to our findings, the food and beverage industry rely on POS advertising to position their products. Store proprietors' decisions that are influenced by the industry's distributors help to shape the foodscape. Therefore, in order to regulate the availability and exposure to UPF, we need to better understand the stores as part of the informal economy in a middle-income country that has deep roots in inequality and poverty where a corner store appears to be one of the few options of being economically active. In a way, food environments, in this case saturated with UPF, can reproduce health disparities and are a reflection of the economic inequality (Cannuscio, Weiss, and Asch 2010; Miewald and Mccann 2014; Popkin, B. & Reardon 2018).

In conclusion, according to our findings, store proprietors and UPFs distributors develop a companionship relationship where they negotiate promotions, information, product placement, stocking and POS advertisement. The food and beverage industry have established a successful relationship with proprietors to guarantee UPF availability and advertising in corner stores in urban and rural Guatemala. Considering that proprietors in Guatemala are unlikely to promote and support the availability and

advertising of healthy foods, healthcare policymakers and should take into account this relationship when designing, planning and implementing UPF regulations in Guatemala and elsewhere.

Obj. 3. To further the knowledge on the foodscapes in Guatemala, the objective **to compare the Food Retail Environment Index between three neighborhoods of different socioeconomic status in Guatemala** was carried out. In Latin America, overweight and obesity prevalence have increased in the last decade. Guatemala, in particular, is struggling with the double burden of disease where underweight and overweight coexist. In 2015, an estimated 28% of Guatemalan students between 13 and 17 years of age were overweight and 7% obese. Most (65%) students reported drinking soft drinks at least once a day. Much of the rising prevalence in overweight and obesity has been attributed to the growing predominance of unhealthy packaged and fast foods. Corner stores in Guatemala (including those near schools) sell primarily energy-dense, nutrient-poor snacks and sugar sweetened beverages (SSBs), which are heavily marketed to children. In addition, fast food venues in Guatemala City have been found to target children using price incentives and toy giveaways. Public health action to improve the food environment has been limited. Thus, we created maps illustrating the prevalence of food swamps and disparities in exposure to unhealthy food environments by socioeconomic status (SES) and urbanicity as a tool to influence Guatemalan public health policy.

Data sources and map logistics

We mapped the food environment in two neighborhoods (middle- and high-SES) in Guatemala City and in Chisec, a low-SES rural indigenous community four hours north of the City. A trained research assistant walked through each neighborhood over six days in September 2018. Corner stores, chain supermarkets, farmers' markets, fast food venues (pizza, burgers, and fried chicken), parks and schools (private and public) were georeferenced with a GPS device (Garmin Oregon®). Corner stores are usually located in the garage or entrance of small houses, family owned, and part of the informal economy. We used QGIS® version 2.18, a free and open source geographic information program, to overlay locations of food outlets and parks on a Bing® basemap layer. Using the "fixed distance buffer" function from the geoprocessing analysis tool, a 493.13 ft buffer was drawn around each school. This buffer was chosen as it has been previously used in Guatemala to survey corner stores around schools. In the analysis tools, the "count points on polygons" function was used to assess the number of fast food venues and parks within the buffer. We used the RFEI to calculate the healthfulness of the food environment around each school as it has been found to be associated with higher odds of obesity. The RFEI considers fast food retailers and corner stores as unhealthy food outlets and grocery stores and markets as healthy. The index is calculated as the ratio of unhealthy to healthy outlets; a higher score indicates a less healthy environment. Where there were no healthy outlets, we used 1 as the denominator. The RFEI of each school across the neighborhood was added and then divided by the number of schools in each territory to determine the mean RFEI.

Highlights

We identified 280 corner stores (Appendix B) in the City and 204 in Chisec. Corner store density was higher in the middle- urban and low-SES rural areas; fast food restaurant density was higher in the high-SES urban area (no fast food restaurants were found in Chisec). Using the RFEI cutoff 3.79, all surveyed neighborhoods were classified as food swamps. The highest RFEI were found in the middle-SES urban and low-SES rural areas. The maps are presented in the annex part of this report.

To the best of our knowledge this is the first evidence of a food swamp in a low/middle income country, Guatemala. However, our findings should be interpreted in light of some limitations. We were

only able to survey two areas in the City and one rural town. However, a strength is that we were able to get comprehensive GIS data for venues that are not registered in the formal economy and likely substantially contribute to the intake of unhealthy foods and beverages.

Action

These maps are a powerful tool for showing the proliferation of food swamps, and SES disparities, in Guatemala. Corner stores and fast food restaurants are part of Guatemala's informal and formal economy, respectively. Each face different regulatory challenges and are difficult to monitor over time. Thus, to date, no one has examined the healthfulness of the built environment across neighborhoods, nor explored sustainable, large-scale strategies to limit exposure to food swamps. The sheer number of unhealthy food businesses and stark disparities across SES is astounding, and maps will be a useful tool for engaging planners, developers, and policymakers in discussions around the built environment and health. Maps may also be useful to school administrators, who might adopt institutional policies, such as closed campuses and nutritional standards for school food vendors to reduce student exposure to unhealthy retailers.

Obj. 4. To determine the relationship between the food and beverage industry and schools in Guatemala City, is an objective were 20 school principals were interviewed. The children's foodscape includes channels and venues like: the media, the internet, the POS, the home and the educational space. Schools are a place where children learn dietary habits. This is the reason to understand the perception of principals regarding their relationship between the food and beverage industry.

We used a sample of 20 schools (10 public and 10 private) within the metropolitan area of Guatemala City. The unit of analysis were the school principals or any educational authority that the principal delegates. The interview guide directed to principals explored the following themes: products from the industry the school sells, management of the store, knowledge on laws for feeding students and history of the relationship between school and industry. The fieldwork was done from November 2019 to march 2020. Quantitative data was analyzed in Stata, while qualitative data was coded in Dedoose.

The main finding is that schools are a disputed space for the food and beverage industry because they see commercial value because children generate dietary patterns since very young. The relationship between the school and the industry is mediated by incentives and benefits offered to the schools like discounts, equipment, refrigerator, free products, promotions, awnings among many other of elements that carry the brand of the industry. This is marketing even though the school principals don't understand it like that. Reaching oral agreements is a strategy from the industry to become providers to the schools. This is interesting because the oral agreements convey trust between the parties that in some cases has lasted an average of 10 years. There is another variant to this relationship where a third party provides the food and beverage stock to the school.

None of the schools have a guideline to restrict, prohibit or regulate the marketing and relationship between the school and the food and beverage industry. Only among public school principals that the *Ley de Alimentación Escolar* (2017) is perceived as a strategy that came to strengthen the good nourishment of the students, it also increased alumni attendance.

Regarding the perception the school principals have towards healthy dietary patterns, they claim that the food consumption among children is a responsibility carried by the parents and ultimately is an individual choice. Prohibiting or restricting all the food and beverage industries' products is not a possibility since the store and cafeteria serve an important economic and social role for the students and the school.

The results can be interpreted through the concept of school commercialization that Molnar & García used to describe the phenomenon of the food and beverage industry using the schools as a point-of-sale and marketing enclave. The concept can also be applied to the phenomena found in Guatemala because the industries try to colonize a space that is meant to educate students in order to influence their dietary habits.

Obj. 5. To design and validate a methodology for monitoring and evaluating the internet marketing of multinational fast food chains in response to the COVID-19 pandemic.

The aim of this new component is to design and validate a methodology for monitoring and evaluating the internet marketing of multinational fast food chains in response to the COVID-19 pandemic. The social distancing measures implemented in most countries have led to an increase in the use of digital media (and thus, individuals' exposure to online advertising) and consequently affected the dietary patterns of the population. Consequently, the food industry has adapted to this new context. Therefore, as countries design public health policies to restrict ultra-processed foods advertising, it is key to use valid and reliable instruments to collect and analyze data that can be compared within and between countries worldwide during the COVID-19 pandemic and its aftermath. The proposed methodology will follow a two-stage analysis procedure using a mixed-methods approach.

First, we will identify the multinational fast-food chains present in the four countries (Argentina, Bolivia, Guatemala and Peru). The unit of analysis will be the post made by the brand.

All of the posts made by the brands on their Facebook timelines during a specific period of time (1 month before and 2 months after the date each country announced state of national emergency due to the COVID-19 pandemic). A random sample of posts will be analyzed qualitatively to examine COVID-19 related content. Given the approach, this tool will emerge from the data itself, following an inductive and iterative process, and will be flexible enough to accommodate new insights provided by the addition of new data.

In the second stage, a quantitative content analysis tool will be developed based on the existing literature (Busse, 2016, 2018; Freeman et al., 2014) and on the qualitative results obtained during the first stage, in order to analyze the entire sample of posts extracted from the Facebook pages of the selected brands. Thus, the tool will include previously used variables (such as food category, marketing methods, persuasive appeals and portrayed eating behavior), but will also implement new context-specific variables. This is expected to provide a holistic picture of the new and rapidly-evolving marketing strategies used by fast-food chains pre and post the COVID-19 outbreak. The new tool will be validated with data in the four countries and the overall research process will be reported for future use.

Project implementation and management:

The grant funds for the project continued to be administered by the Fundación Aldo Castañeda (FAC). The technical progress report, covering the first 12 months of work, was successfully submitted. As for the first financial report, there was a variance of more than 10%, and savings were incurred. The budget categories with variance were: international travel and research expenses.

For Aim 1 (To assess the representation of gender in food and beverage advertising in bodegas around public schools) of the project, one research assistant was budgeted for a period of 6 months. Since execution of this aim was shorter than expected, a surplus of this aim was used to extend the project aim 2 ("To determine the strategies used by the food and beverage industry to place point-of-sale advertising and other marketing strategies in bodegas around schools") in the rural area of Chisec. Local transport and part-time research assistants covered these expenses that included: transportation, lodging and food expenses (GTQ 2,455.42). Likewise, a research assistant was hired to map zone 10 of Guatemala City for (GTQ2500), to compare with Chisec and zone 1 data. Although budgeted for year two, in-depth interview transcriptions were covered under Part time research assistant's (GTQ 450-hour rate for 17.43 hours of verbatim transcription). During May and June the same research assistant was hired as an external coder for Aim 2 analysis (GTQ 6750 for two months). During Year 1, we did not submit any of our findings to any conferences. Therefore we saved GTQ15,603. We also managed to save funds from the in-person meeting in Lima (GTQ 11, 734), since hotel and meal expenses were lower than budgeted.

The final savings from Year 1 research expenses (in-depth interview [GTQ16,895] transcription, camera [GTQ 647], and local transport [GTQ 489]), were then discussed with Mr Bazzani and the idea of using these funds to interview school principals to understand the relationship between the beverage industry and the schools was approved for year 2. An extra GTQ 27,796, were requested from the original budget for year 2, to cover personnel and research expenses.

Therefore, the final amount budgeted for year 2 was GTQ 259, 847 (45,144 CAD). The cash requirements to cover project year 2 were CAD 37, 183.31 taking into account the positive cash on hand of CAD 7, 960. We received a third payment (September 4, 2019) CAD 24, 314, since IDRC policy does not allow the advancement of final payments. The final payment will be calculated based on the final financial report and it is set not to exceed CAD 17, 086.

An in-person meeting to present findings in La Paz, Bolivia, was schedule for year 2. Due to the pandemic Covid-19, these funds were not able to be executed for this purpose. We presented a 4 country- regional proposal to execute these funds to our Grant Administrator. The new proposal is to design and validate a methodology for monitoring and evaluating the internet marketing of multinational fast food chains in response to the COVID-19 pandemic.

We have managed to follow the time line that we have set for each aim of the project (Appendix C). The fieldwork for aim 4 of the project has finished and we are currently working on analyzing the data. The new aim, to design and validate a methodology for monitoring and evaluating the internet marketing of multinational fast food chains in response to the COVID-19 pandemic, was set to be completed in September 2020.

Project outputs and dissemination:

- For aim 1 of the project, to assess the representation of gender in food and beverage advertising in bodegas around public schools, Lucila Rozas from Peru and Sophia Mus have written a manuscript. The process of writing was guided by Peter Busse and Dr. Barnoya. The manuscript is being prepared and adjusted to be submitted in the Journal of Critical Public Health
- Aim 2 of the project, to determine the strategies used by the food and beverage industry to place point-of-sale advertising and other marketing strategies in bodegas around public schools, Aiken Chew wrote a manuscript alongside Dr. Barnoya, Dr. Peter Roloff and Sophia Mus. This manuscript was submitted to the Journal of Environmental Nutrition and Hunger.
- For aim 3 of the project, to compare the Food Retail Environment Index between three neighborhoods of different socioeconomic status in Guatemala, a manuscript was submitted to the CDC Preventing Chronic Disease Journal that has a section called GIS Snapshots, which uses geographic information systems as an innovative tool to enhance surveillance that will prevent chronic diseases and promote healthy practices. This article was published and is available at: https://www.cdc.gov/Pcd/issues/2020/20_0029.htm
- Dissemination plans are to be considered in the following months. Due to the pandemic COVID-19, dissemination through media may be a challenge and risk of poor media coverage might be encountered.

Outcomes:

Objective	Year	Outcomes
Gender representation in printed media	Year 1	<ul style="list-style-type: none"> - Project management and administration has been a continuous learning experience for SM, MD, project coordinator, under the guidance of Dr Barnoya. - SM has also had the opportunity to develop the instrument for gender assessment alongside marketing experts - SM has also broadened her network with researchers of the ongoing project. - SM learned to manage and coordinate teams through the different project objectives
	Year 2	<ul style="list-style-type: none"> - SM has also strengthened her writing skills through the preparation IDRC’s technical and final report. - SM has had the opportunity to work with more experienced colleagues gaining better understanding in the development of manuscript writing
Store proprietors and distributors	Year 1	<ul style="list-style-type: none"> - AC underwent the course of ethics in human research to access a certificate - AC learned about the process on how to submit a protocol in an IRB - Improved AC interview abilities - AC improved abilities to do research in urban settings - AC improved his approach to work as a team - GA improved her transcription skills

	Year 2	<ul style="list-style-type: none"> - AC learned how to use Deedose software - AC improved coding abilities on qualitative data - AC learned how to calculate Kappa index when coding qualitative data - AC improved his ability to write in English - AC expanded his scholar network when he collaborated with Peter Roholoff and Peter Busse - SM strengthen her manuscript development knowledge by revising AC's manuscript drafts - AC learned the process on how to publish in a peer-review journal (Journal of Hunger and Nutrition Environment) - AC learned how to explain the coding process to GA
GIS Snapshot Food environment in three territories of Guatemala	Year 1	<ul style="list-style-type: none"> - AC improved the skills managing geographic information - AC improved his skills to manage GIS software analysis - AC learned about foodscape literature and methods
	Year 2	<ul style="list-style-type: none"> - AC learned the process on how to publish in a peer-review journal (Chronic Disease GIS Snapshot – Preventing Chronic Disease) - AC expanded his scholar network when he collaborated with Alyssa Moran - AC learned how to coordinate dissemination meetings with a Guatemalan newspaper (eP podcast)
Schools and food and beverage industry	Year 2	<ul style="list-style-type: none"> - AC improved his ability to submit research protocols to IRB - AC improved his ability to coordinate research activities - LS improved her interviewing skills - LS improved her transcription abilities - LS learned the basics of coding - SM was able to help LS improve her skills on data base preparation for quantitative analysis - SM was able to learn through the process of helping LS in a better understanding of result presentation for quantitative data - AC and LS improved their descriptive statistics knowledge - LS learned how to use Dedoose software - LS learned how to structure findings for reports and articles - AC and LS learned on the subject of school commercialization.
Methodology to evaluate marketing strategies during the pandemic COVID -19		<ul style="list-style-type: none"> - SM has learned and improved her coding abilities through the qualitative part of this aim - SM worked and participated actively in the development of the instrument to evaluate marketing strategies during the pandemic - SM has strengthened her knowledge and understanding in marketing strategies through social media

Impacts:

- Part of the study results were presented in a podcast with one of the most recognized newspapers of Guatemala - elPeriódico. It had the following impact:

youtube: 96 views, facebook: 12,000 views / 26 comments / 230 reactions.

Links:

- Youtube: <https://www.youtube.com/watch?v=n8mGHnMh7hM&feature=youtu.be>
 - Facebook: https://www.facebook.com/watch/live/?v=449544509319069&ref=watch_permalink
- This project will generate important evidence to support local and regional policy changes that will shape marketing strategies and approaches. The results of this project's aims will shed light on the interaction among storeowners and school's with the food industry.
 - The results of this project will also improve our understanding of foodscapes and will open doors to future research, as it would be important understanding the industry's perspective, and in this way evaluating the whole scope surrounding foodscapes.

Recommendations:

- For future projects on gender preferences, the team advises on involving a multidisciplinary team. This would enrich and broaden the construction of instruments or protocols to assess gender.
- Gender representation in ads, is a field where more research is needed to better understand the impact of gender-oriented marketing.
- For future research in corner stores, the research team advises that participant observation and an ethnographic research design is the most appropriate to use since the store owners are a close group difficult to access. Corner stores need further qualitative research because they are a central part of community and neighborhood life.
- The research team advises that using GIS technology to recollect data is a powerful way to decipher the access, exposure and proximity elements of a food landscape. This should be combined with the perception of customers and storeowners with other qualitative methods.
- It is necessary in Guatemala to do more studies related to the food environment and how it operates both in the urban and rural area.
- In Guatemala it is necessary to identify how the UPF industry has permeated different places where consumers obtain these products.
- It might prove powerful to retrieve data at the micro-level doing ethnography in corner stores, warehouses, *comedores*, to collect the interaction and perceptions of the different players in the food environment.
- The health policymakers can learn and decide how to implement zoning laws to regulate the access of the UPF industry and its products.

Appendix:

Appendix A

Corner store and proprietor profile in Guatemala

	Zone 1 (urban)	Chisec (rural)
Corner store profile		
Median years of store (range)	8 (2-40)	5 (1-27)
Average hours of store open/day \pm SD	14.14 \pm 1.21	14.26 \pm 1.31
Clients who purchased during interview \pm SD	12.06 \pm 8.06	7.73 \pm 4.25
Proprietor profile		
Median years of interviewees (range)	37 (18-68)	31 (22-45)
Male interviewees	12	7

Source: interview during fieldwork 2019.

Appendix B

Table. Number of Corner Stores, Fast-Food Outlets, and Schools in 3 Neighborhoods^a, Guatemala, 2018

Characteristic	Neighborhood Socioeconomic Status		
	Middle	High	Rural Low
Neighborhood area, mi²	1.03	1.27	0.98
Schools and food outlets, number (number per mi²)			
Schools	26 (25)	19 (15)	15 (15)
Corner stores ^b	193 (187)	87 (68)	204 (208)
Fast-food outlets ^c	42 (41)	60 (47)	0
Supermarkets ^d	5 (5)	5 (4)	0
Farmer Markets ^e	4 (4)	3 (2)	1 (1)
Median (range) number of outlets within each school buffer^f			
Corner stores	11 (10–12)	3 (1-5)	11 (9.5–17)
Fast food	0	5 (2.5–9)	0
Markets	0	0	0
Supermarkets	0	0	0
Schools with no store within the buffer	0	1	0
Mean Retail Food Environment Index ^g	12.6	8.3	12.9

^a One high- and 1 middle-socioeconomic–status neighborhood in urban Guatemala City and 1 low-socioeconomic–status neighborhood in rural Chisec, Guatemala.

^b Stores with sufficient product types to complete a fill-in or quick, single-meal shopping trip, often located as a storefront within the primary residence, usually part of the informal economy.

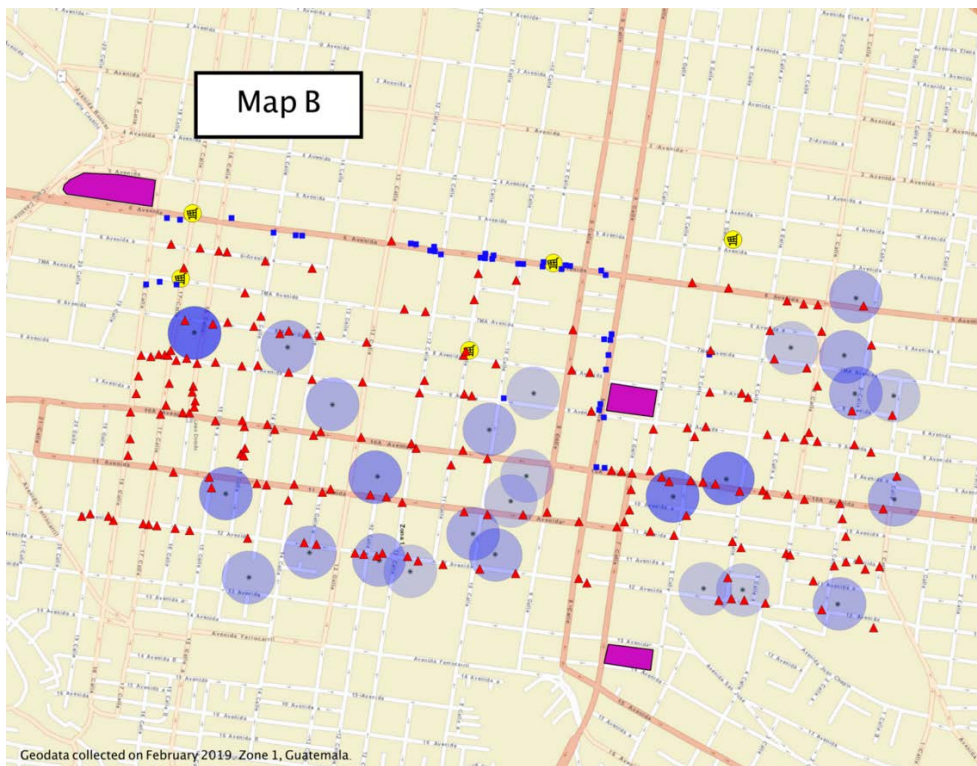
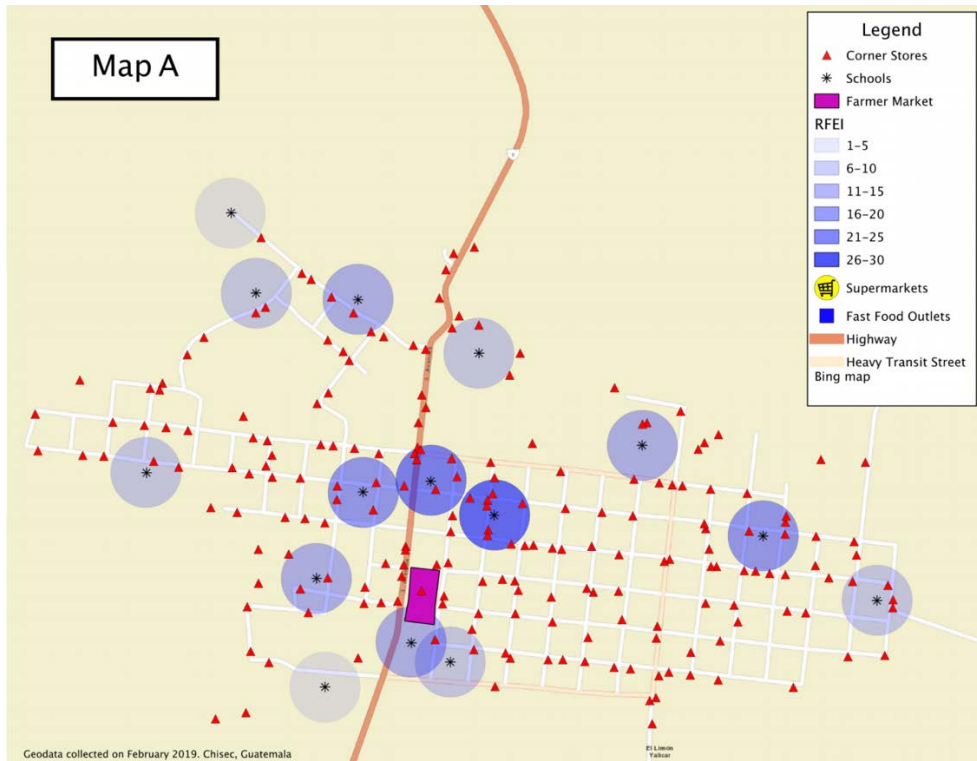
^c Stores that prepare food in a few minutes and have no table service; includes to-go meals (eg, McDonald’s, Pizza Hut, Pollo Campero).

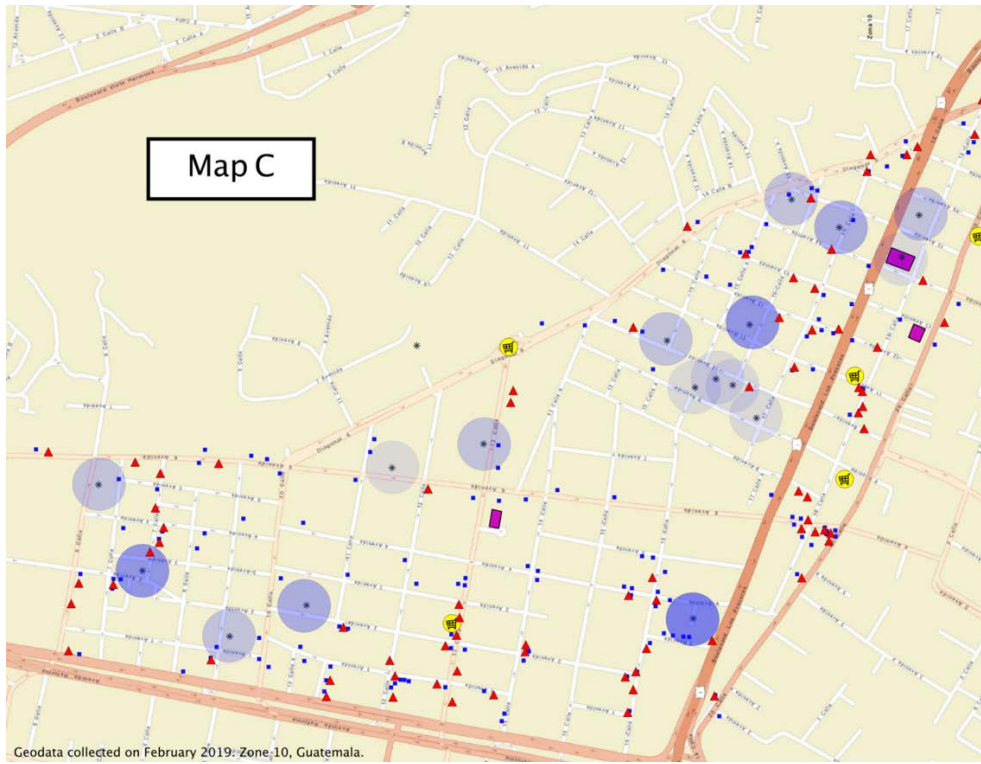
^d Self-service shopping stores (usually chains) with a large variety of products, including fresh produce.

^e Municipal outlets that mostly provide fresh produce from local farmers.

^f Buffer of 150 meters (0.09 miles) around schools.

^g The ratio of unhealthy to healthy food outlets: the higher the score, the less healthy the environment.





Appendix C

Activities	April	May	June	July	August	September	October	November	December
Work completion date June 30th 2020									
Contract completion date September 30th 2020									
Objective 9 To assess the representation of gender in food and beverage advertising in bodegas around public schools. Peru and Guatemala									
Manuscript and report preparation									
Manuscript submission									
Final technical report									
Final financial report									
Policy brief									
Local dissemination									
Regional dissemination									
Objective 10. To determine the strategies used by the food and beverage industry to place point-of-sale advertising and other marketing strategies in bodegas around schools									
Manuscript and report preparation									

Manuscript submission									
Final technical report									
Policy brief									
Local dissemination									
Regional dissemination									

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