Evidence-Based Recommendations to Mitigate Harms from Digital Food Marketing to Children Ages 2-17

Healthy Eating Research

Technical Report | October 2024

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Definitions

Children. Unless otherwise noted, refers to all individuals 2 to 17 years old.

Commercial determinants of health. Industry activities (including marketing) that affect people's health, directly or indirectly, through their influence on social, physical and cultural environments.

Food. Unless otherwise noted, refers to all food, beverage, and restaurant products or brands (including fast food).

Unhealthy food. Nutrient-poor foods and beverages that are high in added sugars, saturated fats, sodium, and/or non-sugar sweeteners and should not be marketed to children. Also referred to in this report as HFSS (high fat, sugar, sodium). These foods are usually highly processed, and consumption is associated with negative health outcomes (adapted from: Fiscal policies to promote healthy diets: WHO guideline. Geneva: World Health Organization;2024. Licence: CC BY-NC-SA 3.0 IGO).

Marketing. Any form of commercial communication, message, or action that promotes a product or its related brand and is designed to increase sales and consumption of the product or brand.

- **Digital marketing.** Any form of marketing that is delivered on a digital device, including computers, smartphones, and other devices connected to the internet.
- **Advertising.** Marketing communications that are created and paid for by the advertiser and placed in mass media, including text, image, audio, and video ads on third-party websites, social media, and streaming services.
- **Brand marketing.** Marketing that promotes a brand (versus a specific product), including through brand logos and mentions or promotion of other products offered by the same brand.
- **Creative strategies/tactics.** The creative techniques that marketers use to maximize the power of their marketing messages to affect children, including brand and licensed characters, celebrities and influencers, music and sports, games and gaming, emotional appeals (humor, fun, cool), engagement techniques (e.g., contests, giveaways, crowdsourcing, encouraging likes/sharing), price promotions/coupons, virtual reality, and AI.
- **Integrated Marketing Communications (IMC).** A common marketing strategy that attempts to unify all marketing communications (including advertising, social media, public relations, direct marketing and sales promotion) to maximize the value and impact of a company's marketing investments.
- **Targeting.** How a company chooses the audience to receive its marketing message, including by demographic characteristics, such as age or race and ethnicity (demographic targeting), online behaviors (behavioral targeting), physical location (geotargeting), or adjacent online content (contextual targeting).

Marketing type. Describes who creates the marketing content and how it is delivered to an audience.

- **Paid.** Advertising, sponsorships, paid product placements and endorsements, promotions, and other marketing messages that a company purchases from a third-party to deliver to a specific audience.
- **Owned.** Content that a company creates to promote its own brand, such as websites, social media accounts, and mobile apps.
- **Earned.** Marketing content that is delivered virally or by word-of-mouth between users, such as unpaid user-generated social media content, liked and shared social media posts, and public relations.

Marketing exposure. The proportion of a specific audience that sees/hears a marketing message (reach) and how many times the average person in the audience sees/hears it (frequency).

Marketing impact. How exposure to digital food marketing affects children, including diet-related behaviors and intermediate outcomes and broader outcomes.

- **Behavioral outcomes** include acute (immediate) intake following exposure, food choice, food purchases, requests to parents, and longer-term diet quality or category consumption.
- **Intermediate outcomes** include brand/product awareness, brand/product attitudes, advertising awareness/recognition, brand/product attitudes/liking, taste preferences, and intent to request or purchase.
- **Broader outcomes** include health disparities, threats to children's rights (including privacy, freedom from manipulation), peer and family relationships, and social norms and culture.

Marketing power. The extent to which marketing affects a specific audience, including effects intended by the marketer (e.g., positive attitudes, sales, consumption of the marketed product) and unintended effects (e.g., consumption of any available foods, health disparities).

Media platforms. The location or tool where the marketing is delivered. Digital media platforms include websites, apps, social media (Instagram, Facebook, Snapchat) and video sharing platforms (YouTube, TikTok), gaming sites (Roblox, Minecraft), livestream gaming (Twitch, Facebook Gaming), and streaming TV (Hulu, Disney).

Policies. All measures to regulate marketing to which children are exposed, including legislation, regulation, government non-mandatory guidelines, and industry voluntary actions.

Abbreviations

The following abbreviations are used throughout the report, and further defined where necessary.

AADC. Age-Appropriate Design Code

ADPPA. American Data Privacy and Protection Act

APRA. American Privacy Rights Act

CARU. Children's Advertising Review Unit

CFBAI. Children's Food and Beverage Advertising Initiative

COPPA. Children's Online Privacy and Protection Act

FTC. Federal Trade Commission

HFSS. Foods high in fat, sugar, or salt

IMC. Integrated Marketing Communications

IWG. Interagency Working Group on Food Marketed to Children

KOSPA. Kids Online Safety and Privacy Act

Introduction

Unhealthy food is now the leading cause of global deaths, diseases, and disability.[1] Public health and child health experts in the United States[2,3] and globally[4-6] stress that resolving the epidemics of obesity and poor diet affecting children, including adolescents, will require drastic changes to the food environment to reduce the availability and consumption of unhealthy foods. The food environment has been designed largely by commercial actors, including food, beverage, and restaurant companies (referred to collectively as "food companies" in this report), through marketing designed to drive profits by increasing consumption[7] of the unhealthy products which make up the majority of their portfolios.[8] Food marketing shapes the availability of and normative beliefs about these unhealthy products, making them the easiest, least expensive, and most desirable choices for consumers.[7,9] Moreover, racialized food marketing exacerbates diet-related health disparities affecting Black and Latino families via targeting through racial/ethnic media and tailored content and through greater exposure to unhealthy food marketing in their communities and the media.[10,11]

Unhealthy food marketing extensively targets children. In the U.S., food companies spent $1.8 billion to market almost exclusively unhealthy products to children in 2009.[12] Globally, sugary drinks, fast food, candy, sugar cereals, and sweet/salty snacks represent the majority of all foods marketed to children.[13] A large body of research has demonstrated the harmful effects of this marketing on children's diet-related behaviors. Exposure to marketing increases children's positive associations, liking, preferences, purchase intentions, and requests to parents for advertised brands.[14] Experimental studies have demonstrated that exposure also increases caloric intake.[14] Despite their more developed cognitive skills and ability to recognize advertising as persuasive attempts, adolescents may be even more susceptible to the harmful effects of food marketing compared to younger children.[15]

The marketing environment has changed dramatically in the past 15 years, as digital media has largely displaced traditional media use among children and adolescents.[16] From 2017 to 2021, the amount of time that younger children (2-11 years) and adolescents (12-17 years) in the U.S. spent watching traditional TV declined by 57% and 60%, respectively.[17] At the same time, children's total entertainment-related screen usage increased, with the majority of screen time now occurring on mobile devices.[16] In 2021, 8- to 12-year-old children used screens for entertainment approximately 5½ hours per day, up from 4½ hours in 2015, and adolescents (13-18 years) used them for more than 8½ hours, up from 6 hours and 40 minutes in 2015.[16] In a sample of U.S. children ages 11-17, usage varied widely, but the median amount of time spent on smartphones was 4½ hours per day.[18] Social media, video streaming, and gaming sites (led by TikTok, Snapchat, Instagram, and Roblox) represented 72% of time spent on mobile devices.[18] In addition, approximately one-third (35%) of very young children (ages 3-5) had their own devices, where they averaged 115 minutes of screen use per day, primarily watching videos on YouTube and YouTube Kids.[19]

Unhealthy food brands have capitalized on this shift in children's media usage by innovating digital marketing techniques that exploit children's developmental vulnerabilities.[20] Unique characteristics of digital food marketing raise concerns about its negative effects on young people's health and wellbeing.[21-24] Yet, U.S. policies regulating marketing to children are lacking, and largely rely on industry self-regulation.[6] Moreover, those who care about children and their health, including educators,[25] healthcare providers, and parents,[19] have limited awareness of the pervasive reach and manipulative tactics used in digital marketing that children experience online and have few, if any, resources to protect their children. In 2015, Healthy Eating Research published *Recommendations for Responsible Food Marketing to Children*, which defined factors to identify food marketing targeted to children and address coverage limitations of food industry self-regulation.[26] These recommendations were developed in the early days of digital marketing, and updated guidelines are needed to encompass continually evolving and increasingly sophisticated digital marketing techniques.

Purpose

Healthy Eating Research (HER), a national program of the Robert Wood Johnson Foundation, convened an expert panel to develop evidence-based recommendations for actions to mitigate harms from digital food marketing to children ages 2 to 17. The panel was charged with developing:

1. Policy recommendations to protect children from harmful and unfair digital food marketing practices;
2. Recommendations for the food industry, online media, and digital providers that accept food advertisements; and
3. Recommendations for future research.

The panel also sought to identify opportunities to inform healthcare providers, educators, parents, and caregivers about the issues of digital marketing to children, and strategies to protect children from its negative impact.

Rationale, Conceptual Model and Frameworks

Building on what we know about food marketing to children

Over the past 40 years, a growing body of research worldwide has greatly advanced understanding of food marketing to children and its negative impact on children's diets and health. In 2006, an Institute of Medicine committee tasked with reviewing and analyzing the existing evidence on food marketing practices in the U.S. and the influence of this marketing on the health of children concluded that television food marketing and advertising is a likely contributor to less healthful diets and may contribute to negative diet-related health outcomes and risks among children under age 13.[1] The committee's recommendations centered around industry self-regulation, but they stressed that Congress should enact legislation mandating that food advertising on children's television shift from unhealthy to healthy foods and beverages if voluntary food industry self-regulatory efforts are unsuccessful. In 2022, more than 15 years later, children (2-11 years) continued to view more than 1000 TV food ads, of which more than two-thirds promoted unhealthy products.[27] Despite this lack of improvement, the U.S. continues to rely primarily on self-regulatory initiatives to address problematic food marketing practices aimed at children.[28] New policy approaches are required to address unique harms resulting from digital marketing exposure.

In 2023, the WHO updated recommendations for global policies to protect children from the negative impact of unhealthy food marketing.[4] As part of this process, WHO commissioned comprehensive systematic and narrative reviews of the academic literature from 2009 to 2020, which included studies that analyzed the content of food marketing in different media and marketing venues and exposure studies documenting the amount of food marketing that children experienced.[13,14,29] These studies consistently demonstrate, across all forms of marketing to children worldwide, the prevalence of foods that contribute to unhealthy diets, predominantly fast food, sugary drinks, candy, sweet and salty snacks, and breakfast cereals high in sugar, as well as the absence of marketing for healthy foods. Based on the strength of the evidence in these reviews, the WHO called for Member States to enact mandatory policies to restrict exposure to and the power of all types of food marketing to children up to age 18.[4] In particular, the WHO identified digital food marketing as increasingly influential and a pressing concern.[4,5] In 2024, the WHO published policy options for restricting digital marketing of unhealthy products (including unhealthy food) to vulnerable populations (including children).[30]

Recent reviews by the WHO and others also cite the need for additional research on a wide range of topics regarding digital food marketing to children to inform policy and systems-level solutions and spur effective actions.[6,13,14,31] As part of this project, an extensive review of digital food marketing research published since 2020 was conducted, and is further described in the **Methodology** section.

Defining digital food marketing

Food marketing to children in digital media is considerably more complex than traditional advertising due to a number of unique characteristics[20,23,31] that increase opportunities for children's exposure, deepen children's engagement with brands, and transform how the marketing impacts children. These characteristics complicate potential solutions to address resulting harms (summarized in **Table 1**). Digital marketing occurs in a variety of digital *media platforms*, including websites, mobile apps, social media, video sharing, gaming platforms, livestream gaming, and streaming TV. Marketing can also be categorized according to the *message source*, including paid advertising resulting from a commercial transaction between a food company and a digital provider; owned marketing when a food company maintains its own digital media content to promote its brand(s); and earned media, which is disseminated by others without compensation from the food company, including viral marketing.[31,32]

In digital media, companies use *targeting* strategies to identify the desired audience to receive its marketing messages, which can take many forms.[33] As in traditional media, companies can target a specific demographic audience, including by age, race, or ethnicity. However, digital media provides much more precise data to identify individuals who are likely to respond to a marketing message, including their online behavior (behavioral targeting) and their physical location (geo-targeting). In addition, contextual targeting allows marketers to place their messages near or embedded within content that the target audience is likely to access. *Creative strategies/techniques* refer to the creative messages and devices that marketers use to maximize the power of food marketing to affect children. Many of these creative strategies are commonly used in traditional forms of food marketing to children, but some are unique to digital media, including engagement appeals, virtual reality, and AI-informed content.

Digital advertising system. Previous reports also highlight the complicated, highly opaque system that has been developed to support commercial marketing in the digital environment.[20,21,23] This system hinges on individuals' behavioral and other data collected throughout their online activities, often without their knowledge or direct consent. Marketers use these data to precisely tailor marketing content to maximize its appeal to an individual, while online platforms (e.g., Google, Meta, or

Table 1. Digital Marketing Typology

Media Platforms	Message Source	Targeting	Creative Strategies/ Tactics
• Websites • Mobile apps • Social media (Instagram, Facebook, Snapchat) • Video Sharing (YouTube, TikTok) • Gaming Platforms (Roblox, Minecraft) • Livestream gaming (Twitch) • Streaming TV (Netflix, Hulu)	• Paid (advertising) – Static (banner) and video ads on third-party sites – Paid influencers/celebrity endorsements – Sponsorships – Product placements – Sponsored and native content • Owned – Food company/brand websites, apps, social media accounts • Earned – User-generated content – User engagement (likes, shares) – Influencers/celebrities (not compensated)	• Demographic (children, adolescents, race/ethnicity) • Behavioral ("personalized" based on user online behavior) • Geotargeting (place-based, physical location) • Contextual (adjacent content)	• Brand and licensed characters • Influencers/celebrities • Music and sports • Games/gaming • Emotional appeals (humor, fun, cool) • Engagement appeals (contests, giveaways, crowdsourcing) • Price promotions/coupons • Virtual reality • Artificial intelligence
Digital marketing is integrated, data-driven, consistent, and brand-focused			

Apple) use these data to suggest additional content designed to maximize the time an individual spends on their platform. Ad exchanges also use these data to facilitate the buying and selling of digital advertising space using real-time bidding. These online activities are guided by complex technical models, or algorithms, that utilize data to predict a favorable outcome for the advertiser or digital platform. This online environment was designed to meet the needs of marketers, with no built-in protections for children. Children are among the primary users of digital media, yet digital platforms and advertisers treat users of digital media as adults, unless proven otherwise. Moreover, food companies and digital providers utilize sophisticated market research tools to understand the needs of children and further fine-tune their messages and techniques to maximize children's desire for their products.[20] Given their domination of the digital marketplace and the lack of alternatives for consumers, these enormous global corporations have little or no incentive to act in children's best interests.

Integrated marketing communications. Another important feature of digital marketing is that companies do not use digital media as a standalone marketing tool separate from other forms of marketing. Rather, digital marketing is an important component of their integrated marketing communications (IMC), a marketing strategy that combines various communications methods to maximize the value and impact of a company's marketing investments.[34] This strategy has become increasingly prevalent in food marketing to children.[35] IMC aims to incorporate a wide mix of media and other channels and ensure that all contacts between current or prospective customers and a brand are relevant to that person.[34] Marketers design all communications to portray a consistent message over time and across channels to build a strong brand identity. IMC recognizes the importance of data collected through digital points of contact with consumers to enhance the power of a company's marketing messages. Thus, digital marketing also amplifies the reach and effectiveness of more traditional forms of marketing.[4] While the focus of this report is on digital food marketing, it is important to acknowledge that all forms of food marketing to children (including television, billboards, packaging, retail marketing, and digital) interact synergistically and cumulatively.

Concerns about digital food marketing to children

Several unique aspects of digital food marketing may have even broader effects on children's health and wellbeing compared to traditional food advertising. Although not as well-studied to date, experts raise concerns that digital food marketing threatens children's rights to privacy and freedom from manipulation;[5,21] influences social norms, youth culture, and relationships with family and peers;[36] and increases health disparities affecting Black and Latino children.[37,38]

Threat to children's rights. Common digital marketing creative strategies and tactics may be unfair and deceptive, especially when experienced by children. For example, digital marketing encourages user engagement with the brand, including viral dissemination through peer networks.[15,20,39] Digital marketers also take advantage of the one-sided emotional connections that children develop with celebrities, online influencers, and brand and licensed characters (i.e., parasocial relationships) to promote unhealthy brands.[40] These techniques take advantage of adolescents' developmental vulnerability to peer influence and social standing[15] and may increase the impact of digital marketing over passive exposure to traditional advertising (e.g., viewing TV ads). In addition, digital marketing connects children's digital devices to their physical environment.[41] For example, geotargeting allows fast food restaurants and retailers to send promotional offers to children when they are nearby, and messages on digital billboards can be targeted to specific demographic audiences in the vicinity at a certain time (e.g., school children at the beginning or end of the school day).[20] Further, school-based digital instructional materials (such as educational websites) and school-issued devices deliver food marketing messages to children in their schools.[42,43]

Much of the marketing that occurs online is embedded within entertainment content (e.g., influencer videos, gaming platforms, and social media posts) in a way that disguises and distracts from its persuasive intent, thus reducing skeptical responses to this marketing.[6,20] These "stealth" marketing tactics manipulate children to experience marketing messages while accessing popular online content, and may qualify as unfair and deceptive, especially when aimed at individuals with more limited cognitive abilities to identify and defend against persuasive attempts.[44] In addition, the common use and sale of children's data for commercial purposes, often without their known consent, represents another potential unfair and deceptive marketing practice.

Socio-cultural impacts. Common digital marketing techniques are powerful tools for increasing children's affinity and consumption of the marketed brands and for amplifying the effects of other forms of food marketing. However, digital marketing also affects children's food environments more broadly. As with more traditional forms of food marketing, digital food marketing likely impacts dietary norms and population shifts in consumer preferences for highly marketed unhealthy categories of foods (e.g., fast food, sugary drinks). It also shapes children's social environments, including youth culture and other social norms,[31,36] as well as children's identity development and peer and family relationships.[15,45]

Contributing to health disparities. Digital food marketing to Black and Latino youth raises substantial public health and equity concerns. Companies often utilize Black and Latino celebrities, professional athletes, music, and other cultural themes to target youth audiences.[20,46] In addition to appealing to Black and Latino children, brands use these messages to portray a "cool" image that appeals to all adolescents[47] and to tout their "representation" of traditionally underrepresented consumers as a sign of their commitment to diversity, equity and inclusion.[48] However, food companies use these racialized messages almost exclusively to promote unhealthy foods (e.g., fast food, sugary drinks, snacks and candy) that contribute to diet-related diseases and health disparities affecting communities of color.[20,46] Food companies also aggressively promote these racialized messages through their social media accounts, encouraging children to share the messages virally through their peer networks, thus further integrating unhealthy food brands into youth culture.[20,46] Moreover, racialized food marketing may disproportionately affect youth of color whose identity and self-esteem has been influenced by racism and the relative lack of representation in marketing for most products.[37]

Black and Latino children are also exposed to more unhealthy food marketing on television and in other media, and individuals living in low-income and communities of color experience more food marketing in their communities, combined with less access to healthy foods.[10,11] Therefore, racial and ethnic tailored content in digital food marketing, combined with greater total exposure, likely increases the power of unhealthy food marketing to shape Black and Latino youth's food-related attitudes and behaviors.[10,37] As a result, digital food marketing likely contributes to poor diets among Black and Latino children and higher rates of diet-related diseases in these populations.[10,11]

Conceptual model and frameworks informing the expert panel's approach

The expert panel approach was guided by the socio-ecological model to describe how children's macro-level, physical, and social environments shape children's food-related beliefs and behaviors.[49] The panel also applied the context of commercial determinants of health, which describes how widespread commercial sector practices at the macro-level create an environment that prioritizes commercial profits and drives ill health and health inequities.[7,50] These models provide a framework to understand how commercial actions in children's macro-level environment, including digital food marketing, shape their physical and social environments and impact diet-related outcomes, as well as their health and wellbeing more broadly. These same factors also influence children's families and their offline communities, which can reinforce the messages that children receive online. Since children are now continuously connected to the digital world through their smartphones, tablets, and other digital devices, their physical and social environments have become embedded within this macro-level digital food marketing environment (**Figure 1**).

Building on this conceptual model, the expert panel identified key actors affecting children's diet-related beliefs and behaviors, health, and wellbeing through their digital environment. Key actors at the macro-level, include advertisers (i.e., food companies and the companies who support their marketing activities, such as market research firms, advertising agencies, and data analytic companies), digital platforms, and the ad exchanges that determine what advertising is served to children. At the physical level, digital food marketing reaches children in community locations (retailers, restaurants, outdoor advertising) and schools. At the social level, digital marketing enlists children's peers and their online parasocial relationships (with celebrities, influencers, brand and media characters) to disseminate food marketing messages (**Figure 2**).

Marketing reaches children through multiple pathways in this digital environment. Digital marketing to children originates with key actors in the macro-level environment. Key actors in children's physical and social environments also create content and send food marketing messages directly to children on their digital devices. Sophisticated technological tools (e.g., algorithmic models, real-time ad buys) facilitate these interactions between key actors, thus amplifying exposure and impact of companies' food marketing messages. Children's online behaviors also produce data, which are collected and sold by key actors and eventually filter back to advertisers, digital platforms, and ad exchanges. These macro-level players then use children's individual data to evaluate and fine-tune their marketing messages and target audiences to maximize children's exposure and the power of these messages.

Expert Panel Process and Methods

HER convened a multidisciplinary panel of 12 experts for this project. The panel included researchers, advocates, and practitioners with expertise in the areas of digital and food marketing, racial and ethnic disparities, children's privacy, community engagement, children's media usage, communications, psychology, pediatrics, and digital technology. The expert panel met virtually nine times from September 2023 to May 2024; the panel chair, Dr. Jennifer Harris, led the panel meetings. The expert panel provided input on all aspects of the project, including the scope and outline of the technical report, the conceptual model, the criteria for evaluating policy options, and the final recommendations. Expert panel members also reviewed and provided input on the final technical report. The research team included the panel chair, a PhD student with expertise in nutrition and digital marketing, and a master's student with nutrition experience.

The review of the evidence and expert panel recommendations presented in this technical report were developed in five key steps:

1. The research team conducted literature reviews to summarize the current academic research on digital food marketing to children and adolescents (up to 18 years old).

2. The research team, together with policy experts on the panel, identified and evaluated policies and other potential systems-level solutions that have been implemented or proposed by a) industry (food, advertising and media companies) and b) government.

3. The research team, guided by a sub-group of expert panel members, conducted key informant interviews to identify barriers and potential solutions to digital food marketing policy changes.

Based on the evidence gathered in Steps 1 to 3, the research team and expert panel members developed the recommendations presented in this report as follows:

4. The expert panel reached consensus on recommendations for actions by key actors in children's macro-level, physical, and social environments.

5. The expert panel developed additional recommendations for a) potential government actions; b) future research; and c) resources for advocates, educators, health providers, parents, and youth.

Figure 1. Conceptual model of digital food marketing to children

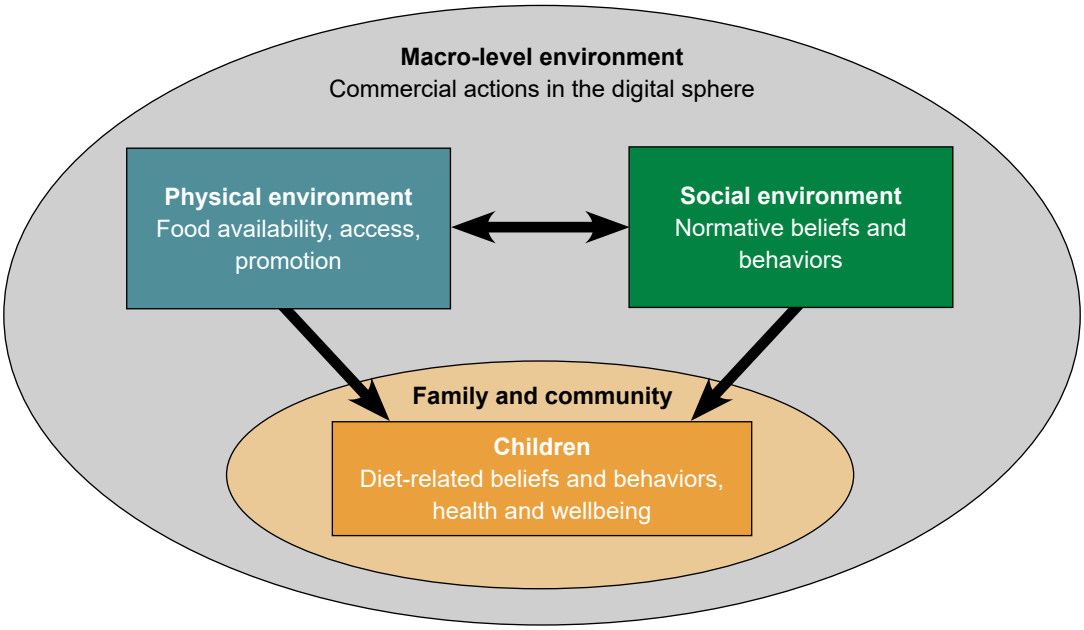
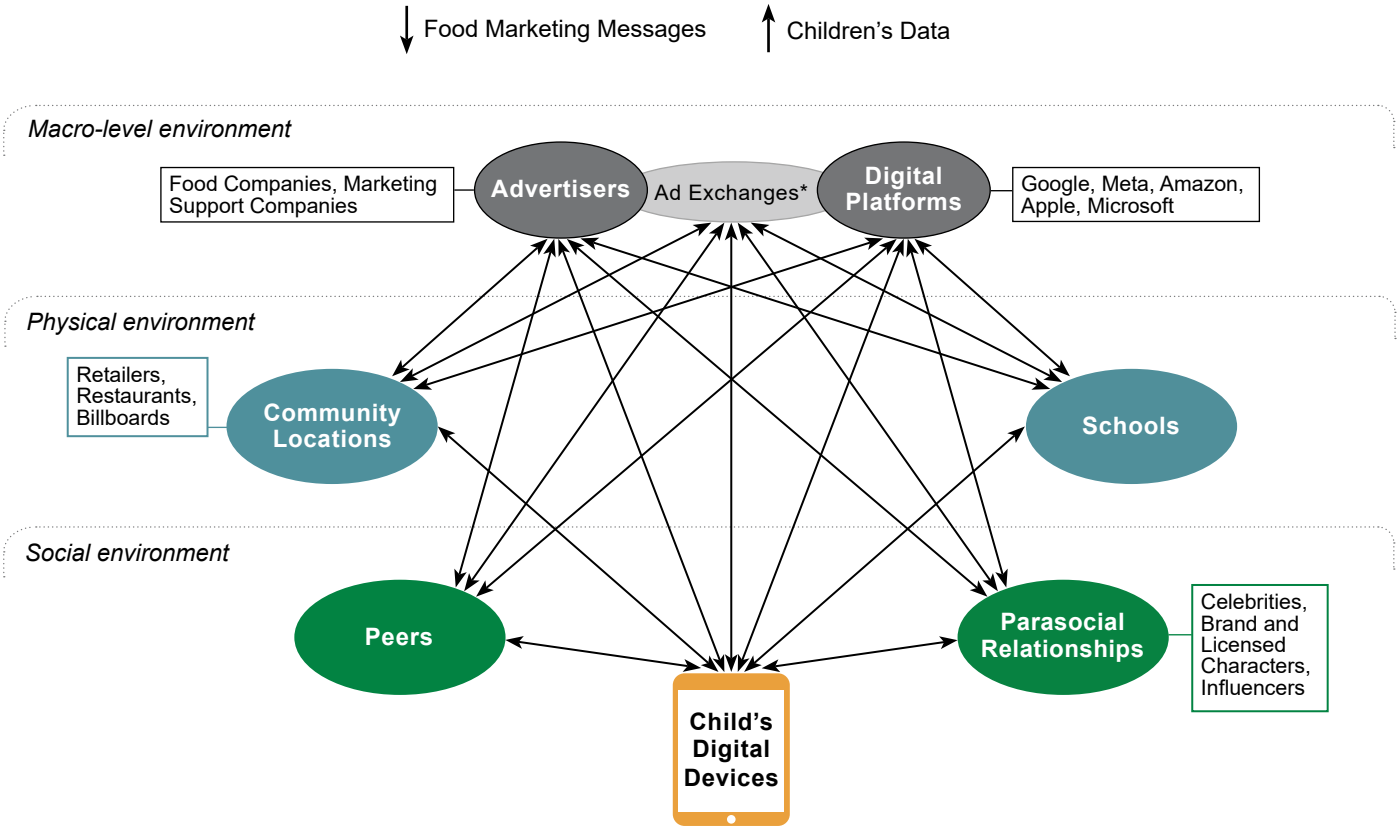


Figure 2. Key actors in children's digital environments and pathways of influence



** Digital marketplaces that facilitate the buying and selling of digital advertising space.*

Step 1. Review the current literature on digital food marketing to children

The research team undertook a series of literature reviews on the following topics regarding digital food marketing to children: (1) descriptive research on the content of food marketing in digital media; (2) measures of children's exposure; (3) effects on children's diet-related behavioral and intermediate outcomes and other broader outcomes; (4) targeted marketing and impacts on health disparities; and (5) brand marketing.

All academic papers published on digital marketing to children in the previous decade (from January 2013 through December 2023) were identified in two steps. Due to the expert panel timeline and the number of topics within the project scope, the research team first conducted a review of reviews (e.g., narrative, systematic, meta-analyses) to identify articles that examined any form of food marketing to children published from 2019 to 2023.[13,14,52-59] From the articles cited in these reviews, the research team selected all studies that examined digital food marketing and were published in 2013 or later for inclusion in the literature review.

The most recent comprehensive food marketing literature reviews only included papers through March 2020 and relatively few of the reviews examined digital marketing specifically. Thus, the research team also conducted a systematic literature search to identify additional peer-reviewed research on digital food marketing to children published from January 2019 to December 2023. English-language studies conducted in any country were included in the search. **Appendix A** details the search strategy and inclusion/exclusion criteria for the systematic review.

Step 2. Identify and evaluate policies and other potential systems-level solutions

The research team conducted targeted literature searches to identify previously proposed recommendations on digital marketing to children and existing evaluations of proposed actions. Searches for additional research evidence to inform the potential effectiveness of recommendations identified in the literature search, as well as potential recommendations identified by the expert panel were also conducted. In addition, expert panel members provided relevant peer-reviewed and grey literature to inform evaluation of potential recommendations.

Based on the results of this targeted literature search, the research team proposed a set of criteria to evaluate the potential effectiveness of existing and proposed policies to reduce children's exposure to unhealthy digital food marketing and its power to negatively affect them. These criteria were presented and discussed with the expert panel, and the expert panel reached consensus on the final list of criteria, which can be found in the **Criteria for policies to protect children from unhealthy digital food marketing** section of this report.

The research team, in consultation with expert panel members, then identified existing industry self-regulatory policies in the U.S. and existing and proposed government policies in the U.S. and other countries that would address unhealthy digital food marketing to children. Policies included actions that addressed food marketing to children specifically, as well as policies that would address broader harms of digital marketing to children, such as data protection and privacy or unfair and deceptive practices. Researchers then applied the set of criteria developed by the expert panel to evaluate the potential impact of these policies. The findings of this analysis were used to inform the expert panel recommendations.

Step 3. Conduct interviews with key influencers to identify barriers to enacting mandatory policies and potential solutions to address those barriers

A sub-committee composed of five expert panel members with expertise in digital marketing policies and advocacy met three times over five months with the task of identifying key influencers and producing insights on the barriers and facilitators to enacting digital food marketing policies in the U.S. The subcommittee recommended a power mapping approach (informed by *The Commons Social Change Library*) whereby key informant interviews were conducted with individuals identified as having influence to either support or resist changes designed to protect children from targeted marketing in the digital marketing landscape (e.g., policymakers, government officials, advocates). The purpose of the key informant interviews was to reveal the power dynamics at play and determine what stands in the way of making the policy changes needed to protect children from harmful marketing. The interview questions were crafted with input from experts and covered the following topics: challenges in regulating digital food marketing to children in the U.S., successful policy implementation, supporters and blockers of progress, reasons for inaction, potential for litigation, and targeted marketing. A full list of interview questions can be found in **Appendix B**.

Recruiting participants. The initial phase of the interview process involved seven interviews with members of the expert panel. To broaden the scope of perspectives and expertise, a snowball sampling technique was used where panel members recommended additional experts in the field for interviews; 12 additional interviewees were identified through this process. A graduate student at Duke University (Galiya Chenault (GC)) conducted the interviews and was trained by expert panel members with expertise in power mapping and interviewing techniques. The interviews were conducted via Zoom from March to June 2024 and recorded and securely stored on the

University's service designed to protect sensitive information. Participants were told their names would be kept confidential and all data would be aggregated and not attributed to individuals.

Data analysis. The interviews were transcribed verbatim to ensure accuracy. GC prepared and analyzed the interview data to identify key themes in two areas: 1) barriers to implementing digital food marketing policies; and 2) potential solutions to overcome those barriers. Important points from each interview were highlighted to identify recurring themes. Key themes were then merged, grouping similar themes together. A summary sheet was created to list and describe the key themes, supported by examples from the interviews, and the frequency of each theme's occurrence across the interviews. Finally, an analysis of the themes was conducted to interpret the data and draw conclusions.

Step 4. Develop the expert panel recommendations

In developing the conceptual model to guide the panel recommendations, the expert panel first agreed on the key actors affecting children's digital environments at the macro, physical, and social levels. The panel also applied the criteria developed to evaluate existing and potential industry-led and government policies (in Step 2) to assess the potential impact of policies and other systems-level actions that could be taken by each key actor. This approach was used in lieu of a formal methodology grading due to the small number of studies evaluating effectiveness of policies available in the existing literature. The expert panel defined positive impact as a reduction in children's exposure to digital marketing and/or a reduction in the power of digital marketing to negatively affect children.

The expert panel chair drafted preliminary recommendations for each key actor based on the literature findings and input from expert panel members with expertise in that particular area. The expert panel discussed the draft recommendations and revised them until consensus was reached, through a process adapted from the Consensus Development Panel Methodology used by NIH.[60] Decisions were made by agreement rather than majority vote. To identify areas of disagreement, panel members completed a series of Qualtrics surveys asking if they agreed, disagreed, or were not sure about each proposed recommendation. At subsequent panel meetings, the expert panel chair facilitated discussions on all policies where one or more panel members disagreed or was not sure. When possible, recommendations were reworded or revised to address the concerns raised, and agreement with the revised recommendation was assessed in a follow-up Qualtrics survey. All recommendations, including those deliberated, but where full consensus was not achieved, are presented in the **Expert Panel Recommendations** section of this report.

Step 5. Developing potential government policy solutions

Based on the findings in Steps 1 to 3, the research team identified a number of potential policy solutions that would directly address digital food marketing to children. These potential solutions are not considered recommendations as the panel did not conduct the same consensus-building process described in Step 4. Instead, select panel members, two legal experts, and an advocacy expert (outside of the expert panel) reviewed and provided input on the potential government policy solutions. All expert panel members then reviewed the list, and their comments were integrated into the final report.

The Evidence

Current Literature on Digital Food Marketing to Children

To understand the most recent literature on digital food marketing to children and remaining research gaps, the research team sought to answer the research questions, *"What is the current research that describes digital food marketing, where and how are children exposed, and what are the diet-related and other impacts of exposure?"* A comprehensive review of the English-language peer-reviewed literature on digital food marketing to children in any country published during the past ten years was conducted. Details on the search criteria and other methods can be found in the **Methodology** section and **Appendix A**.

Previously Identified Research Gaps

To inform the literature review conducted by this expert panel, previously identified research gaps were considered. Previous reviews of the food marketing literature highlight numerous gaps in the research needed to inform potential policy and systems-level solutions to protect children, and many of these research gaps have special relevance to digital marketing.

For example, research is sorely needed to understand how unhealthy food marketing in all forms contributes to health disparities affecting Black, Latino and Indigenous children,[6] which is critical to identifying effective solutions.[37] Documenting Black and Latino children's exposure to digital food marketing is an important first step, but food marketing research rarely includes adequate ethnic and racial groups for these analyses. One systematic review found only 25 eligible studies globally across all forms of food marketing that included analyses of socio-economic or ethnic and racial differences; none of these 25 studies focused on digital marketing.[61] In addition, few studies have examined how structural inequities, such as racialized marketing and the food environment in low-income communities, shape experiences of food marketing by minoritized youth.

Previous food marketing reviews have also noted the need for research on exposure to brand marketing in all media and how it affects attitudes and consumption of brands' unhealthy products.[31] Brand marketing includes marketing that features only a brand logo or mention (without referring to a specific product) or marketing that promotes healthier products offered by a brand that also has unhealthy products in its portfolio. This question is especially relevant to digital media as marketing messages online often portray a brand logo alone, not individual products.[20,62] Research is also needed to examine exposure to food marketing and its effects on children of all ages, including adolescents and young children (under 6 years) who have not been well-studied.[14,53] Further, food marketing research primarily focuses on one type of marketing (e.g., TV advertising, or social media), and rarely assesses cumulative impact or exposure of food marketing delivered across different media.[31,63] In addition, few studies have assessed the broader socio-cultural impact of food marketing in any form, including digital.[36]

Research to quantify children's actual exposure to digital food marketing is crucial to raise awareness of the extent of the problem and to identify effective solutions to protect children from digital marketing exposure.[37,62] However, measuring digital marketing exposure faces unique challenges due to its highly targeted and personalized nature, researchers' inability to access company proprietary data, the substantial resources required to conduct this research, and potential ethical issues.[31,61,63]

Another challenge for digital food marketing researchers is keeping up with the rapidly changing platforms and creative strategies used in digital marketing. For example, many academic studies have focused on effects of advergames, an early digital food marketing technique targeting children, that is rarely used today. However, few studies have examined marketing in current popular gaming platforms (e.g., Minecraft, Roblox) or livestream gaming sites (e.g., Twitch).[53] Additional currently popular digital media that have received little or no food marketing research attention include esports, food delivery and other mobile apps, and the metaverse.[31] By the time there is enough evidence to publish reviews on the prevalence and effects of newer popular digital marketing techniques, food companies will have likely developed new ones.

Finally, few studies have examined how unique aspects of digital food marketing described earlier may increase the power of those messages, including engagement techniques and use of parasocial relationships, peer dissemination through social networks, and interactions between children's digital and physical environments.[31] Moreover, how advertisers use children's personal data and online behaviors to identify susceptible consumers and precisely target and personalize marketing messages to them is not well-understood. Research on children's ability to recognize food marketing messages embedded within entertainment content online (i.e., stealth marketing) and how it affects them is another important research gap.[31]

Current Literature Review Results

This literature review identified 102 papers that examined food marketing to children (<18 years of age) in digital media published since 2013, including 42 studies[64-105] from previous literature reviews[13,14,52-59] and 60 studies[106-165] from the systematic review of more recent literature. Studies were categorized by research topic as follows: 1) descriptive studies that analyzed the content of different types of digital food marketing (n=35); 2) studies that quantified children's exposure to this marketing (n=18); and 3) studies that investigated the impact of marketing exposures (n=49) (including six studies that also included self-reported exposures to digital marketing).

Within each research topic, studies were also categorized by type of digital media examined, including social media (e.g., Instagram, Facebook, Snapchat), video sharing platforms (e.g., YouTube, TikTok), game platforms (e.g., Roblox, Minecraft), livestream gaming (e.g., Twitch, Fortnite), websites, and mobile apps. The majority of studies were conducted in high-income countries (89%), including a relatively small number from the United States (n=21). **Appendix Tables C1-C3** provide details about the studies identified in this review.

Key Findings

- Across all digital media, food marketers promote unhealthy products that do not contribute to a healthy diet.
- Digital marketing of all forms has similar negative effects on children's diets as traditional marketing, including behavioral outcomes (increased acute calorie intake, unhealthy food choices, requests to parents, and a decrease in longer-term diet quality) and intermediate outcomes (positive attitudes toward the ads and advertised products and intent to purchase or request the products).
- These negative effects occur with adolescents, as well as younger children.
- Digital marketing is often difficult for children, including adolescents, to notice and recognize as advertising.
- Initiatives to increase children's recognition of digital marketing and understand its persuasive intent (e.g., ad disclosures, digital literacy training) do not reduce the power of this marketing to increase children's positive attitudes and desire to consume advertised products.
- Interventions to promote healthy foods in digital media rarely increase children's consumption of or preferences for fruits and vegetables and do not reduce their preferences for unhealthy foods.

Descriptive studies of different types of digital food marketing

A recent WHO-commissioned narrative review included descriptive studies that analyzed the content of food marketing in different media and marketing venues and exposure studies documenting the amount of food marketing that children experienced or were likely to experience in these different settings.[13] These studies consistently demonstrate, across all forms of marketing to children worldwide, the high prevalence of foods that contribute to unhealthy diets, predominantly fast food, sugary drinks, candy, sweet and salty snacks, and breakfast cereals, as well as the absence of marketing for healthy foods. The narrative review examined 24 studies of food marketing in digital media (out of a total of 143 content analysis studies), including paid ads that appeared on child-targeted websites and gaming platforms, marketing on food-brand websites and social media accounts, and food brand mentions on YouTube videos posted by popular child influencers.[13] However, the authors could not make broader conclusions about the content of digital food marketing or children's exposure due to the relatively small number of digital marketing studies and the wide variation in digital media and techniques examined.

Recent Literature on Types of Digital Food Marketing

The 35 descriptive studies of digital food marketing to children in the current review included 14 papers from the review of reviews and 21 studies from the recent literature search. These papers described the presence of food marketing in the following types of digital media: social media (n=17), video sharing (n=16), websites (n=7), livestream gaming (n=3), advergames (n=1), and food brand mobile apps (n=1), with studies often examining more than one platform. This research was conducted in primarily high-income countries and regions, including the U.S. (n=12), Australia/New Zealand (n=8), Canada (n=4), and Europe (n=4).

These descriptive studies primarily used two methods to identify the content for analysis: 1) digital media and/or platforms that were popular with children (n=19); or 2) company owned-media (e.g., websites, social media accounts maintained by the companies) from unhealthy food brands that were popular with children (n=14). One study examined both brand-owned and third-party websites,[73] and one study compared digital to traditional forms of marketing.[124] One paper used qualitative analysis to identify creative techniques in ads that adolescents considered to be "teen-targeted".[123] The remaining papers utilized content analysis to describe food marketing in digital media.

Food marketing in digital media popular with children

- The analyses of digital media identified as popular with children examined a variety of types of media, including influencer and other videos (n=11), ads on third-party websites (n=3), brand mentions on livestream gaming platforms (n=3), and celebrities' social media accounts (n=1). Although most (77%) did not provide specific target audience age ranges, papers examining YouTube Kids or kid influencers on YouTube noted that this marketing is targeted at children younger than 13 years old.[64,66,108-111,115] Papers that described ads on third-party websites used publicly available market research data to identify websites popular with children ages 2-17.[65,73]

- These studies consistently found that unhealthy food predominated on digital media popular with children. Across social media and video sharing platforms, the top marketed food categories included fast food, snacks (mostly labeled by researchers as savory), sweets (included candy, confectionery, chocolate, ice cream, and other desserts), and sugary drinks (soda, sports drinks, and energy drinks). Food ads on third-party websites also primarily featured fast food, sweets and snacks, as well as sugary cereals.[65,73] One study found that energy drinks were the most commonly marketed product on livestream gaming, significantly outpacing marketing of other food categories, including fast food and food delivery services.[112]

- Studies also reported a variety of creative techniques, including influencer marketing, marketing embedded within entertainment content, and engagement techniques (e.g., giveaways, competitions, and calls to action such as sharing content with friends). Additionally, one study reported the use of celebrity endorsement of food brands on celebrities' own social media accounts.[113] In studies that examined video sharing platforms (YouTube and TikTok), branded products were integrated into the entertainment content through product placement in the background, verbal references, and product consumption. Influencer marketing strategies on video sharing sites included discussing appealing flavor attributes of the products. Similar to video sharing platforms, the primary technique reported on social media was embedding products and brands within the entertainment content. Engagement with social media content was only described in one paper as liking and commenting on celebrities' posts, with no mention of specific calls to action or giveaways.[113] On livestream gaming platforms, food brand placements appeared as streaming content and brand mentions in the stream titles, as well as brand mentions in the chat, which could also include user-generated mentions.[106,112] Only one of the studies analyzing websites popular with children reported on creative techniques. That study reported that product placements were integrated within the game at varying levels.[67]

Brand-owned digital media

The food brands included in the analyses of food company-owned media (social media accounts, mobile applications, and websites) represented similar product categories, including sugary drinks (n=7), sweets (n=7), fast food (n=5), sugar cereals (n=3), energy drinks (n=2), and snack foods (n=1). The target age groups in these papers were typically defined as brands popular with "children" and/or "adolescents".

- Food brands used a variety of creative strategies across digital media platforms. While few brand websites had a designated section for children, their websites featured creative techniques that the researchers identified as appealing to children, including advergames, promotional or licensed characters, downloads, and engagement techniques.[73,74,77,122] The techniques reported most often on brands' social media accounts included engagement devices (hashtags, calls to share content, and tagging) and endorsement by celebrities or athletes. One study reported on "promotional activities" within mobile applications available to children under the age of 13 that included interactive games and calls to also visit the brand's social media pages.[75]

Advertising disclosures

The presence of advertisement disclosures was reported in six of the studies examining digital media popular with children and one study of food company-owned digital media.

- Within influencer videos on YouTube, few disclosures of paid brand and product sponsorship or advertisements were reported by influencers (0.3% to 6.9% of videos).[104,108,109,114] Sponsorship of Instagram posts were disclosed in 4.8% of celebrity posts and 23.5% of influencer posts.[113,114] TikTok posts related to energy drinks reported paid advertisements and brand sponsorships in 29% of the videos and broadly in 6.5% of influencer videos.[107,114] In contrast, one study from New Zealand found that 90% of the food brand websites analyzed contained legal information in the form of privacy statements that were made available to parents.[122]

Summary of Descriptive Studies

These descriptive studies clearly establish the frequent presence of unhealthy food marketing across a variety of digital platforms, including social media, video sharing platforms, brand and third-party websites, and livestream gaming. A few studies also specifically examined marketing delivered via influencers, celebrities, and gaming sites popular with children. Across all media types, food brands embedded within entertainment content and devices that encourage engagement with branded content were common. Nearly all marketed foods were from categories with primarily unhealthy products, including fast food, sugary drinks, sweets, and snacks. Studies

that reported disclosures of advertising content found low rates of disclosures on branded content (including influencer videos and posts) and it is difficult for researchers to identify whether this content was paid (i.e., the company paid the provider to include their brand). These brand mentions could also have been earned marketing, where content creators chose to include a food brand for another reason and were not compensated by the food company.

There are some limitations in interpreting the findings. These studies examined marketing in digital media and/or food brands that are popular with children as a proxy for exposure, but in most cases, data are not available to measure how many children were actually exposed to the marketing. In addition, creative techniques were often described broadly and conceptualized differently between papers, making it difficult to make comparisons between types of marketing and/or brands. Additionally, newer digital platforms and those that may be more popular with adolescents compared to younger children, such as livestream gaming, Instagram, Snapchat, TikTok, and mobile apps were not as well studied. Finally, creative techniques that appeared to target specific ethnic, racial, or economic groups were not captured in these content analyses.

Children's exposure to digital food marketing

Prior to 2020, few research studies quantified children's actual exposure to digital food marketing. For example, the WHO narrative review identified more than 100 exposure studies that documented the prevalence of unhealthy food marketing in media popular with children, but just two studies measured children's actual exposure to digital marketing.[13]

Recent Literature on Exposure to Digital Food Marketing

While descriptive studies provide a broad picture of food marketing found in specific types of digital media, fewer studies measured children's exposure to this marketing. This review identified 16 papers from the recent literature search and two papers from the review of reviews that used various methods to quantify actual or estimated exposure, including self-report (n=9), screen recording (n=7), and syndicated market research data (n=2). Of the 18 studies, 12 primarily examined social media and/or video sharing platforms. Three papers examined all forms of digital media that appeared on children's smartphones using screen recording, and six papers examined self-reported exposure on non-specified "online" platforms.

These studies were conducted primarily in high-income countries and regions, including Canada (n=7), Australia/New Zealand (n=4), and the U.S. (n=3). One study was based in Mexico[121] and another multi-nation study included Mexico and Chile.[138] Most exposure papers included adolescents (ages 13-17) (n=14), while nine included children under the age of 13 years. Seven studies reported participant race and/or ethnicity,[79,127,128,130,132,133,140] including four studies with a large proportion of non-majority participants (i.e., 70% or more of the sample).[79,132,133,140] Six studies reported participant SES or household income.[79,127-130,138]

Screen recording studies

In screen recording studies, researchers captured videos of the child's smartphone screen over a certain period of time and then used content analysis to identify and code the food marketing messages that appeared. In these studies, the proportion of children exposed to food marketing was high.

- One study examined New Zealand adolescents' (16-18 years) exposure to food advertising on Facebook only (viewed on a desktop computer) and found that only 4% of advertisements were food related.[131] However, three other studies[79,127,128] that examined exposure on mobile devices found rates of exposure ranging from 70% to 76%.

- Frequency of exposure (i.e., number of exposures viewed) varied widely, which is likely the result of varying sample compositions and digital media examined. One study that recorded all smartphone usage across more than one time point, found that Australian adolescents (13-17 years) were exposed to an average of 17.4 food promotions per hour and an estimated 168.4 per week.[130] Other studies estimated food marketing exposure rates per 10 minutes of social media use by adolescents in Canada (2 and 2.6 exposures)[79,128] and Australia (5.8 exposures).[129] Studies that included younger child participants found lower rates of exposure, including a study of social media use by 7- to 11-year-olds in Canada (1.4 exposures per 10 minutes)[79] and another study that measured exposure during all smartphone use by children 6 to 19 years old in Mexico (2.7 exposures per hour).[127]

- Another study recorded adolescents' screens (13-16 years) while using social media to measure their actual exposure and then asked participants if they recalled seeing any food marketing.[129] Despite an actual exposure rate of 12 food promotions per 10 minutes, the majority of the sample responded that they "rarely" or "sometimes" recalled seeing food promotions. However, they recalled seeing promotions for unhealthy (defined as 'non-core') foods more often than healthy (or 'core') foods.[129]

- One study collected 500,000 smartphone screenshots across 1 to 3 months from four U.S. Latino adolescent participants.[132] The authors quantified and described the wide variability in food-related content that individual participants viewed and shared on one screen day.

Self-reported exposure and syndicated data studies

Studies using self-reported exposure typically measured the reach of digital marketing (or percent of children exposed) over various timeframes, from the last 30 days to the last year, by asking children if they recalled seeing food advertisements "online" or on "social media". All self-report exposure studies found that 75-82% of participants reported any amount of exposure to food marketing on digital platforms. Syndicated data studies used research data purchased from market research firms.

- One study spanned six countries and found a wide range of self-reported exposure on social media (27% in the UK to 60% in Chile) and gaming platforms (10% in Australia and the UK to 17% in Chile).[138] Another study asked adolescents to take screen shots of food content on social media; 49% of captured images were branded foods on posts from both peers and influencers, and 49% of these images were earned marketing and 40% paid marketing.[78]

- In three studies, researchers asked participants to take screen shots of advertisements they saw online for one week.[134,135,139] Participants in these studies identified six to seven advertisements that they felt were "teen-targeted" over a seven-day period, of which 80-91% appeared on social media platforms. Another study surveyed a large sample of adolescents (ages 13-17, N=1564) and found that approximately 70% reported engaging with at least one food brand on social media, and 35% reported engaging with five or more food brands.[140] This study also found differences in engagement by race and ethnicity, with a higher percentage of Black (81%) and less-acculturated Latino participants (i.e., those who speak Spanish more often) (73%) engaging with at least one food brand compared to White (70%) and more-acculturated Latino participants (69%).

- A syndicated research study estimated exposure through social media user demographics and found that 6.2 million U.S. adolescents followed food and beverage brands.[142]

Types of foods marketed in digital media

Most foods featured in digital marketing across all types of exposure studies were unhealthy or those that did not meet nutrition criteria for advertising to children, with fast food, sugary drinks, snacks, and candy reported most often.

- One study based in Canada used screen recording to capture exposures on social media and reported that candy and chocolate marketing was more frequently viewed by children, while snack food marketing was more frequently viewed by adolescents.[79] Two studies investigated self-reported exposure to energy drink marketing only and found that 75-82% of participants had been exposed to these advertisements.[136,137]

- One Canadian study found differences between racial groups in the types of foods marketed, with White participants reporting seeing more ads for fast food, snacks, sugary drinks, desserts, and sugary cereals than Asian participants.[133] In comparison, Indigenous participants reported more frequent exposure to snacks, sugary drinks, and sugary cereals than White participants.[133] Another study examined differences in exposure between countries and reported that children in Mexico and Chile were more likely to be exposed to sugary drink ads and that U.S. children were more likely to report exposure to marketing for fast food compared to other product categories.[138]

Creative techniques

Creative techniques were reported in 11 of the exposure studies, primarily those that used screen recordings. Techniques were similar to those found in the descriptive studies, including engagement (calls to interact or share content, quizzes, polls and contests), characters, and branding.

- Two papers quantified how much exposure came from owned (5-16%), earned (58%), and paid media (23-24%) where the source could be identified.[129,130]

- Two papers using screen recording methods also noted the proportion of marketing embedded in user-generated (19%), influencer and/or celebrity (17-26%), and other types of content (34-36%).[79,129]

Summary of Exposure Studies

These exposure studies provide a more specific lens into the reach, frequency, and types of marketing children are exposed to in digital media. Screen recording studies in particular provide tangible proof of the types of digital marketing that children regularly experience on their smartphones. Because these studies are recent (2019 or later), they document many of the more current forms of digital media, especially social media and video streaming platforms.

Screen recording studies present a snapshot in time, from which broader exposure can be estimated. However, screen recording studies tend to have smaller sample sizes (all but one had approximately 100 participants or fewer). In addition, the highly individualized marketing content viewed on digital platforms presents a challenge to estimating population-level exposures from relatively small samples. As a result, estimated number of exposures varied widely. Self-reported exposure measures allow for larger and more diverse samples, but they are less precise, subject to recall and self-presentation biases. They also require children to notice and recognize marketing when they see it. However, self-reported methods can help quantify the types of marketing that children are aware of and remember seeing on these platforms.

In contrast to earlier food marketing studies, exposure studies primarily examined adolescents, although a few also measured exposures by children under age 10. Only two studies examined differences in exposure between diverse participants, but almost one-half reported participant SES, race and/or ethnicity and one study reported on Indigenous children in Canada.

Table 2. Categorizing effects of digital food marketing exposure

Diet-related effects[13,14,166]	
Behavioral outcomes	**Intermediate outcomes**
• Brand/category choice • Requests to parents • Purchase • Acute (immediate) intake • Longer-term diet quality/ category consumption	• Brand/product awareness • Ad awareness/recognition • Ad attitudes (liking) • Brand/product attitudes • Taste preferences • Intent to request/ purchase
Broader outcomes[36-38]	
• Health disparities • Threat to children's rights (including privacy, freedom from manipulation) • Peer/family relationships • Social norms, culture	
Digital marketing similarly affects children and amplifies the effects of traditional forms of marketing	

Impact of digital food marketing

To demonstrate how exposure to all forms of food marketing affects behavioral and health outcomes in children, the WHO commissioned a systematic review and meta-analysis of quantitative studies assessing associations of food marketing with specified outcomes (e.g., purchase requests, dental caries, weight) in children and adolescents (aged 0-19).[14] A WHO-commissioned narrative review, which included qualitative and cross-sectional studies, also found associations between food marketing exposure and diet-related outcomes.[13] Guided by the food marketing hierarchy of effects model,[166] the WHO reviews concluded that exposure to unhealthy food marketing negatively affects *diet-related behavioral outcomes*, including acute food intake immediately following exposure and children's food choices and requests to parents. In addition, they found that food marketing affects *intermediate or proxy outcomes* associated with unhealthy diets by increasing children's brand awareness and positive attitudes, ad liking, taste preferences, and purchase intent for the unhealthy foods marketed most frequently. The authors also found "no statistical evidence that marketing channel (digital, TV, or packaging) moderates effects on food intake, food choice, or food preference." Thus, all forms of food marketing to which children are exposed are likely to influence diet-related behaviors. The analysis also found no evidence that age moderated the effects of food marketing, but most of the research was conducted with children ages 6 to 12.

A number of previous reviews have also summarized the literature on diet-related effects of specific types of digital food marketing. Advergames (a form of paid or owned marketing in which branded food messages are embedded in game play)[52-56] and marketing in social media and video sharing platforms, including by influencers and celebrities, have been examined most often.[52,53,55,57] These reviews conclude that exposure to digital marketing increases children's positive attitudes and preferences for the unhealthy foods advertised. In addition, playing advergames increases acute caloric intake during or immediately following exposure[54], with effects likely greater than those found with TV food ad exposure.[56]

Research has consistently shown that digital food marketing to children has similar diet-related effects as traditional food marketing, including on both behavioral and intermediate outcomes (see **Table 2**). However, the digital food marketing literature described in these reviews focused on a subset of digital media and creative strategies and has not kept pace with the rapidly changing digital marketplace. In addition, unique aspects of digital food marketing that may have even broader effects on children's health and wellbeing were not well-studied, and few studies examined how digital food marketing interacts with and may amplify the effects of traditional forms of marketing.

Recent Literature on Impact of Digital Food Marketing

A total of 49 studies examined the impact of exposure to digital food marketing, including 26 studies from the review of reviews and 23 studies from the recent literature search. Impact studies measured effects and/or associations of digital food marketing on diet-related behavioral outcomes (e.g., food intake or choice) (n=28), intermediate diet-related outcomes (e.g., food preferences, ad attitudes) (n=31) and broader socio-cultural outcomes (n=4). Impact studies used experimental (n=33), cross-sectional survey (n=10), and qualitative (n=6) methodologies. Social media and video streaming platforms (n=24) were the most studied type of digital media. A large subset of studies also examined effects of advergames in unspecified media platforms (n=21) across all study designs. Four studies measured other forms of digital marketing (livestream gaming and websites).

Similar to the descriptive and exposure papers, studies measuring the impact of digital marketing were primarily conducted in high-income countries, including Netherlands (n=14), Australia (n=8), Belgium (n=7), U.S. (n=7), and Canada (n=2). Only 12 papers reported on race and ethnicity, while three had highly diverse participant samples (55% or less non-Hispanic White).[83,101,155] Participants in impact studies spanned age groups from early childhood through late adolescence, with 44 papers including ages less than 13 and 21 including ages 13 and older.

Advergames

Of the 21 studies that measured the impact of playing advergames, 20 used experimental designs to assess outcomes immediately following advergame play. One paper collected qualitative data related to an advergame exposure.[96] All studies included participants under 13 years old. Six studies also included children younger than 7 years old, and two studies also included adolescents (ages 13-14). Four advergame studies were found in the recent literature search, the rest were older studies identified in the review of reviews. Although advergames have been largely replaced by newer, more sophisticated forms of digital marketing, these studies demonstrate the power of digital marketing to negatively impact children.

- *Behavioral outcomes.* Approximately one-half of the advergame studies assessed effects on behavioral outcomes, including acute food intake (n=9) and/or food choice or preference (n=6). Most food intake studies measured amount of food (calories or grams) consumed during or immediately after game play. In all studies but two,[87,145] a brief experimental exposure to an advergame containing a branded food cue increased caloric intake and choice or preference for the unhealthy marketed food when compared to a game with no food cues or healthy food cues. Only one study measured repeated exposure and found that playing an advergame increased choice of the product featured in the game (brand and category) with no additional effects when the game was played daily over five days.[80] Two studies compared advergames to TV advertising. In one, playing an advergame increased children's unhealthy food choices compared to viewing a TV commercial.[81] In another, playing an advergame and watching TV commercials increased caloric intake to a greater extent than viewing TV commercials alone.[82]

- *Intermediate outcomes.* Ten studies measured intermediate diet-related outcomes of advergame exposure, including intentions to purchase or request the brand from parents (n=7), brand attitudes (n=6), ad awareness/recognition/attention (n=5), and desire or intent to consume the advertised food (n=1). The one qualitative study reported high recognition of branded characters and desire to purchase the featured fast-food brand after playing an advergame in a small sample of children (ages 5-8).[96] Studies comparing advergame to TV commercial exposure found that advergames were less likely to induce advertisement awareness or persuasion knowledge, but had a greater effect on purchase intention and attitudes.[85,93,95,144]

- *Attention and advertising literacy.* Two studies found that greater attention to the branded food and degree of entertainment or liking the game may increase the impact of advergames on behavioral outcomes.[81,90] One study included an ad disclosure condition and found that food intake increased when exposed to food brand advergames regardless of the ad disclosure message.[84] Moreover, greater persuasion knowledge while playing the advergame was counter-intuitively associated with greater purchase intention.[86]

- *Effects on healthy versus unhealthy foods.* Nearly all advergame studies used branded unhealthy foods as the stimuli, including candy, sugary cereal, and chips. Five studies included a healthy food condition using fruit, and four of these studies found no effect of healthy food advergame on intake of fruit.[81,94,145,146] One study found a positive effect of a healthy advergame on fruit intake by very young children (ages 4-5), but only when the child was aware that the licensed character (Dora the Explorer) was present in the game.[83] This study had a more diverse sample, with only 35% White participants.

Social media and video streaming platforms

The 24 impact studies that examined effects of digital marketing in social media and video streaming platforms used experimental (n=12), cross-sectional (n=7), and qualitative (n=5) methods. In contrast to the advergame studies, two-thirds (n=8) were newer studies identified in the recent literature search. They were conducted with children under 13 years (n=21) and/or 13 years and older (n=17), with some samples including both age groups.

Experimental studies tested effects of digital marketing in YouTube (n=5), Instagram (n=5), Facebook (n=2), or an unspecified social media platform (n=4). Creative techniques used in the experimental studies included influencer marketing within videos (n=9), static posts with images of branded products (n=6), and engagement through liking and comments (n=1). Cross-sectional (n=7) and qualitative studies (n=5) examined associations with self-reported exposure to YouTube (n=5), Instagram (n=3), Facebook (n=4), or unspecified social media on diet-related behavioral and intermediate outcomes. Two self-report studies captured engagement through likes, shares, and comments, but the qualitative and remaining cross-sectional studies did not identify specific techniques used in social media exposures.

- *Behavioral outcomes.* Thirteen impact studies measured behavioral outcomes, including acute food intake following exposure, food choice, purchase requests and self-reported diet measures. These studies were mainly conducted with children older than age 10.

  - In experimental (n=4), cross-sectional (n=5), and qualitative (n=2) studies, exposure to food marketing on social media was related to unhealthy food consumption. Two experimental studies provided children (ages 9-11) chocolate cookies after exposure to a YouTube video, finding that total caloric intake increased after exposure to a video with food marketing compared to non-food marketing.[100,104] Self-reported exposures to food marketing within social media were consistently associated with higher reported intake of unhealthy foods.[78,98,99,103,153] However, these studies did not specify the types of foods featured in the self-reported exposures beyond the distinction of being unhealthy or high in fat, sugar, or salt (HFSS).

  - Similarly, participants in cross-sectional studies were asked to recall whether they had seen food marketing on various social media platforms, but outcomes could not be linked to viewing on specific platforms.

  - Qualitative studies reported that children (ages 11-16) were able to verbalize the impact of influencer food marketing on their food choices and eating behaviors. In one study, Black children indicated that celebrities of the same race have a significant impact on their food choices.[101] Additionally, children reported that marketing messages on social media were more impactful on their food choices than parental messaging about healthy food choices.[102]

- *Intermediate outcomes.* Experimental (n=9), cross-sectional (n=2), and qualitative studies (n=4) also measured a variety of intermediate outcomes from exposure to digital food marketing, including brand and marketing attitudes and intentions to purchase and consume.
  - Studies found that marketing in social media and video streaming platforms impacted brand awareness and purchase requests. Children (ages 10-13) recalled seeing food brands on video streaming platforms and 58% of these children reported asking their parents to purchase brands and products seen within these videos.[163] Another study found that adolescents recalled more unhealthy food marketing than healthy food marketing within social media posts (Facebook).[147] A study comparing traditional TV ads to a brand's Facebook page found that children (ages 8-14) reported similar desire to consume the product in both conditions.[97] However, exposure to social media also influenced the perceived appropriateness of frequent consumption of the marketed foods.
  - Two studies examined attitudes about and recognition of digital marketing in social media and video streaming platforms. Advertisements on Instagram were more appealing and less identifiable as marketing compared to traditional display ads in a sample that included 47% Black participants.[155] When comparing brand-owned to influencer-generated Instagram posts, one study found no difference in recognition of marketing, but greater brand liking with influencer posts.[154]
  - Qualitative studies interviewing children (older than age 10) found that they believed that food ads on social media positively impacted brand attitudes and generally accepted them as a way to learn about new products and engage with brands they like.[102,158,164,165] Furthermore, adolescents (ages 12-16) had positive attitudes towards influencers and were not critical of influencer marketing.[165] A sense of familiarity with an influencer was found to be the most important factor impacting positive attitudes towards influencers for children (ages 10-11), which is important for the effectiveness of influencer marketing.[164]
- *Healthy food marketing effects.* Two experimental studies that included healthy food marketing exposure in social media found no effect on either healthy (vegetables and fruit) or unhealthy food intake after healthy food exposure.[100,149] One study comparing two influencers portraying different lifestyles found paradoxically that a sedentary influencer promoting an unhealthy product significantly increased healthy food choice, whereas an active influencer promoting a healthy product did not.[148] While self-reported exposure to healthy food marketing on social media was not significantly associated with healthy food intake, participants who reported higher food literacy were more likely to report unhealthy food marketing exposure.[156]
- *Advertisement disclosures.* The impact of advertisement disclosures on food-related outcomes were included in five experimental studies, all examining influencer videos on YouTube.[84,104,159-161] One study found that food intake increased after exposure to food marketing in a YouTube video regardless of the presence of an ad disclosure, although the disclosure improved brand recall.[104] Another study found that an ad disclosure decreased desire for the product, but only if the child remembered the disclosure and did not have a strong parasocial relationship with the influencer featured in the YouTube video.[160] An experimental study evaluating the effectiveness of ad disclosures in a YouTube video found that ad disclosures increased awareness of advertising and understanding of persuasive intent for older adolescents, whereas younger adolescents required the ad disclosure to also include a statement disclosing the ad's persuasive intent.[162] Another study found that disclosures that originated from the digital platform decreased positive brand attitudes and purchase requests compared to disclosures from the influencers.[159] In a qualitative study, adolescents reported admiring influencers and not always critically evaluating their intentions.[165]

Marketing in other types of digital media

Five studies measured the impact of other forms of digital marketing.

- Two cross-sectional studies looked at the impact of exposure to livestream gaming platforms. Self-reported exposure to food marketing on a gaming platform (Twitch) was related to self-reported craving and purchasing of marketed products.[151] In addition, adolescents who recalled seeing food marketing across three gaming platforms (Facebook, YouTube, and Twitch) were more likely to report craving and purchasing the marketed products.[150]

- Two experimental studies examined the effects of food marketing on websites. One study looked at pop-up ads for a biscuit/cookie within a webpage (unspecified content) and found no effect on choice of an unhealthy (biscuit/cookie) versus healthy food (apple) or on positive attitudes toward the unhealthy brand.[105] Another study compared ads on websites and social media to television ads and found that all ad exposures, regardless of type, increased desire to consume the featured products.[97]

- One cross-sectional study measured young children's exposure (3-5 years old) across ad-supported media, including internet, apps, streaming, and gaming, and found that exposure was related to poor diet quality.[152]

Socio-cultural outcomes

Only four papers reported broader socio-cultural outcomes from exposure to any type of digital food marketing.

- Adolescents' belief that peers consume unhealthy foods was positively associated with amount of self-reported exposure to unhealthy food marketing in social media.[78] In addition, adolescents rated their peers more positively when the peers shared unhealthy food posts on social media compared to healthy food posts.[147] They were also more likely to share unhealthy food content (branded and unbranded) themselves. Similarly, children and adolescents (ages 11-16) reported sharing food (branded or unbranded) content to build social standing with peers.[102]

- Adolescents (ages 12-16) reported that family influences on eating behaviors reduced the impact of marketing messages.[174]

- In addition, ads on social media increased perceived appropriateness of frequent consumption of products depicted in the ads compared to traditional ads.[97]

Summary of Impact Studies

The variety of study designs, digital marketing platforms, and outcomes measured in these studies provides a strong evidence base for the negative impact of unhealthy digital food marketing on diet-related outcomes for younger children and adolescents. Older studies primarily used experimental methods showing increased food intake in younger children (<12 years old) immediately following exposure to advergames. More recent studies used experimental, cross-sectional, and qualitative methods to demonstrate increases in unhealthy diet-related behaviors and intermediate outcomes (including more positive brand attitudes and purchase/consumption intentions for unhealthy foods) following exposure to food marketing on social media and video streaming platforms. These studies examined younger children and adolescents, and many of them focused on influencer videos. Two studies found similar effects of marketing on livestream gaming platforms.

These outcome studies also contribute to our understanding of the potential effectiveness of proposed solutions to reduce the impact of unhealthy digital food marketing on children. Experimental studies found that marketing promoting healthy food and active lifestyles did not increase healthy or reduce unhealthy food consumption or choice. Experimental studies of ad disclosures in influencer videos demonstrated that disclosures can increase recognition of advertising messages, but that ad recognition and understanding persuasive intent do not reduce the effectiveness of influencer marketing in most contexts.

These studies do have some limitations worth noting. The cross-sectional studies provided a broader view of the potential impact of exposure to food marketing in social media and gaming platforms on dietary patterns, primarily with children older than age 10, but relied on participants' recall and awareness of food marketing exposures and self-reported food intake. A few qualitative studies provided some insights into potential broader social impacts of exposure to digital food marketing, but these outcomes were rarely examined. A small number of studies had highly diverse samples, but most did not report SES or race and ethnicity of participants.

Although there is high consistency of study findings across countries, this review also highlights the need for additional U.S.-specific research. Most U.S. studies were descriptive in design, and only two measured children's exposure.

It is also important to note that this review examined published scientific literature only. The food, advertising, and digital industries also conduct volumes of research to evaluate the efficacy of their marketing practices, but their studies are proprietary and findings are not available to the public. In addition, industry research does not face the same requirements and challenges that can limit the scope and speed of academic research. For example, industry research, even with child participants, does not require human subjects protections for vulnerable populations. Industry can use their research findings immediately as their funding is not determined by the grant acquisition process and findings do not require peer review prior to publication and dissemination. Moreover, food companies and digital platforms control access to the data that researchers need to evaluate the full impact of their marketing efforts, which they rarely provide to outside researchers. Academic research cannot keep up with the rapid pace of change in digital marketing practices nor reveal the full extent of their impact on children. Therefore, effective policy design will require access to the trove of data and market research findings that companies who market to children have accumulated.

Research Progress and Remaining Gaps

Some progress has been made in addressing the research gaps identified in previous reviews of the food marketing to children literature.

- Earlier digital marketing studies focused primarily on advergames, Facebook, and traditional ads on third-party websites. More recent studies have documented similar unhealthy food ads, child-appealing content, and impact of food marketing on newer popular digital platforms, including social media (Twitter, Instagram), video streaming (YouTube, TikTok), and livestream gaming (Twitch).
- Newer studies have documented more recent creative strategies, including branded content in influencer videos and branded posts on social media, and their impact on children.
- Recent studies have begun to document children's exposure to and ability to recognize digital marketing, primarily in social media and video streaming platforms.
- The majority of newer studies examining exposure and effects of digital marketing in newer media have examined adolescent participants, in contrast to earlier studies that primarily focused on children ages 7 to 12.
- A few studies have also examined the potential impact of solutions that have been proposed to reduce the power of digital food marketing to negatively impact children, including ad disclosures and marketing of healthy food in digital media.

However, major research gaps remain. Future studies are needed to:

- Understand and address the impact of digital food marketing on health inequities affecting Black, Latino, and Indigenous children and those living in low-income communities.
- Examine popular types of digital media that have received limited research attention across all study designs and types.
- Standardize research protocols to code features of digital marketing in a consistent way that is designed to inform policy actions.
- Further document children's exposure (across all age groups) to digital food marketing.
- Monitor cumulative exposure across multiple forms of marketing and assess cumulative and synergistic impact over time, including on broader socio-cultural outcomes.
- Demonstrate the power of potentially unfair and deceptive creative techniques commonly used in digital food marketing.
- Assess the effectiveness of existing and proposed policy solutions.

Evaluation of Existing and Proposed Policy Actions

To understand potential policy actions, the research team and expert panel sought to answer the research question, *"What existing and proposed policy actions have the potential to reduce children's exposure to and/or the impact of unhealthy digital food marketing?"*

This section: 1) outlines and presents evidence to support the expert panel's criteria for policy actions that have the potential to reduce children's exposure to digital food marketing and its power to negatively affect children's food behaviors and health; 2) identifies existing and proposed policy solutions for implementation by key actors in the United States, including industry-led and government policies; and 3) evaluates the policies according to the expert panel's criteria and other available research on the effectiveness of these policies.

Criteria for policies to protect children from unhealthy digital food marketing

A WHO-commissioned systematic review examined studies that evaluated the effectiveness of existing policies to protect children from all types of unhealthy food marketing according to their ability to reduce children's exposure to marketing and its power to negatively affect them.[29] Based on this review, the WHO identified policy design elements that increase the likelihood policies will protect children from unhealthy food marketing, including digital marketing.[3] The expert panel evaluation of existing and potential industry self-regulatory and government policies for digital food marketing adopted these recommendations, as well as additional criteria that were agreed upon by all panel members.

Table 3. Expert panel criteria for effective policies to reduce children's exposure to and/or the power of unhealthy digital food marketing

Criteria for Effective Policies
1. Protect children of all ages (2-17 years)
2. Apply science-based nutrition criteria (when nutrition-focused)
3. Minimize the risk of marketing migration to other media – Restrict brand marketing
4. Restrict unfair and deceptive practices – Collection, use, and sale of children's data – User engagement – Influencer marketing – Other forms of stealth marketing
5. Address health disparities (race, ethnicity, SES)
6. Provide mechanisms for independent monitoring and evaluation

Table 3 provides the six criteria that were used to evaluate existing industry self-regulatory policies and proposed and existing government policies. The rationale for each is described below.

Criterion 1: Protect children of all ages

The WHO calls for restrictions on unhealthy food marketing to children up to age 18.[4] The research evidence for protecting children up to age 12 is clear. Until age 7 or 8, children do not have the cognitive capacity to understand persuasive intent, including the inherent bias in marketing messages, and they consider advertising to be just another source of information.[2,168] By age 11 or 12, children understand the intent of advertising, but they do not have the cognitive abilities to actively defend against its influence. This research provided the rationale for early self-regulatory and government policies restricting unhealthy marketing to children under age 13.

However, more recent research has demonstrated that adolescents must also be protected from unhealthy digital food marketing. For example, studies have shown that older children's understanding of marketing intent and ability to defend against advertising does not reduce the persuasive impact of unhealthy food marketing.[24,169,170] In addition, adolescents may be even more susceptible to the power of marketing than younger children due to developmental vulnerabilities at this age, including the importance of peer relationships, sensitivity to social affiliation and standing, heightened reward sensitivity combined with less-developed impulse control capabilities, and the establishment of dietary habits that continue into adulthood.[15,171-173]

Criterion 2: Apply science-based nutrition criteria

To ensure that policies effectively reduce children's exposure to food marketing of unhealthy foods and beverages, the WHO recommends the use of a government-led nutrient profile model to identify and classify unhealthy foods that should not be marketed to children.[4] The nutrient profile model should be aligned with the most recent national dietary guidelines. A common shortcoming of food industry voluntary policies is that the sponsoring industry group, including participating companies, establish their own nutrition criteria to identify healthier foods that can be advertised to children, which are less restrictive than government-led nutrient profile models. Policies that use company-led nutrition criteria are less likely to reduce children's exposure to unhealthy food marketing.[29]

Criterion 3: Minimize the risk of marketing migration to other media

Policies should be comprehensive to minimize the risk of food marketing migrating to other forms of marketing not covered by the policies. Examples of potential migration include marketing in media or venues not covered by a current policy and newer or unspecified types of marketing in covered media, as well as marketing aimed at somewhat older children or marketing a brand rather than an individual food item.[4] The WHO guidelines note that migration of marketing from traditional forms (especially television) to digital media has been a common result of both voluntary and mandatory food marketing policies. Additional research is needed to demonstrate the effects of brand marketing versus marketing of specific unhealthy products.[4] However, the panel determined that the exclusion of brand marketing represents a major loophole in nearly all existing food marketing policies, and that the migration of food marketing to brand marketing significantly limits the potential effectiveness of food marketing policies. Thus, the panel determined that brand marketing should also be included in the criteria for effective digital food marketing policies.

Criterion 4: Restrict unfair and deceptive practices

Due to the unique characteristics of digital marketing, the panel also included criteria to restrict the use of digital marketing techniques that take advantage of children's developmental vulnerabilities and other unfair and deceptive practices. The collection, use, and sale of children's data to target advertising and direct content to them violates children's rights to privacy and freedom from manipulation and increases the power of food marketing directed to all audiences.[5] Common design elements in apps, social media, websites, and other digital media that children experience also increase their risks, including opaque data privacy policies that are difficult to opt out of and location-based targeting. Restricting the use of children's data for all commercial purposes would also result in less exposure to and reduced power of unhealthy food marketing.

The WHO has also identified the use of creative techniques that encourage user engagement and influencer marketing as unfair digital marketing practices that could be regulated when used to encourage consumption of harmful products (including unhealthy food) to vulnerable populations (including children).[30] Digital marketing often encourages children to engage with and share marketing messages virally through their peer networks, including competitions and crowdsourcing, sharing user comments, permitting users to share companies' content, and engaging with consumers directly. As noted earlier, these techniques may increase the power of digital food marketing over passive exposure to marketing messages and amplify their effects.[20,39,40]

Influencer promotion of commercial products or brands, whether or not the influencer was compensated, also raises concerns. Using high-status celebrities and influencers to deliver marketing messages takes advantage of adolescents' heightened developmental need for peer acceptance and social standing.[6,15] In addition, research on children's parasocial relationships with online personae (including influencers, celebrities, and media characters) has shown that children feel an emotional connection, personal identification, and high level of trust in these entities.[174-176] Experiencing a parasocial relationship with media personae increases children's positive attitudes and purchase intent toward the products they promote.[160,163,174,177] Understanding the persuasive intent of the influencer does not necessarily reduce the effects of this form of marketing.[160,174]

The U.S. Federal Trade Commission (FTC) has identified advertising embedded or hidden within other online content (i.e., stealth advertising), including product placements and influencer marketing, as potentially unfair and deceptive, especially when used to promote unhealthy products to children.[44] In addition to potential harms to children's privacy and health, the FTC identified a number of additional concerns about the effects of stealth advertising. These concerns include increased trust in marketing messages delivered by influencers or others with whom children have built parasocial relationships, positive emotions that transfer from entertainment content to the marketed brands through classical conditioning, effects on normative beliefs about consuming marketed products, and disproportionate effects on some children, including those who consume more digital media and those targeted by the unhealthy messages.

Criterion 5: Address health disparities

Policies should recognize and address effects of common digital food marketing practices that exacerbate diet-related health disparities experienced by Black, Latino, and Indigenous children. These common practices include racial or ethnic tailored content and placement in targeted media and disproportionate exposure to food marketing in the media and the communities where these children live.

Criterion 6: Provide mechanisms for independent monitoring and evaluation

Policies should include mechanisms and access to data for monitoring policy implementation and evaluation of outcomes by outside independent researchers. Evaluations should include whether the policy reduces children's exposure to all unhealthy digital food marketing, as well as to specific unfair or deceptive techniques.

Existing and Potential Policy Solutions by Key Actors and Evaluation of Such Policies

This section identifies existing and potential industry and government policy solutions. Each identified policy was evaluated using the criteria developed by the expert panel to determine effective policies to reduce children's exposure to and/or the power of unhealthy digital food marketing.

Key Findings

The evaluation of industry-led and government policies reinforces the WHO's recommendation that mandatory policies are required to effectively limit unhealthy food marketing to children, including in digital media.[3]

- Media company policies are somewhat more restrictive than industry-wide policies (CFBAI and CARU), but necessarily limited to the digital media they own.
- Although existing and proposed government policies tend to be more restrictive and would address some concerns about digital marketing to children, they tend to be designed to address other harms to children, not marketing specifically.
- None of the industry-led or government policies examined are comprehensive enough to limit food companies from migrating to other common forms of marketing not covered by these policies.
- All policies fail to address the full range of unfair and deceptive tactics commonly used in marketing that children experience online.
- Few policies include independent monitoring mechanisms.
- None of the policies directly address the effects of marketing on health disparities.
- Current policy solutions to protect children from unfair digital marketing require transparency and teach important digital skills, but they do not reduce the effects of the marketing.

Industry-Led Policies

The WHO-commissioned systematic review of food marketing policies concluded that mandatory policies are more likely to meet recommended policy design elements for effective policies compared to voluntary policies.[29] In addition, mandatory policies would limit marketing to children by all food companies, not only the companies who voluntarily agree to participate in self-regulatory initiatives or follow suggested guidelines. However, in the absence of government policies, it is useful to evaluate the potential strengths and weaknesses of industry-led policies to encourage improvements in existing policies, as well as to provide evidence to further support the need for mandatory policies.

Existing industry-led policies in the U.S.

Two industry-wide self-regulatory policies covering digital food advertising to children in the U.S. were evaluated. Both policies are administered by the U.S. Better Business Bureau (BBB). The Children's Food and Beverage Advertising Initiative (CFBAI) is the food industry's primary voluntary self-regulatory program for food, beverage, and restaurant companies to address unhealthy food advertising to children,[178] while the Children's Advertising Review Unit (CARU) is the primary self-regulatory mechanism for the advertising industry.[179] Three additional policies established by individual media companies (Disney and Google) specifically addressing food marketing to children on their own digital platforms were also identified.

Food companies voluntarily agree to participate in the CFBAI, which currently includes 21 of the largest U.S. food advertisers, including two fast-food companies.[178] Participating companies pledge that they will only advertise foods and beverages that meet "strict" nutrition criteria in "advertising primarily directed to children under age 13 in the U.S." A few companies go further and pledge they will not advertise any product in child-directed media. Previous evaluations of the CFBAI have shown similar limitations as other voluntary food marketing policies,[4] including migration of food advertising to a somewhat older adolescent audience not covered by the policy, exclusion of common forms of marketing targeted to children (e.g., product packaging, in-store marketing, company-owned digital marketing), exclusion of brand marketing, and industry-defined nutrition criteria that permit companies to continue to advertise unhealthy products to children.[28,180-184] None of these studies specifically examined CFBAI policies regarding digital food marketing.

CARU provides guidelines for all U.S. companies with national advertising (including food companies) to protect children from deceptive or inappropriate advertising.[179] CARU is also designated as a COPPA Safe Harbor organization and is responsible for ensuring that its members comply with the COPPA Rule. To do so, CARU sets out specific guidelines for the responsible use of children's online data by its members.

> The Children's Online Privacy Protection Act (COPPA) was enacted by Congress in 1998 to address the misuse of children's online data. COPPA requires parental permission to collect any personal information from children under 13 years old. It was updated in 2013 to address newer digital platforms, including social media. However, digital media and the data that companies collect on children have changed dramatically in the past 10 years.

Both CFBAI and CARU have been updated in recent years to address concerns about digital marketing to children. In 2020, the CFBAI implemented revised Core Principles that incorporate more up-to-date forms of digital media in its list of child-directed media covered by company pledges.[185] At the same time, CFBAI also updated its nutrition criteria. In 2023, CARU released *"Guardrails for Child-directed Advertising and Privacy in the Metaverse"* to provide recommendations and best practices to assist companies in complying with advertising and privacy laws and to "engage responsibly with children online".[186]

The Disney Company publishes guidelines for advertising on all its digital brands and properties that require disclosures and pre-review of all advertising directed at children under 13.[187] Disney also sets its own nutritional guidelines for foods in advertising, including ads directed to children aged 13 and older, stating that foods that do not meet those guidelines should be targeted only to adults.

Google (which owns YouTube) restricts all advertising for food and beverages, regardless of nutritional content, on YouTube Kids or in/around "made for kids" content on its main YouTube platform.[188] Google's YouTube guidelines apply to companies worldwide. In addition, Google does not allow advertising of HFSS foods to children under age 18 on any of its platforms, including YouTube and the Google app, in the UK and EU only.[189] Google has not stated why it has not established these same policies in other countries, including the United States.

Evaluation of industry-led policies

The WHO-commissioned systematic review[29] identified four studies examining voluntary digital food marketing policies in the EU[190] and Canada.[191-193] These studies found that companies with voluntary policies continued to include child-directed marketing on their websites[190,191,193] and that the majority of products with child-directed marketing did not meet independent nutrition criteria for healthy foods.[190,193] In addition, more than 90% of food ads placed on third-party websites that were popular with children promoted HFSS products.[192] However, the review found no studies of impact on other types of digital food marketing

Appendix D, Table D1 provides a summary of the industry-led self-regulatory policies evaluated in this report. **Figure 3** summarizes the expert panel's evaluation of these policies according to the established criteria.

Criterion 1: Protect children of all ages

- Neither CFBAI nor CARU cover marketing to children ages 13 or older. In addition, both policies state that they only cover ads "primarily directed to" children under 13 as defined in their policy, using audience composition measures and more subjective criteria to determine child-directed content. Their criteria for child-directed content excludes advertising in media that are also viewed by adults, including family programming (viewed by children and their parents), programming with large adolescent audiences, and programming with large audiences of all ages including children (e.g., sports events). This limitation has not been evaluated in digital media, but less than 10% of TV food ads seen by children under 12 occurred on programming that would be classified as child-directed according to CFBAI.[27]

- YouTube's policy is consistent with CFBAI and CARU and does not require any additional protections for children ages 13 and older.

- In contrast, Disney and Google's UK/EU policies cover all children up to age 18. Disney goes further and requires unhealthy food advertising to be adult-oriented without kid appealing features. Google states that it only allows food advertising to users with a declared age of 18 or older in the UK/EU, but independent investigators found that Google allowed targeting of "unknown" users, which skews to children under 18 years old.[194]

Figure 3. Overall ratings of industry self-regulatory policies according to expert panel criteria

	Child age	Nutrition criteria	Minimizes migration	Covers brand marketing	Restricts unfair practices	Addresses health disparities	Monitoring and enforcement
CFBAI	Up to 13				N/A		
CARU	Up to 13	N/A			Relies on disclosures/ad IDs/context		Enforcement mechanism available
Disney ad guidelines	Up to 18						
Google HFSS UK/EU	Up to 18				N/A		
YouTube Kids and "made for kids" content	Up to 13	All foods					

Green = meets criteria; Yellow = partially meets criteria; Red = does not meet criteria

Criterion 2: Apply science-based nutrition criteria

- The CFBAI nutrition criteria for healthier foods that can be advertised to children do not meet science-based nutrition criteria. Recent evaluations of CFBAI's revised nutrition criteria have found that 70% of food ads viewed by children (under age 12), including two-thirds of ads viewed on children's TV, exceeded U.S. government-proposed criteria for nutrients to limit.[27] Moreover, CFBAI nutrition criteria for most product categories do not align with the U.S. 2015-2020 DGAs, especially for sodium and added sugar intake.[184] CARU's policy only restricts advertising for products that are illegal to sell to children or labeled as not appropriate for children and does not address marketing for unhealthy food.

- The nutrition criteria in some media company policies are more restrictive than CFBAI's. YouTube's limits on foods advertised to children are the most restrictive, as they apply to all foods regardless of nutrition content.[189] A review of Google's criteria found that only 43% of products approved for advertising to children by CFBAI standards would be allowed to advertise on Google's UK/EU platforms.[195]

- Disney's nutrition criteria use a similar approach as CFBAI, with varying sugar, sodium, and fat limits by category.[196] Independent research has not compared Disney's criteria to CFBAI criteria or independent nutrition profiling models. However, these criteria also apply to ads for foods that are primarily intended for "kid" consumption (including all fruit snacks), even when targeted to adults (i.e., parents).

Criterion 3: Minimize risk of marketing migration to other media

- Both CFBAI and CARU policies appear to cover a wide range of digital marketing and media. They encompass advertising on third-party media (including websites, social media, and video sharing platforms), child-directed content on advertiser websites, social media and video streaming platforms, influencer content, and paid product placements and integrations. CARU also covers all types of commercial messages in advertising primarily directed to children, including brand marketing. Although the CFBAI and CARU lists of digital media covered are comprehensive, other program limitations enable migration to non-covered digital media and marketing. Both programs allow any form of marketing in digital media that is not primarily directed to children, even though children are exposed. In addition, CFBAI does not cover brand marketing, so companies may advertise any food products if only a brand logo appears in the ad or if the ad shows a healthier product from a brand that also offers unhealthy products. For example, only 2 of 45 Lunchables products meet CFBAI criteria for products that can be advertised to children, yet Lunchables can advertise to children as long as the ad features one of those two products or a brand logo alone.[184]

- Individual media company policies are necessarily limited to the digital media owned by the media company. Disney's policy is the most comprehensive as it covers all Disney entertainment properties, including Disney Digital and Disney+. Google's EU/UK and YouTube policies only cover advertising on third-party websites, including YouTube and websites on the Google Display Network. Neither Google policy covers owned or earned marketing, including paid branded content. One evaluation of YouTube's policy found that only five food ads appeared on made-for-kids child influencer channels following implementation of the policy, out of 1050 total ads on the channels.[109] However, the policy does not cover branded food placements within YouTube videos, which are prevalent in child-influencer videos.[109,117] One study found that 40% of child-influencer videos averaged 3.7 branded food appearances each, and 80% of branded foods were unhealthy products, including candy, sweet and salty snacks, and sugary drinks.[109]

Criterion 4: Restrict unfair and deceptive practices

- CARU requires parent permission and transparency for online purchases by children, in addition to requiring compliance with COPPA. However, it allows child-directed advertising integrated into entertainment content (e.g., games or activities) provided the content is identified as advertising through disclosures or contextual cues. CARU also allows celebrity and influencer endorsements directed to children, as long as they clearly and conspicuously disclose a material connection to the advertiser. In addition, CARU's guidelines specifically exclude advertising that is "clearly commercial" (e.g., branded websites, social media channels or apps) from its ad disclosure requirements, presumably exempting food company owned marketing. Moreover, the policy specifically states that product placements and integrations that do not constitute an endorsement (e.g., TV show product placements) are "not within the scope of these guidelines."
- As with the CFBAI, Google's UK/EU policy focuses only on the types of foods in paid advertising on its site and places no restrictions on creative techniques or messages used. Beyond requiring compliance with COPPA, the Disney and YouTube policies place few additional restrictions on children's data usage or privacy or on unfair and deceptive content. Disney only allows third-party technology for monitoring or research purposes and does not allow interactive features in advertising to children or allow ads disguised as editorial content. It also prohibits branded food mentions in entertainment content, but only when the content includes Disney characters, assets or branding. In addition, Disney characters cannot be shown eating, drinking or even looking at advertised products. However, as with CARU, Disney presents ad disclosures as the solution to inform children of advertising content on its digital platforms. YouTube prohibits engagement features in all ads on YouTube Kids and made-for-kids content.
- The CFBAI policy places no restrictions on creative techniques or messages used in child-directed media, provided the advertised products meet its nutrition criteria. Similarly, Google's EU/UK and YouTube policies do not restrict branded food mentions within user-generated content, paid or not, including in food company-owned content.

Criterion 5: Address health disparities

- None of the industry policies attempt to address, or even mention, potential negative effects of marketing to children on health disparities.

Criterion 6: Provide mechanisms for independent monitoring and evaluation

- CFBAI and CARU both indicate that they monitor child-directed advertising for compliance with their policies, but neither one provides outside access to data to allow for independent monitoring of policy coverage or effectiveness. They both also allow others to file complaints against member companies, but only CARU has a transparent enforcement mechanism. The individual media companies do not provide any mechanisms for independent monitoring or enforcement of policies.

In summary, individual media companies' policies were generally more restrictive than CFBAI and CARU. Two of the three media company policies cover children up to age 18, and media company nutrition criteria were stricter than CFBAI criteria, including a restriction on all food advertising (including brand marketing) by YouTube on "kids" content. Disney and YouTube also limit some forms of unfair and deceptive marketing to children. However, overall ratings for all policies were low and all contain loopholes, including ambiguous definitions, that further limit their potential effectiveness. Not one policy addresses the potential impact of marketing on health disparities. Moreover, none provide a mechanism for external monitoring or evaluation, so it is impossible to know whether they have had a positive impact or have even been implemented as promised.

In addition, all policies allow marketing embedded within other content to some extent, as well as advertising to very young children online. The mechanisms that CARU has established to protect children from these potentially unfair and deceptive digital marketing practices are inadequate. Since children under the age of 7 or 8 do not have the ability to understand persuasive intent,[2,168] or perhaps even the ability to read, an ad disclosure would be meaningless to them. The goal of ad identifiers and disclosures is to increase children's recognition that the content includes advertising, but our literature review (see **Research Question 2**) and a systematic review that assessed effects of children's exposure to marketing of any type of product (including unhealthy food, tobacco and toys) found that greater recognition and/or understanding of advertising intent did not reduce the impact of the advertising on brand or product attitudes.[169] In addition, research has shown that disclosures do not consistently increase children's recognition of digital content as marketing and that, even when recognition is improved, disclosures do not reduce the power of marketing to impact children, including adolescents.[104,159-162] Notably, CARU prohibits host selling on children's TV programming, but not in digital programming for children. It is not clear why CARU's standards for advertising to children in digital media are less strict than standards for advertising in traditional media.

Government Policies

The research team and policy experts on the panel identified 22 government policies with potential to reduce harms from children's exposure to digital media, although most of these policies were not designed to specifically address digital food marketing to children (see **Table 4**). The list includes policies that have been enacted or proposed in various jurisdictions in the United States (n=16). It also includes policies enacted in other countries (n=6) that address digital marketing and could be applied to the United States. These policies have the potential to reduce children's exposure to and/or the power of digital food marketing (n=10); protect children's data, privacy and online safety, including restricting some unfair and deceptive online digital marketing practices (n=8); and/or present possible solutions to protect children from unfair and deceptive digital food marketing (n=3). Policy details are summarized in **Appendix D, Table D2**.

Existing government policies to reduce children's exposure to and/or the power of unhealthy food marketing

UK Health and Care Act

- Worldwide, the UK is the only country to enact regulation or legislation to restrict unhealthy food marketing in digital media, although implementation has been delayed until 2025 (at the time of writing).[197] This policy meets many of the criteria identified by the expert panel for effective food marketing policies. It applies to all individuals, not children specifically, and utilizes a science-based nutrient profile model to identify HFSS products that cannot be advertised in digital media. The policy covers all forms of paid advertising online, including user-generated content when compensated by an advertiser. However, it specifically excludes brand marketing, company-owned marketing (including company websites and social media accounts), and other common forms of marketing, including gaming, sponsorships, and corporate social responsibility marketing. In qualitative interviews, digital marketing experts noted that the policy would address socio-economic inequalities as unhealthy food marketing is disproportionately targeted to less advantaged social groups.[197] However, these experts noted policy weaknesses, including that unhealthy food marketing would likely migrate to uncovered forms of marketing, that outside tracking and monitoring of HFSS digital food marketing would be necessary to ensure compliance, and that regulatory responsibility for enforcement was unclear.

U.S. Interagency Working Group (IWG) on Food Marketed to Children

- The IWG was established in 2009 under direction of the U.S. Congress, and comprised of representatives from the Federal Trade Commission (FTC), the Food and Drug Administration (FDA), the Centers for Disease Control and Prevention (CDC), and the U.S. Department of Agriculture (USDA) to develop recommendations for the nutritional quality of food marketed to children and adolescents, ages 2-17. The Working Group recommended that foods marketed to children should make a meaningful contribution to a healthful diet and limit nutrients that have a negative impact on health and weight.[198] The IWG guidelines referenced a comprehensive definition of marketing to children established by the FTC in its report to Congress on industry expenditures on food marketing to children, including digital marketing practices at the time (e.g., ads on websites, advergames).[199] These voluntary proposed guidelines were published for public comment in 2011, and they received widespread support, including by children's health advocates. However, final guidelines were never published purportedly due to powerful industry pushback.[200] Research has compared these IWG nutrition guidelines to CFBAI nutrition criteria. More than 50% of products in CFBAI-company ads viewed by children on child-directed TV programming exceeded IWG nutrients to limit, although they met CFBAI nutrition criteria.[27]

School Wellness Policies

- Since 2011, USDA's Local School Wellness Policy is the only other U.S. federal policy (proposed or enacted) to limit food marketing to children. Implemented in 2016, it requires that local school districts establish a policy on marketing and advertising of foods to children in schools.[201] The USDA requires school wellness policies to prohibit marketing of foods that do not meet USDA's Smart Snacks in School nutrition standards on school grounds during the school day, including "electronic educational materials."

- However, USDA does not provide guidance about common forms of digital marketing to students in schools. Examples include food ads on educational websites that teachers recommend to students (e.g., ABCya), exposure to marketing content while children use their own or school-issued devices in schools, and ed tech platforms' usage of student data for commercial purposes.[25,42,43] An analysis of 475 school districts found that only 25% of middle schools had any kind of food marketing policy and only 14% of policies addressed digital food marketing.[25] Moreover, although mechanisms to protect children from digital food marketing in schools are widely available, only 64% of middle schools used ad blocking software on school networks and 41% used it on school-issued devices outside of schools, while 62% of schools permitted location tracking on school devices.[25]

Table 4. Existing and proposed government policies that apply to digital food marketing

Policy	Jurisdiction	Status
Policies that address digital marketing to children		
UK Health and Care Act	UK	Passed/not yet implemented
Interagency Working Group on Food Marketed to Children (IWG)	U.S. agencies (FTC, CDC, FDA, USDA)	Proposed
Local School Wellness Policies	USDA	Enacted
Kids Online Safety and Privacy Act (KOSPA) (includes previously proposed "COPPA 2.0" update provisions)	U.S. Congress	Passed in Senate
The American Data Privacy and Protection Act (ADPPA)	U.S. House	Proposed
American Privacy Rights Act (APRA)	U.S. Senate	Proposed
The Predatory Marketing Prevention Act (PMPA)	NY State	Proposed
Student cellphone use bans	U.S. states	Enacted in FL, other states considering
UN Convention on the Rights of the Child (UNCRC)	UN	Enacted
2022 EU Digital Services Act	EU	Enacted
Data privacy and online safety policies		
Children's Online Privacy Protection Act (COPPA)	U.S. Congress	Enacted
COPPA, regular rule update	FTC	Proposed
EU General Data Protection Regulation (GDPR)	EU	Enacted
Kids Online Safety Protection Act (KOSPA) (includes previously proposed Kids Online Safety Act [KOSA] provisions)	U.S. Congress	Passed in Senate
Age-Appropriate Design Codes (AADC)	CA, MD, UK	Enacted
Commercial surveillance and data security	FTC	Proposed Rulemaking
Safe for Kids Act and Child Data Protection Act	NY	Enacted
Child-Oriented Approach to Data Processing	Ireland	Guidance
Other potential solutions		
Endorsement and Testimonial Guides	U.S. FTC	Enacted
Media literacy in schools	U.S. states	Enacted and proposed
Protecting Kids from Stealth Advertising in Digital Media	U.S. FTC	Recommendations

Proposed U.S. federal legislation

- In July 2024, the U.S. Senate passed the Kids Online Safety and Privacy Act (KOSPA) that begins to address some forms of digital marketing to children, including adolescents, and covers all products, including food. This bill would expand COPPA to limit the amount of data collected on and prohibit targeted advertising to children under age 17. This bill would also require schools to limit online service providers' use of student data to educational purposes only and specifically prohibit its commercial use. KOSPA would also require digital platforms to enable the strongest privacy settings by default for children (including adolescents). The bill requires independent monitoring of platforms' compliance and research on how the platforms impact children's wellbeing, focusing on protecting children from specific mental and physical harms in social media, not including unhealthy food. Companies would be required to adopt these safety procedures if they have any indication (implied or circumstantial) that the account is owned by a child. The bill must also pass in the U.S. House of Representatives to be signed into law.

- The American Data Privacy and Protection Act (ADPPA) (at the time of writing) is under consideration in the U.S. House of Representatives. A similar American Privacy Rights Act (APRA) proposal in the U.S. Senate would also prohibit targeted advertising to children under age 17, as well as establish additional data privacy and protection provisions for all ages. More information about ADPPA can be found in **Appendix D2**.

- A common limitation of these potential policies is that they only cover behavioral and demographic targeting (i.e., forms of targeted advertising that utilize individual data). They would not cover contextual advertising (i.e., placement of advertising near content that appeals to children), sponsored content, or company-owned or earned marketing.

U.S. state policies

- Some U.S. states have also proposed or enacted novel laws that could impact children's exposure to some forms of digital food marketing. The New York State Predatory Marketing Prevention Act (PMPA) provides a mechanism for the NY State Attorney General, NY cities, and other affected persons to sue food companies for unhealthy food advertising directed at children as unfair or misleading.

- Florida enacted a ban on students' use of cell phones during class time, and other states are considering similar policies. Designed to restrict access to social media to improve students' mental health and academic performance, these policies would also limit children's exposure to digital food marketing in schools on their own devices.

Other international policies

- The United Nations (UN) has called for broad restrictions on the use of children's online data for profiling or targeting them for commercial purposes, based on the rights of children in the digital environment under the UN Convention on the Rights of the Child (UNCRC). Member States are required to enact their own policies, and the European Union (EU) Digital Services Act was enacted to comply. The EU Act also requires large digital platforms to conduct risk assessments for their impact on children's rights. Notably, the United States is the only country that has not ratified the UNCRC to date.

<u>Existing and potential policies to protect data privacy and online safety</u>

The most common types of laws addressing digital marketing in the U.S., enacted or proposed, are designed to protect children's online data privacy and/or safety. They do not address specific types of marketing to children but would limit how companies can use children's data for commercial purposes. Thus, they would likely reduce children's exposure to and the power of unhealthy digital food marketing. These laws are also designed to protect children's rights to privacy and reduce the use of manipulation and unfair tactics in digital media.

- A proposed regular rule update to COPPA by the FTC would further strengthen privacy protections. The FTC also called for public comments on proposed rulemaking to regulate commercial surveillance and data security.

- Internationally, the 2016 EU General Data Protection Regulation (GDPR) requires data privacy by design and default, data protection assessments, and transparency. It requires parental consent for children up to 16 years old, but individual countries may set lower age limits.

Age-Appropriate Design Code (AADC)

- AADC laws have been enacted or proposed to address unfair and deceptive digital food marketing to children. The UK enacted the first AADC in 2019. It requires platforms to implement a comprehensive set of 15 "privacy by design and default" practices to protect children online. Similar policies have passed in California and Maryland (but not yet enacted) and been proposed by other U.S. states. The UK AADC requirements apply to all online services that children up to 18 years old are "likely to access," not to individual children nor to services directed at children.[202,203] Therefore, this law does not require verification of individual users' ages. In addition, it bans some specific marketing practices, including geotargeting, profiling for commercial purposes, design features that are detrimental to children's wellbeing, and manipulative design to get children to sign away their data and other personal information. It also requires platforms to conduct risk assessments of how they use children's data. An impact assessment of the UK AADC found that platforms report they have implemented numerous improvements, including higher default privacy settings, reduced use of profiling, notifications and interruptions, and restrictions on some personalized ad content.[202] However, due to somewhat ambiguous definitions of required practices, platforms have implemented these requirements in different ways.[202] In addition, research has not examined children's actual experiences while on these platforms or analyzed the effects of these changes. For example, the AADC requires platforms to default to the highest privacy settings for child users, but children may choose to opt for less private settings.

Potential solutions to protect children from unfair and deceptive food marketing

The three U.S. government policy solutions in this area utilize an information-based approach to reduce the impact of children's exposure to potentially harmful digital content, including marketing. FTC rules require endorsers (including influencers) to disclose all material connections with brands. The FTC's proposed solutions to stealth or blurred advertising also include ad disclosures or icons; educating parents, children, and educators; and parental controls. In addition, 19 states require media literacy and/or digital citizenship education in K-12 schools. Greater transparency and understanding of how companies collect and use children's online data are worthwhile outcomes.

However, as noted earlier, disclosures and increased recognition of advertising intent are not an effective solution to reducing the power of digital food marketing. Research on the effects of disclosures on influencer videos promoting food brands has found that disclosures do not reduce marketing effectiveness,[104,159] especially when the child has a parasocial relationship with the influencer.[160] In addition, one study found that only 1 of 260 child influencer videos that contained branded food content disclosed a commercial endorsement.[109] It was not clear whether the influencers did not receive compensation from the brands they promoted or whether they failed to comply with the FTC rule.

Evaluating government policies

This analysis identified a wide range of government policies, including enacted and proposed U.S. policies, with the potential to protect children from exposure to and/or the power of unhealthy digital food marketing. Some features of these policies meet the expert panel's criteria for effective policies, including protecting children up to age 18 and using science-based nutrition criteria.

Criterion 1: Protect children of all ages

- Most government policies cover children up to age 17 or 18 and would improve upon previously enacted U.S. government and self-regulatory policies (COPPA, CFBAI and CARU) that only cover children up to age 13.

Criterion 2: Apply science-based nutrition criteria

- The three government policies that address food marketing specifically (UK ban on HFSS food advertising, proposed IWG nutrition guidelines, USDA School Wellness policies) use government-led science-based nutrition criteria that would restrict advertising for many of the products currently allowed under less stringent CFBAI nutrition criteria. In addition, government policies (with the exception of the voluntary IWG nutrition criteria) would apply to all advertisers and/or digital platforms, ensuring broader compliance, not just by companies who voluntarily agree to comply.

Criterion 3: Minimize risk of marketing migration to other media

- All government policies examined have limitations in their ability to restrict migration of food marketing to other forms of digital marketing not covered by the policy. Policies created to broadly protect children's data and safety online would also limit food companies' ability to use these data to market their products to children online. Yet all data protection policies, including policies that would not allow targeted marketing to children (e.g., KOSPA), would only cover forms of marketing that use children's online data. They would not cover many common forms of digital marketing, including contextual advertising, company-owned marketing, earned marketing, or sponsored content that appeals to children (including influencer marketing, sponsored games and other content).

- In addition, most data protection policies only apply to children when the platform knows they are underage. Children who do not provide truthful age information and media that do not collect age information would be excluded from protections. The UK ban on HFSS digital food marketing addresses this issue by applying the policy to individuals of all ages. It also covers the widest range of digital marketing platforms and creative techniques, but it specifically excludes brand marketing, as well as company-owned marketing (including brand accounts on social media and video sharing platforms) and earned marketing.

Criterion 4: Restrict unfair and deceptive practices

- Other policies would address some common forms of unfair and deceptive digital food marketing to children, including children's online safety (e.g., KOSPA) and AADC policies. However, these policies focus primarily on restricting highly manipulative techniques. None would specifically restrict many unfair practices commonly used in digital food marketing, including stealth marketing and engagement devices that enable dissemination of marketing through peer networks. In addition, policies to protect children's online safety are designed primarily to address specific harms, including mental health, addiction, and sexual exploitation. KOSPA would limit alcohol and tobacco advertising to children, but specifically excludes other marketing of harmful products, including unhealthy food. The EU Digital Services Act has the potentially broadest impact as it requires the best interests of the child to be the primary consideration when regulating digital marketing that is accessible to children, including protecting children's rights to privacy and freedom from manipulation.

Criterion 5: Address health disparities

- When interviewed, experts highlighted the potential positive impact of the UK HFSS digital marketing ban on health disparities affecting less advantaged socio-economic populations.[197] However, none of the policies specifically address structural inequities that negatively affect the health of children of color and those living in low-income households and communities.

Criterion 6: Independent monitoring and evaluation

- A few policies specify monitoring and reporting requirements. KOSPA would require independent research on how digital platforms impact children, and others (e.g., CA AADC, EU GDPR) require digital platforms to conduct impact or risk assessments for how their activities affect children. However, most government policies have no clear monitoring mechanism, including the UK HFSS digital marketing ban. In addition, independent evaluations of policies that require compliance by non-corporate entities (USDA School Wellness policies and FTC influencer disclosures) have found low compliance. Moreover, the FTC influencer disclosure policy is the only government policy to be evaluated for its effectiveness at reducing the negative impact of digital marketing, and disclosures did not protect children from persuasive effects of digital food marketing in influencer videos.

Additional policy features

- This analysis also highlights the need for additional policy features recommended by the WHO for effective government policies to restrict digital food marketing for harmful products.[30] For example, the WHO noted that digital marketing regulation is often highly fragmented with many pieces of legislation and government agencies involved. It recommends that one government entity be designated to oversee and coordinate all policies regarding digital marketing. In the U.S., legislation at both the national and state level further complicate authority for policy design and implementation.

- The WHO also recommends establishing mechanisms for independent research to monitor digital content and policies to require advertisers and platforms to disclose digital marketing activities and their impact on vulnerable populations.[30] In addition, a government entity should be sanctioned by law to enforce digital marketing laws with broad investigative powers and varied sources of information allowed as the basis for investigation and enforcement. The WHO specifically recommends that consumers, civil society organizations, and competitors be allowed to bring actions for violations before the courts.

The WHO and UNICEF have designated restrictions on children's exposure to food marketing as a global health priority[4] and governments are obligated to act.[5] However, the dearth of policies that specifically focus on reducing children's exposure to and the impact of marketing that promotes harmful products, including unhealthy food, to children in digital media presents a major policy challenge. New and innovative government policy options will be required to protect children from the harmful impact of unhealthy digital food marketing.

Interviews to Identify Barriers and Solutions to Enacting Digital Food Marketing Policies

To understand barriers to enacting digital food marketing policies and potential solutions, a total of 19 semi-structured interviews were conducted with experts from the United States (n=16) and the United Kingdom (n=3). The interviewees included researchers (n=6), advocates (n=6), policymakers (n=5), and government officials (n=2) with expertise in digital privacy, public health law, industry self-regulation policies, and racial justice.

The interviews focused on two main research questions:

- Barriers to policy implementation: Defined as challenges that interfere with the implementation of policies regulating digital food marketing to children. These barriers include legal, political, and societal factors that delay progress.

- Potential solutions: Defined as the strategies and actions proposed to overcome the identified barriers to policy implementation. These solutions aim to strengthen regulatory frameworks, increase accountability, and empower advocates.

Main themes addressing these two questions were identified during the analysis. This section outlines interviewees' recommendations for policies and support for advocates, in addition to supporting quotes. Specific themes are provided in **Appendix B**.

Barriers to policy implementation

Key informant interviewees reported several significant barriers to the implementation of policies regulating digital food marketing to children. Many of these themes were mentioned by approximately three-quarters of interviewees.

Industry Power and External Pressures

The industry holds strong political power, putting external pressure on legislators and influencing policy decisions through lobbying and campaign contributions. This dominance is further exacerbated by voluntary compliance measures that are often found ineffective and the industry's participation in policymaking processes. As one interviewee noted:

"…I think one of our biggest challenges is lobbying. The largest food and beverage companies give a lot of money to political figures, and as a result, people don't want to bite the hand that feeds them…" — Researcher

Targeted Marketing and Systematic Inequalities

Targeted marketing strategies specifically aim at children of color by integrating advertisements within games and movies that resonate with these individuals and their communities, as well as featuring popular celebrities to draw their attention. This approach exploits the culture of these communities for commercial gain and reinforces systemic inequities. By promoting unhealthy products that disproportionately impact children of color, these marketing practices contribute to health disparities and unhealthy consumption patterns. One interviewee mentioned the following:

"...We have looked at digital marketing campaigns for unhealthy foods, sugary drinks, fast food, and salty snacks where these campaigns focus on equity or racial justice. Since the rise of Black Lives Matter and the killing of George Floyd, racial justice initiatives are often paired with unhealthy food products. This feels like targeting, as it connects a concern for the Black community with unhealthy food products. I see this as problematic and indicative of targeted marketing practices…" — Researcher

First Amendment

Recent decisions of the Supreme Court found that the First Amendment of the U.S. Constitution protects corporate speech as individual speech, a reversal of previous interpretations that complicates regulatory efforts. Companies exploit this constitutional protection to argue against stricter controls on their marketing practices. According to one of our interviewees:

"…I think the main challenge for regulation is the First Amendment. It's very difficult for the government to regulate in this space because, as long as the advertising and marketing are truthful and not misleading, it's a very high hurdle to show that limitations or restrictions would be consistent with advancing the goals of the government…" — Government Official

Perceptions of Personal Responsibility

Public perceptions about government overreach into parental responsibilities and food choices create additional challenges, as does the public narrative of personal responsibility that overlooks systemic issues. As one interviewee noted:

"…The growth of libertarianism and the myth of personal responsibility present another obstacle. The idea that we should be free to eat and drink whatever we want has expanded to imply that we should also be able to advertise whatever we want to anyone. As a public health and advocacy community, we need to do a better job of making distinctions between access, availability, and marketing. Marketing, in fact, undermines free will, a concept supported by a long body of research…" — Policymaker

Competing Public Health Priorities

Competing public health priorities, such as immediate threats like gun violence and drug use, often overshadow food marketing issues. Since COVID-19, significant societal changes have shifted focus to more pressing concerns like crime, safety, and climate change. As a result, digital food marketing is often considered a lower priority by policymakers compared to other issues, leading to insufficient attention and resources from policymakers and advocates. According to one of the interviewees:

"…And now, with climate change, sustainable diets, and everything going on with COVID, improving diet quality and addressing hunger have been pushed back. COVID has set us back about 10 years, so people's intellectual energies are focused on feeding people first. We need to address this (hunger) before we can focus on nutrition security and the quality of food marketed to children and teens…" —Researcher

Additional barriers were identified by approximately one-half of interviewees. Historical setbacks in attempting to regulate food marketing, such as the shutdown of interagency efforts due to political pressure, may negatively impact future attempts. Existing regulations are outdated and not well-suited to the modern digital landscape, failing to adequately define what constitutes child-directed content and advertising. The absence of robust evidence connecting digital food marketing to negative health outcomes in children makes it difficult to justify strict regulations. Grassroots movements and parental involvement, while critical, often lack the resources to match the industry's influence. These barriers create a challenging environment for the implementation of effective policies to regulate digital food marketing to children.

Potential Solutions and Opportunities to Overcome the Barriers

To overcome the barriers in regulating digital food marketing, interviewees put forth several solutions to address both regulatory and advocacy needs.

Enhance Regulatory Authority

Strengthening the regulatory authority of government agencies, such as the FTC, is necessary. This involves updating existing regulations and ensuring that rules change with advancing digital marketing technologies. Establishing clear regulations with significant penalties for non-compliance can deter companies from engaging in harmful marketing practices targeted at children. Increasing transparency in industry lobbying efforts and marketing practices is another key strategy. Exposing financial ties between policymakers and the food and beverage industry can help hold companies accountable and pressure them to adopt more responsible marketing practices. Transparency in these areas can also enhance public trust and support for regulatory measures. One of the interviewees suggested the following:

"…I think the government should have more transparent disclosures. Wouldn't it be powerful if, whenever a policymaker spoke, they had to say, 'Hi! I'm so-and-so, representative of the State of Florida, and I've received funding from Coca-Cola, Philip Morris, and Monsanto and this is what I have to say. They would have to say that every time they spoke…" — Researcher

Narratives and Alliances for Stronger Advocacy

Advocacy groups play a crucial role in this process, and their efforts can be amplified through stronger alliances with public health organizations and community groups. Utilizing science, media, and storytelling, along with increasing funding for grassroots movements and public health campaigns, can further support these advocacy efforts and help create a more supportive environment for policy changes. One of the interviewees said:

"…Nobody's telling the story, so you need to talk to the grassroots people who are affected by it and maybe even mobilize them more. I'm not sure how much they are mobilized or if it trickles up to the federal level. I don't see that happening. So, for Congress to listen, folks who want to engage at that level need to start telling more tangible stories about food marketing…" — Advocate

Build and Communicate Research

Building a robust evidence base through research is essential for supporting regulatory proposals. Continued research on the impacts of digital food marketing on children's health, combined with promoting digital literacy among parents and children, can provide the necessary data to drive policy changes. Documenting health outcomes and comparing them to historical cases, such as those related to the tobacco industry, can underscore the need for stringent regulations. One of the interviewees reported the following:

"…I think the key thing is that any policy changes, more so than what we already have, need to be grounded in really robust evidence…" — Government Official

Need for Litigation

Exploring litigation as a tool to challenge unfair marketing practices, such as those targeting vulnerable populations, would be beneficial. Legal action can force clearer definitions and stricter enforcement of marketing regulations, holding industries accountable for their impact on children's health. An interviewee noted the following:

"…Millions and millions of lives were saved because of policy and legal actions against the tobacco industry that took place. It took a long time for these policies to be implemented, and some of that ground was softened by successful legal actions that brought a lot of negative attention to the tobacco industry and made them seem less all-powerful. This, in turn, allowed legislative doors to open. I think a similar scenario is likely to play out here. If we achieve some litigation victories, it will bring tremendous attention to the problem, as the press covers these litigation efforts extensively. Additionally, through the discovery phase of litigation, we would get lots of internal documents from the industry that can be highly damning and involve a new set of players, like the state attorneys general, who are not currently involved…" — Advocate

Look to Successful International Action

Adopting successful international practices and enhancing governmental policy actions, such as banning online junk food advertising in the UK, can offer valuable insights for local policy implementation. Studying how different countries address digital food marketing can help tailor effective strategies to the U.S. context. As mentioned by one interviewee:

"…There is a report of an overview of 20 years of policymaking in the UK that led up to the visual marketing regulations. It clearly demonstrated how strong the advocacy arm was and how critical it was to getting this policy agreed upon by the government. They kept it on the agenda, pushed back against industry arguments, ensured the best evidence was used, and tirelessly campaigned for it repeatedly. They submitted evidence, brought people together, and made sure the advocacy teams had a united voice, just like the industry does…" — Researcher

Highlight Disproportionate Impact

Finally, framing the issue of digital food marketing as part of a broader struggle against inequality can help garner support for regulatory changes. By highlighting how these practices disproportionately affect certain groups, advocates can address the issues within a larger context of social justice and equity. As noted:

"…I think having an ecosystem approach to this work is essential. One area where we have a lot of opportunities is in the power space that needs to be developed between advocates and communities with power to influence policymakers in a way that offsets the power of industry. It would be great if funders and all of us saw ourselves as part of an ecosystem with trusted relationships, adequate funding, and a focus on collaboration rather than competition to make real change happen…" — Advocate

Integrating these strategies will enable policymakers and advocates to work together more effectively to create a healthier digital environment for children and mitigate the adverse effects of digital food marketing.

Expert Panel Recommendations

All expert panel members agreed upon the following recommendations for policies and systems-level solutions to reduce children's exposure to and/or the power of unhealthy digital food marketing. All recommendations focus on the key actors affecting children's digital environments, including industry-led policies, school-based policies, other physical food environment policies, social environment policies, and government policies. Specific government policies that could be enacted in the short-term, new and innovative government policy approaches, as well as recommendations considered but not put forth by the expert panel are also provided. Recommendations are provided in the tables below.

Industry-Led Policies

As described in previous sections, current food and advertising industry self-regulatory programs (CFBAI and CARU), as well as the few existing media-company policies, do not protect children from the harmful effects of unhealthy digital food marketing.

The expert panel agreed that industry actors, including food, marketing, and media companies and digital providers must take actions to: 1) reduce children's exposure to unhealthy food marketing in digital media; 2) address health inequities resulting from unhealthy food marketing practices; and 3) stop unfair and deceptive practices in digital food marketing to children.

The expert panel recognizes that industry actors are unlikely to take these actions unless required to do so by government or public pressures. Therefore, these recommendations are intended as a benchmark for future industry actions to assess whether such actions will result in meaningful improvements. These recommendations also inform potential government actions to reduce children's exposure to digital food marketing and/or its power to persuade them. The panel also noted that these actions to prevent unfair and deceptive digital food marketing should apply to all ages, but that children under 18 deserve additional protection.

Recommendations for Industry-Led Policies	

To effectively limit children's exposure to unhealthy food marketing to children, industry-led policies must:	• Protect children up to 18 years old.
	• Address all forms of digital marketing to children, including:
	  – All forms of paid and owned marketing (e.g., influencer content, product/brand placements or integration, food company apps/websites/social media accounts); and
	  – Brand marketing, as well as marketing for unhealthy products.
	• Address all marketing to which children are exposed, regardless of audience composition and method of targeting.
	• Apply nutrition criteria that adhere to the Interagency Working Group on Food Marketed to Children (IWG) nutrition principles designed to identify foods that make a meaningful contribution to a healthful diet and minimize consumption of foods with significant amounts of nutrients to limit.
	  – Alternatively, policies should limit all food marketing, regardless of nutritional content.
	• Include a provision to release data for independent evaluations of policy effects on exposure and/or power of marketing to children.

To prevent further contribution to racial, ethnic, and other inequities (directly or indirectly), companies must:	• Examine and disclose how their business models and practices (e.g., marketing, philanthropy, lobbying) contribute to racial, ethnic, and other inequities (directly or indirectly). • Marketers and digital platforms must implement actions to ensure that their marketing practices do not contribute to health disparities affecting low-income persons and communities of color.

To prevent unfair and deceptive practices in food marketing to children, industry-led policies must:	• Restrict all branded food content (paid or not) embedded within any entertainment content viewed by children, including (but not limited to) influencer, cartoon, TV shows/movies, music, virtual reality, and gaming content (also known as blurred or stealth marketing). • Comply with privacy by design and default practices to safeguard children's data, including: – Not collect personal information about children that is not needed to deliver the service, including any activity related to individual-specific advertising; – Not share or sell children's personal information; – Not track children's location; – Not profile children unless profiling can be shown to be in children's best interests for non-commercial reasons; – Not use children's data in ways for which companies have not obtained explicit permission from the child's parent or the child (depending on the child's age); and – Conduct a risk assessment of how they use children's data. • Comply with privacy by design and default practices to safeguard children's privacy, including: – Set all default settings to the most private; – Make it easy for children to report privacy concerns; – Let children know whenever they are being monitored or tracked; and – Provide privacy notices in clear language that young users can understand. • Comply with age-appropriate design features to prevent manipulative and unfair techniques in digital marketing to which children are exposed, including: – Not use design features that may be detrimental to children's well-being; – Not use manipulative design to get children to sign away their information or view marketing; and – Design age-appropriate experiences for children based on set age ranges. • Companies that conduct research with children must require human subjects protections for all research participants under age 18. • Food, marketing, and digital companies must disclose any studies that they or their affiliated foundations sponsor or conduct on the health, psychological, purchasing practices, or other effects of their marketing on children. Such disclosures should include the amount (dollars and in-kind), purposes, and recipients of such support and the published and unpublished findings.

School-Based Policies

Children are exposed to digital food marketing on their own devices in schools and on school-issued devices and networks in and outside of school.[42,43] Schools have the opportunity and the obligation to take actions to reduce children's exposure to unhealthy food marketing and protect children from unfair and deceptive digital marketing practices that can result from use of school-based technology.

Recommendations for School-Based Policies

- School-based digital networks and school-issued devices should install robust ad-blocking technology and filters.
- School districts should have a robust student privacy policy that does not allow collection of online student data, unless required for the school's own use, and does not allow the sale or use of student data by any other entity.
- In their local school wellness policies, school districts should specify that digital instructional materials can not include unhealthy food marketing.
- Edtech companies that sell technology to schools must offer ad blocking and filter capabilities and comply with privacy by design and default. Schools should only purchase services and equipment from edtech companies that offer these protections.

Other Physical Food Environment Policies

Children are exposed to food marketing on their digital devices that directly links to locations in their physical environment (such as restaurants and food retailers), thus encouraging visits to those locations and food purchases.[18,54]

Recommendations for Other Physical Food Environment Policies

- Retailers, restaurants, and food ordering services (e.g., Uber Eats, Door Dash) with apps and/or websites accessed by children must comply with age-appropriate design features.
  - In particular, they should not utilize geo-location data or otherwise target children with marketing, including push notifications and sales promotions.
- Digital billboards located near schools and other places where children gather must not be used to market unhealthy foods.

Social Environment Policies

Food companies exploit the parasocial relationships that children establish with online personae to amplify and increase the effectiveness of their marketing strategies.[160,174,177,204] These key actors should not take advantage of the emotional connections they have established with children to promote unhealthy foods.

Recommendations for Social Environment Policies

- Influencers, celebrities, and licensed characters must not promote unhealthy food brands to children online (whether or not they are directly compensated by the brand), including speaking positively about the brand or encouraging its consumption in any way.
- Brand characters must not be used to promote unhealthy food brands in digital media, including on company websites, social media, and apps.

Government Policies

The expert panel agreed that government policies are required to mandate that industry (including food, marketing, and media companies and/or digital providers) reduce children's exposure to and/or the power of unhealthy digital food marketing. Current industry self-regulatory policies are extremely limited and do not meet the panel's criteria for effective digital marketing policies. However, industry players are unlikely to enact effective policies unless mandated to do so and the expert panel agreed existing evidence warrants immediate government regulatory and legislative actions.

- Current enacted and proposed U.S. and state government policies to protect children's data and privacy, and to require age-appropriate design features in digital media to which children are exposed, are important first steps (including KOSPA and Age-appropriate Design Codes).

- However, a wide range of new and innovative government policy options will be required to protect children from the harmful impact of unhealthy digital food marketing.

Potential government policies

In addition to current and proposed children's data protection and privacy and online safety policies (e.g., KOSPA, age-appropriate design codes), expert panel members identified a number of additional government policies with potential to directly address digital food marketing, including 1) policies that could be implemented and enforced under existing U.S. regulatory policies, and 2) new and innovative policies that would require substantial changes to current U.S. government practices and priorities. These government policies and approaches were discussed by panel members and other experts, but did not undergo the same consensus-building process as the previously presented Expert Panel Recommendations (described in Step 4 of the **Methodology**). Therefore, they are presented below as "potential" policies or approaches to directly address digital food marketing to children rather than recommendations.

The panel's vision for a digital world would prioritize children's health and wellbeing and equity over commercial interests. Achieving this vision will require new and innovative approaches to legislating, regulating, monitoring, and enforcing restrictions on unhealthy digital food marketing to children, including mandatory comprehensive government policies, attractive commercial-free digital content alternatives, a convincing and coordinated public narrative, and funding.

Potential Government Policies That Could Be Implemented in the Short-term	
Governmental agencies should implement and enforce policies under existing U.S. regulatory policies.	• The Interagency Working Group on Food Marketed to Children (IWG) should publish its final nutrition principles for foods marketed to children and update its marketing definitions to incorporate current digital marketing practices.[198] • The Federal Trade Commission (FTC) should update its "Review of Food Marketing to Children and Adolescents,"[12] last published in 2012, and implement regularly scheduled updates. To obtain data for this report, the FTC should subpoena documents from food companies and digital platforms to assess digital food marketing practices. The FTC has the authority to do so under Section 6(b) of the FTC Act (15 USC 45).[205] • The FTC should utilize its powers under Section 5 of the FTC Act that prohibits "unfair or deceptive acts or practices in or affecting commerce" to address digital marketing to children, including civil law enforcement actions against advertisers and digital platforms. • The FTC can file anti-trust actions against the large digital platforms, which currently monopolize the digital marketplace. • The FTC should exercise its authority around unfair and deceptive advertising to address stealth advertising online and bring enforcement actions against companies that are running improperly disclosed advertising content. It should hold digital providers and advertisers responsible for ensuring that content providers comply. • The USDA should require school districts to incorporate digital food marketing in Local School Wellness Policies and provide guidance for schools on effective actions.
The U.S. Congress should allocate funding and other resources to implement actions to address unhealthy digital food marketing to children.	• Designate a responsible agency and provide adequate and appropriate resources to formally monitor and regularly report on progress in restricting children's exposure to and/or the power of digital food marketing. • Assign dedicated personnel at the FTC to enforce the prohibition of unfair and deceptive digital marketing to children. • Expand the federal research capacity (including through FTC, USDA, Health and Human Services (HHS), and the National Science Foundation (NSF) to support digital food marketing research priorities. • Develop and test solutions at the state and local levels.
State and local governments can also take action to address the harms of digital food marketing to children.	• Attorneys General can make claims against food advertisers and digital platforms under the authority of state unfair and deceptive acts and practices. – Require companies and industry organizations with policies addressing digital and/or food marketing to children to release data for independent evaluations of their claims that policies protect children. • States can require school districts to develop "Screen Use in Schools" policies and mandate use of ad blocking and filter technology, age-appropriate design features, and student privacy protections.

Potential New and Innovative Government Policy Approaches	
Mandatory comprehensive government policies	• Establish one government entity responsible for protecting children's health and well-being, monitoring all digital marketing to children and enforcing restrictions. • Comprehensive legislation that effectively protects children from exposure to and the harms of digital food marketing by: – Restricting all forms of digital food marketing (paid, owned, and earned) that children under age 18 are exposed to, including brand marketing; – Utilizing the IWG nutrition principles to identify healthful foods that can be marketed to children; – Prohibiting all unfair and deceptive digital marketing to children, regardless of the type of product, including the collection and sale of children's data; and – Establishing regular monitoring by an independent third-party and enforcement to ensure compliance. • Food marketers and digital providers are held accountable for their harmful practices – through transparency, monitoring and enforcement – including unhealthy marketing to children and structural inequities that contribute to health disparities affecting persons with low income and communities of color: – Establish an independent board to set standards for advertising to children and evaluate compliance in a manner that is not subject to industry influence; – Provide a public forum for consumers, civil society organizations, and competitors to file complaints about harmful digital marketing to children; – Require companies to prove that their content and platforms are safe for children (as FDA requires of drug companies); – Require advertisers and digital platforms to disclose all marketing that children could be exposed to, maintain complete Ad Libraries with open access to independent researchers, and provide access to data for independent monitoring and evaluation; – Require all research conducted with children by commercial entities to follow human subjects protocols for research with vulnerable populations, as set out in the Belmont Report, and report findings of all studies conducted with children; and – Use supply-side controls, such as licensing requirements or liability measures, to require companies to comply in order to do business.
Attractive commercial-free alternatives	A free, child-friendly, high-quality commercial-free digital space where companies cannot interact with children is necessary to provide an appealing alternative to current profit-driven platforms. • Content created by non-commercial entities to support children's health and wellbeing. • Independently funded by government or non-profit organizations.
Convincing, coordinated and well-funded advocacy campaign	A convincing narrative and extensive outreach are required to increase public and policymaker awareness and understanding of the harms of digital food marketing on children. • A major media campaign, developed by experienced advertisers, and funded at levels comparable to the Truth anti-tobacco campaign. • Readily available resources for educators, health care providers, and parents to increase awareness of digital food marketing and the harms it poses to children's health. • Research to inform and evaluate potential effective policy actions, quantify children's widespread exposure to unhealthy digital food marketing, and clearly demonstrate the harms from this exposure. • A forum for researchers, advocates and policymakers to educate and inform each other's efforts.
Funding	Food companies and digital platforms should be required to allocate a small portion of their profits to fund these actions. • Congress could impose a tax on advertisers and digital platforms that market to children and earmark it for free, commercial-free, high-quality child-friendly content. • Penalties imposed on companies for violating regulations and unfair and deceptive marketing practices (e.g., through FTC and AG complaints), could be earmarked for these purposes.

Policies Not Recommended By Expert Panel

The expert panel discussed additional policies that have been implemented or proposed to address unhealthy digital food marketing to children and other harmful digital marketing practices. However, these policies are not included in the recommendations primarily due to evidence suggesting the policies are ineffective, the policies did not fare well when evaluated using the criteria, and/or expert panel members were not in agreement and therefore consensus was not reached. A rationale for each potential policy is described below.

Information-based approaches

The panel discussed policies that have been implemented or proposed to help children recognize and understand the purpose of digital marketing when they encounter it online, including:

- Require food and media companies to disclose advertising (verbal and/or written) or use icons to flag advertising.
- Social media channels for influencers who engage in promoting unhealthy food should be labeled as "intended for mature audiences."

Examples of these types of existing policies include CARU's guideline that advertising embedded within entertainment content should be identified as advertising through disclosures or contextual cues[179] and the FTC's rules that influencers must disclose all material relationships with brands.[44]

Although ad disclosures can increase children's recognition of advertising content, research demonstrates that they do not reduce the impact of digital food marketing on children's attitudes and desires for the unhealthy food products promoted.[104,159-161,174] Therefore, the panel recommended that any entertainment content viewed by children must not have branded food content (paid or not) embedded within.

- Require schools to offer digital media literacy curricula to students.

The American Academy of Pediatrics[22] and National Academies of Sciences[206] both endorse teaching digital media literacy in schools to help children understand when their personal data are being collected and processed, what digital platforms and companies know about them, and how companies use their data to target marketing and other content to them. However, research demonstrates that this understanding does not reduce children's desire to engage with digital food marketing nor their ability to resist its influence.[169] Therefore, information-based approaches such as these did not meet the expert panel criteria for policies that are likely to reduce exposure to or the impact of unhealthy digital food marketing on children.

However, expert panel members endorsed other potential benefits of these policies, including increasing children's ability to recognize digital marketing attempts and their ability to make informed decisions regarding data privacy and usage agreements. In addition, advertising disclosures increase transparency of marketing attempts by advertisers and content providers, which may increase parent and other consumer participation in advocacy efforts to protect children from digital advertising.

Some panel members also expressed concern that endorsement of these information-based approaches would perpetuate common beliefs that children (especially adolescents) should be able to resist harmful marketing messages. These approaches shift the burden of responsibility onto children, parents, and schools, while permitting companies to continue their aggressive investments in marketing unhealthy foods to children.

Addressing health disparities

The panel also discussed other policies that have been proposed to address digital food marketing practices that contribute to health disparities experienced by children of color.

- Companies should leverage diversity, equity, and inclusion (DEI) commitments to push for change in DEl efforts and marketing to youth of color.

Greater representation of Black, Latino, and Indigenous consumers in marketing is an important goal for companies. However, food companies have touted their inclusion of Black and Latino celebrities and culture in their marketing for unhealthy brands as evidence of their commitment to DEI.[20,46,48] The expert panel supports greater representation in digital media, but does not condone the use of these racialized messages in marketing that promote unhealthy products to children.

- Since children of color in the U.S. have more exposure to unhealthy digital food marketing, effective policies to protect all children will likely reduce health inequities.

Panel members agreed that this statement is accurate, but it does not address the structural and racial justice issues that have led to these inequities. Panel members believe that companies should be held directly accountable for recognizing and amending their actions that have contributed to health disparities affecting children of color.

Additional school-based policies

The panel discussed additional potential school-based policies that would limit children's exposure to food marketing on students' digital devices in schools and on school-sponsored social media accounts.

- Schools should restrict the use of student-owned digital devices during school hours, including during lunch or recess.

- Schools should refrain from using social media for student-facing communication, including class work, homework-assignments, sports, club or team-related events and schedules, and should not host school discussions or events on social media or use social media to communicate school events.

These policies would restrict school practices that appear to condone students' use of social media and may benefit the learning environment. However, research has not evaluated the impact of these policies on children's exposure to digital marketing. In addition, some panel members raised concerns that such policies reduce schools' ability to tailor their practices to meet the unique needs of their students and families and raise potential equity and accessibility issues.

Policies to address broader issues

The expert panel discussed two potential recommendations that might address broader structural and socio-cultural issues of digital food marketing.

- Digital platforms should increase access to high quality commercial-free content for children.

- Advocates, researchers, and youth-centered organizations should sponsor and support youth-led countermarketing campaigns that highlight the manipulative tactics used by the food industry, including mechanisms to deliver campaign messages through children's social networks.

The expert panel chose not to endorse these recommendations, primarily due to questions about who would have responsibility for and fund these initiatives. Many did not feel that digital platforms should be responsible for creating and/or designating content as "high quality for children". Countermarketing campaigns have been successful in reducing exposure to and impact of tobacco marketing to youth and could be effective in changing public attitudes about unhealthy food marketing.[207] However, the panel felt that this recommendation would put the onus on individuals to resist marketing and let food companies off the hook.

Research Recommendations

The expert panel identified key priorities for additional research to inform and support effective policies to reduce children's exposure to and the negative impact of unhealthy digital food marketing.

As noted in previous reviews, the majority of research on digital food marketing has been conducted in high-income countries, although relatively few of these studies (approximately 20%) were based in the United States. In addition, most U.S. studies were descriptive studies of food marketing in digital media; only two measured children's exposure. Although there is high consistency of study findings across countries, this review highlights the need for additional U.S.-specific research.

Research is necessary to understand and address the impact of digital food marketing on health disparities affecting Black, Latino, Indigenous, and children from families with low-incomes:

- Recruitment of diverse samples and oversampling demographic groups to allow for comparisons by race, ethnicity and/or income.
- Studies that assess how racial and ethnic targeted marketing of unhealthy foods affect exposure to and the power of digital food marketing on children in communities of color.
- Studies that assess how other structural inequities, including volume and type of data collected about individuals from different backgrounds, neighborhood marketing, and food availability characteristics, may also affect children in low-income communities and communities of color.

Additional research should examine common forms of digital food marketing that have not been well-documented, including descriptive content analyses, exposure, and impact studies.

- Digital platforms that have not been well-studied include gaming sites (Roblox, Minecraft) and livestream gaming platforms (Twitch, Facebook Games), mobile apps (including fast-food and other food ordering apps, grocery apps, other branded food apps, and other apps with embedded marketing, such as TeamSnap or AI-powered chatbots), esports platforms, virtual worlds, and the metaverse.

Researchers should utilize standardized protocols to code features of digital marketing in a consistent way that will inform policy actions.

- Studies that differentiate between paid, owned, and earned food marketing, as well as between brand and product marketing, which are critical distinctions for effective policy actions.
- Brand marketing studies to:
  - Measure impact of brand marketing only (i.e., logos/names/mentions) and compare effects of brand and product marketing within different digital contexts (e.g., social media, gaming, video) on diet-related behavioral and intermediate outcomes.
  - Assess effects of marketing healthy products offered by a brand on attitudes and consumption of unhealthy products offered by the brand.

Studies should document children's exposure to digital food marketing across multiple platforms.

- Additional studies that utilize existing protocols for screen recording and coding to allow for comparisons across different studies and populations (such as the WHO Europe CLICK protocols).[208-210]
- Newer methods, such as sequential screen shots, citizen science with data donation, and other comprehensive methods to assess how children encounter food marketing on user interfaces.
- Studies with young children (under 10 years), to supplement existing studies focused primarily on adolescents.
- Ongoing monitoring studies to track changes in digital food marketing and exposure over time, including in longitudinal cohorts, and provide an opportunity for natural experiments to examine changes due to policy implementation, self-regulatory actions, marketing practices, new technologies, and major events.

Cross-platform and longitudinal studies are necessary to assess the cumulative and synergistic impact of digital food marketing.

- Longitudinal studies to measure associations between exposure over time and across platforms and behavioral and intermediate marketing outcomes, as well as longer-term impacts on unhealthy eating patterns.
- Studies that assess broader socio-cultural impacts of food marketing, including social norms about dietary behaviors and category preferences, the denormalization of junk food marketing, youth culture, and peer and family relationships and conflict.
- New methods to measure the impact of repeated exposure over time to food marketing designed to reach children as often and in as many venues as possible and to target children based on their online behavior and interests.

Studies should demonstrate the power of potentially unfair and deceptive digital food marketing techniques on recognition and awareness of marketing, as well as impact on marketing and broader outcomes.

- Examination of common creative techniques that have not been well studied, including engagement techniques, peer dissemination of marketing, parasocial relationships (in addition to influencers), other types of stealth marketing (i.e., marketing embedded within entertainment content), interactions between digital and physical environments, highly targeted and personalized messages, and AI-informed marketing.
- Understanding children's experiences with and perceptions of these techniques, including recognition, awareness, acceptance, desirability, and ability and motivation to resist.
- Examine potential mechanisms to increase children's concerns and motivations to resist influence when they encounter digital food marketing.
- Impact of digital food marketing on young adults (18- to 24-year-olds) who are moving outside their parental influence and establishing their own lifetime food, media, and health habits.

Research should assess the effectiveness of existing and proposed solutions on reducing children's exposure to and/or the power of unhealthy digital food marketing.

- New policy solutions when proposed, such as changes currently being implemented by digital platforms and marketers to comply with age-appropriate design codes.
- Novel, potentially more effective methods of disclosure and transparency about when sponsored content is present, why children receive specific ads, what data have been collected about them, and how experiences vary by child age.
- Experimental intervention studies in schools and families to test different approaches to reduce exposure to marketing and/or selective or total use of digital media.

Research is needed to understand the parental role in mediating, protecting, or enabling their children to be exposed to digital media.

- What parents understand about digital food marketing to their children, how they view these media and their messages, and what roles they play in restricting or promoting exposure to digital food ads.

Research should also identify potential policy actions and opportunities to increase public and policymaker support for policies to address all forms of unhealthy food marketing, including digital marketing, to children.

- Assess approaches to increase public awareness of the extent and negative impact of unhealthy food marketing to children and assess approaches to denormalize these practices, such as countermarketing and youth- or parent-led advocacy campaigns, including in communities of color.
- Studies to monitor public concern about food marketing to children and support for effective policy solutions.
- Policy studies on the potential for and impact of litigation to force media and food companies to pay for harmful consequences of their marketing (using tobacco and opioid litigation as models) and additional successful policy approaches from other public health domains.

Conclusions

The panel's vision for a digital media environment would prioritize children's health and wellbeing and equity over commercial interests. Achieving this vision will require new and innovative approaches to legislation, regulation, monitoring, and enforcement of restrictions on unhealthy digital food marketing to children, including mandatory comprehensive government policies, attractive commercial-free digital content alternatives, a convincing and coordinated public narrative to support these policies, and sufficient funding.

This report provides evidence-based recommendations for industry, policymakers, educators, and researchers to begin to address the overwhelmingly unhealthy digital food environment that children now experience. Industry must create a safer and healthier digital marketing environment for children, and policymakers must step in if industry continues to refuse to take effective action voluntarily.[4,5,22,31] Schools should take action to limit children's exposure to digital food marketing in school and on school-issued devices, as well as the commercial use of children's data collected for educational activities.[42,43] Researchers must further document children's exposure to the broad array of food marketing that they experience on their digital devices and its effects on their diet-related behaviors, as well as on broader socio-cultural outcomes.

Parents and healthcare providers can also work with children to limit their digital media use and protect their privacy online.[22] **Appendix E** suggests resources for practitioners, educators, parents, and advocates to learn about the marketing that children are exposed to on their digital devices, information about and resources to limit how companies use children's data and other potentially harmful techniques in digital marketing, and resources and opportunities to advocate for protecting children from harmful digital marketing.

Research has yet to identify effective strategies to reduce the harms resulting from children's exposure to unhealthy food marketing in digital media. Therefore, the food industry has been able to manipulate children and embed their unhealthy brands into children's social networks in a digital world that largely falls under the radar of parents, healthcare providers, educators, and policymakers. This report focuses on digital food marketing, but research and public policy must also address the cumulative and synergistic impact of children's exposure to all forms of unhealthy food marketing. Coordinated action by advocates, researchers and others who care about children will be necessary to increase awareness and generate demands for industry to amend their unhealthy and unfair marketing practices experienced by children. Children's health and wellbeing must not be determined by the profit-driven motives of large food and digital media companies.

Appendices

Appendix A. Methodology for the systematic literature review

One member of the research team (SM) conducted a search of the academic literature on digital food marketing to children for articles published from January 2019 to the date of the search.

Three databases were searched on December 19, 2023: PsycInfo, Business Source Premier, and Web of Science. PubMed was searched on January 2, 2024.

The following search terms were used to identify any papers related to digital food marketing to children:

- **Marketing**: market* OR persua* OR advert* OR commercial OR promot* OR technique OR brand* OR sponsor*
- **AND Children**: child* OR adolescen* OR "young people" OR teen OR "junior high" OR "primary school" OR "elementary school" OR "high school" OR "secondary school" OR youth OR boys OR girls OR camp OR parent* OR "pre-adolescent"
- **AND Food**: food OR drink OR beverage OR snack OR juice OR soda NOT alcohol* OR diet*
- **AND Digital**: social* OR digital* OR "mobile" OR "online" OR "internet" OR "apps" OR "smartphone" OR game* or "new media" OR advergame* OR influencer OR website OR in-game OR engage* OR "product placement" OR "video" OR "YouTube" OR "Facebook" OR "TikTok" OR "Twitch" OR "Instagram" OR "video game" OR livestream*

Controlled vocabulary was used for PsycInfo, PubMed, and Business Source Premier searches

Articles were included in the review if all of the following criteria were met:

- The article was published in English
- The primary age demographic was 17 years or younger
- The study examined marketing on any type of digital platform (studies could also include other forms of marketing)
- Food and/or non-alcoholic beverages were specified as the marketed product type
- Studies assessed any of the following measures:
  - Descriptions of marketing on any digital platform
  - Amount of exposure
  - Behavioral, intermediate or broader outcomes as specified in Table 2

Articles were excluded if the inclusion criteria were not met according to the following criteria:

- The sample only included individuals >17 years
- No digital platforms were included
- No food or non-alcoholic beverage products (e.g., tobacco, alcohol) were specified in the methods
- Review papers were saved for cross-checking the final list of papers
- Policy-related papers were saved to contribute to other sections of the technical report

One member of the research team (SM) reviewed all papers identified in the review of reviews and the systematic literature search to ensure that they met the inclusion criteria and to categorize them by topic. In consultation with the panel chair, the research consultant then coded the studies for relevant information as appropriate for the topic, including types of digital media examined, country, age, race and ethnicity, and SES of the children, methodology, and outcomes. Study details and results are summarized in the technical report (the **Evidence Review** section), together with an analysis of research gaps. The research team and two expert panel members reviewed and provided feedback on the literature review results. The information from this review was used to identify the research recommendations (found in the **Expert Recommendations** section).

Appendix B. Key informant interview questions and themes

Interview Questions

1. What do you think are the main challenges faced in the U.S. by those advocating for policies to regulate how the food, beverage, and restaurant industries use digital food marketing strategies that target children?
2. Can you share any examples where advocacy has led to the successful implementation of policies designed to protect children in the digital marketing space?
3. Who are the actors supporting progress on reducing children's exposure to and harm from digital food marketing?
4. Who are the actors blocking progress on reducing children's exposure to and harm from digital food marketing? For example, "actors" could be particular political figures, U.S. regulatory agencies, other government entities, industry or individual companies.
5. What are the reasons and motivations for inaction and/or resistance to policies that specifically address digital food marketing to children from federal agencies, policy makers, industry, and advocates?
6. Most of the field's focus has been on possible legislation or regulatory actions. Do you see a role for litigation (such as taking possible legal action) as a strategy?
7. Do you see food and/or digital media companies systematically targeting children of color? If so, in what ways?

Interview Themes

Table B1. Barriers to policy change

Sub-themes	Frequency
Industry Power and External Pressures: Food and beverage companies, along with the restaurant industry, have a significant influence on regulatory actions due to their financial capabilities.	19/19
Targeted Marketing and Systematic Inequalities: Marketing strategies used to target children of color disproportionately affect minority communities and exacerbate existing health disparities.	18/19
Public Perception and Parental Responsibility: Challenges related to public perceptions about government overreach into parental responsibilities and food choices. The public narrative of personal responsibility that overlooks systemic issues.	17/19
First Amendment: Difficulty in regulating marketing due to strong protections under commercial speech rights.	14/19
Competing Public Health Priorities: Challenges in prioritizing food marketing issues when compared to immediate threats like gun violence or drug use.	14/19
Low priority: Due to significant societal changes, especially since COVID-19, issues like food marketing are being overshadowed by more pressing concerns such as crime, safety, and climate change.	12/19
Lack of Resources for Grassroots Movements and Parental Influence: Local and grassroots movements, including parental involvement, are critical but often lack the resources to match the industry's influence.	12/19
Previous Government Setbacks: Historical setbacks in attempting to regulate food marketing, such as the failure to finalize Interagency Working Group guidelines due to political pressure, may negatively impact future attempts.	12/19
Lack of Updated Regulations: Existing regulations are outdated and not well-suited to the modern digital landscape, failing to adequately define what constitutes child-directed content and advertising.	10/19
Lack of Strong Evidence: Absence of robust evidence connecting digital food marketing to negative health outcomes in children, making it difficult to justify strict regulations.	10/19
Voluntary Compliance: Reliance on industries to self-regulate often results in inadequate protection for consumers, particularly vulnerable populations like children.	9/19
Regulatory Loopholes: Companies strategically exploit gaps in regulations to continue targeted marketing efforts.	8/19
Early Technology Use: The societal norm of providing young children with smartphones increases their exposure to digital marketing.	7/19

Table B2. Potential opportunities to overcome barriers

Sub-themes	Frequency
Advocacy and Research: Collaboration between researchers and advocates to produce evidence-based pressure on policymakers and corporations is needed.	19/19
Government and Legislators: Involvement of political figures who could potentially advocate for or against marketing regulations based on their past and current interests.	19/19
Need for Litigation: Exploring litigation to challenge unfair marketing practices, especially those targeting vulnerable populations.	18/19
Need for Clearer Regulations: Litigation could force clearer definitions and stricter enforcement of digital advertising to children. Industries should be held accountable for health outcomes similar to the tobacco industry, focusing on the negative impacts of their products on children's health.	18/19
Integrate Advocacy and Public Engagement: Utilizing science, media, and storytelling to push for changes, supported by increased funding for advocacy groups and building broader coalitions across various sectors.	18/19
Research and Education: Advocating for more research to evaluate the effects of digital marketing on children's health and promoting digital literacy among parents and children.	18/19
Enhance Regulatory Authority: Strengthening the FTC's power to enforce stricter disclosure requirements and penalize non-compliance, including revising legislation to close existing loopholes.	17/19
Global and Governmental Initiatives: Adopting successful international practices, enhancing governmental policy actions like setting better nutritional standards, and encouraging industries to adopt more responsible marketing practices.	13/19
Larger Struggle: Opportunities to frame the marketing tactics as part of a larger struggle against inequality.	11/19
Transparent Disclosures: Advocating for policymakers to openly disclose their financial ties to industries during public communications.	8/19
Systematic Examination of Marketing Practices: Conducting detailed analyses of how specific brands target racial and ethnic minorities	6/19

Appendix C. Studies included in the literature review

Table C1. Descriptive Studies

Source	Author	Year	Media type	Country	Selection method	Age	Top food categories	Creative techniques	Ad disclosures
Recent lit search	Evans R, Christiansen P, Masterson T, Barlow G, Boyland E[106]	2024	Livestream gaming (Fortnite streamers on Twitch)	UK	Digital media type	Adolescents	HFSS foods: energy drinks, fast food; food delivery; sugary drinks	Branded food cues as product placement or a looping image, consumption of food	N/A
Recent lit search	Ayalde J, Ta D, Adesanya O, Mandzufas J, Lombardi K, Trapp G[107]	2023	Video sharing (TikTok)	Australia	Digital media type	Children and adolescents	Energy drinks	Child/adolescent in video, positive attitudes about Eds, consumption of ED, rapid/excessive consumption	29% disclosed paid advertisement/ sponsorship
Recent lit search	Choi E[108]	2023	Video sharing (YouTube)	US	Digital media type	Child-targeted videos	Not reported	Product placement, unboxing, product integration into video content	7% included advertising disclosures
Recent lit search	Fleming-Milici F, Phaneuf L, Harris J[109]	2023	Video sharing (YouTube)	US	Digital media type	Made-for-kids child influencer videos	Candy, sweet/salty snacks, sugary drinks, ice cream. Healthy foods (9%)	Branded product appearances, types of mentions (consumption, implied consumption, verbal thumbnails)	8% disclosed sponsored content
Recent lit search	Matos J de P, Tobias PB, Baldim L, Horta PM[110]	2023	Video sharing (YouTube)	Brazil	Digital media type	YouTube channels aimed at children	Ultraprocessed (94%); sweets and treats, dairy drinks, juices/soft drinks, bundled breads/biscuits	Consumption of branded product, demonstrating brand food characteristics, food brand in background	N/A
Recent lit search	Meyerding SGH, Marpert JD[111]	2023	Video sharing (YouTube)	Germany	Digital media type	Child social media influencers	Candy and sweets, fast food, energy drinks, chips, sugary drinks	Child consumed product, branded product placement	N/A
Recent lit search	Edwards CG, Pollack CC, Pritschet SJ, Haushalter K, Long JW, Masterson TD[112]	2022	Livestream gaming (Twitch, Facebook Gaming, YouTube)	US	Digital media type	Not specified	Energy drinks, restaurants, soda, snacks	Brand names in stream title (indicates sponsorship)	N/A
Recent lit search	Turnwald BP, Anderson KG, Markus HR, Crum AJ[113]	2022	Social media (Instagram)	US	Digital media type	Celebrities popular with "young people"	Food: snacks/sweets, fruits, proteins, mixed dishes, vegetables, grains. Beverages: alcohol, coffee/tea, sweet drinks, water	Celebrity endorsements, likes/comments	4.8% disclosed sponsored content
Recent lit search	Winzer E, Naderer B, Klein S, Lercher L, Wakolbinger M[114]	2022	Social media (Instagram), video streaming (TikTok, YouTube)	Germany	Digital media type	Influencers popular with adolescents	Candy/desserts, ready-made/convenience foods, beverages, savory snacks, sweet snacks, sauces, fruits/vegetables	Branded images, product consumed, verbal references, placement without brand mention	Ad disclosures: YouTube 5.2%, TikTok 6.5%, Instagram 23.5%; YouTube: 0.3% paid by brand; TikTok: 8.1% gifted by brand, 8.1% paid by brand
Recent lit search	Tsai KA, Pan P, Liang C, et al.[115]	2022	YouTube (educational videos)	US	Digital media type	Child-targeted videos	Only healthy food/drinks (35%), only unhealthy food/drinks (42%), top brands (sweet beverages, candy, snacks)	Food/beverages used in experiment/tutorial, consumed by person	N/A
Recent lit search	Amson A, Remedios L, Pinto A, Potvin Kent M[116]	2021	Social media (Facebook, Twitter, Instagram)	Canada	Digital media type	Family-friendly event	Fast food, other restaurants, candy, other beverages, alcohol	Posts featuring a child, products intended for children, presence of family	N/A
Recent lit search	Alruwaily A, Mangold C, Greene T, et al.[117]	2020	Video sharing (YouTube)	US	Digital media type	Child social media influencers	Fast food, candy, soda, cereal, coffee drinks	Child consumed product, child played with the food, branded logo or food preparation	N/A
Recent lit search	Pollack CC, Kim J, Emond JA, Brand J, Gilbert-Diamond D, Masterson TD[118]	2020	Livestream gaming (Twitch)	US	Digital media type	Not specified	Restaurants and food delivery services, candy, energy drinks, sugary drinks, processed snacks	Streamer profiles and stream titles (indicates brand sponsorship), chat mentions	N/A

Review of reviews	Coates AE, Hardman CA, Halford JCG, Christiansen P, Boyland EJ[64]	2019	Video sharing (YouTube)	UK	Digital media type	Social media influencers popular with children (5-15 years)	Cakes, fast food, chocolate/confectionary, fruits/vegetables (less frequent)	Consumed product, verbal reference, product placement without reference	Not explicitly presented as part of a marketing campaign 94%, gifted by brand 6%, paid by brand <1%
Review of reviews	Potvin Kent M, Pauzé E[65]	2018	Third-party websites	Canada	Digital media type	Adolescents (12–17 years)	Sweets, cereal, restaurants, sugary drinks	Display ads (creative techniques not described)	N/A
Review of reviews	Tan L, Ng SH, Omar A, Karupaiah T[66]	2018	Video sharing (YouTube)	Malaysia (authors)	Digital media type	Child-targeted videos	Fast food, chocolate/candy, sweet baked goods	Taste appeal, uniqueness/novelty, animation, fun appeal, promotional characters, price, health and nutrition benefits	N/A
Review of reviews	An S, Kang H[67]	2014	Advergame	US	Digital media type	Child-targeted advergames	Cookies and crackers, candy and gum, cereals, soda, other drinks, meals/entrees, fast food, yogurt/ice cream	Food placement within game, product package placement, product used as objects in game or earn points	10% notified users of commercial nature via ad breaks during the game
Review of reviews	Ustjanauskas AE, Harris JL, Schwartz MB[68]	2013	Third-party websites (children's websites)	US	Digital media type	Children (2-11 years)	Breakfast cereals, fast food, prepared foods/meals, fruits/vegetables (0.01%)	Display ads (creative techniques not described)	N/A
Recent lit search	Ayoub C, Pritchard M, Bagnato M, Remedios L, Potvin Kent M[119]	2023	Social media (Facebook, Instagram, Twitter)	Canada	Brand-owned media	Not specified	Energy drinks (ED)	Viral marketing, presence of teen themes, cross-promotions, calls to action	N/A
Recent lit search	Gómez P, Tamburini C, Rodríguez García V, Chamorro V, Carmuega E[120]	2023	Social media (Facebook, Instagram)	Argentina	Brand-owned media	Children and adolescents	Sugars and fats (60%+), dairy, legumes/ starches, fruits/vegetables (<5%)	Interaction with consumer, promotional strategies, characters and celebrities, deal, posts (images, videos, texts)	N/A
Recent lit search	Valero-Morales I, Nieto C, García A, et al.[121]	2023	Social media (Facebook, Instagram), video sharing (YouTube)	Mexico	Brand-owned media	Children and adolescents	Sweetened beverages/juices, chocolate/ confectionery, coffee, cakes/cookies/ pastries	Brand logo, packaging image, product image, hashtags, engagement to consume	N/A
Recent lit search	Garton K, Gerritsen S, Sing F, Lin K, Mackay S[122]	2022	Websites, social media (Facebook), video sharing (YouTube)	New Zealand	Brand-owned media	Children	Unhealthy per nutrient profile model: >80%	Labeled “for kids,” family-oriented messaging, owned/licensed characters, sports people, designated sections for children, advergaming, sensory-based characteristics, emotive claims, suggested uses, convenience, health and nutrient claims	Websites: 90% had some disclosures, primarily legal information for parents
Recent lit search	Elliott C, Truman E, Stephenson N[123]	2022	Social media (Twitter, Instagram), video sharing (YouTube), print ad, packaging	Canada	Pre-selected ads	Adolescents (13-17 years)	Fast food, chips, salad dressing, soda, crackers, energy drinks, coffee	Indicators of "teen-targeted" : humor (particularly irony) and celebrities most commonly chosen	N/A
Recent lit search	Silva da JM, Rodrigues MB, Matos J de P, et al.[124]	2021	Social media (Facebook, Instagram), video sharing (YouTube), TV	Brazil	Brand-owned media	Children and adolescents	Fast food, soda, cookies/sweets, meat/ sausage	Cartoon/company-owned characters	N/A
Recent lit search	Théodore FL, López-Santiago M, Cruz-Casarrubias C, Mendoza-Pablo PA, Barquera S, Tolentino-Mayo L[125]	2021	Social media (Facebook, Twitter), video sharing (YouTube)	Mexico	Brand-owned media	Children and adolescents	Cola and soft drinks, sweetened juices, pizza, hamburger, sausages, and breaded products (nuggets); products with excess critical nutrients	Promotional characters, incentives, digital techniques, elements attractive to children (games, characters, bright colors)	N/A
Recent lit search	Bragg MA, Pageot YK, Amico A, et al.[126]	2020	Social media (Instagram, Facebook, Twitter, Tumblr, Vine)	US	Brand-owned media	Adolescents	Soda, fast food, snack food, energy drinks.	Geotags, interactive posts, celebrities, cross-promotions, adolescents featured	N/A
Review of reviews	Jaichuen N, Vongmongkol V, Suphanchaimat R, et al.[69]	2019	Social media (Facebook)	Thailand	Brand-owned media	Children and youth	Retail food, soft drinks, confectionery	Images, branding elements, hashtags, conversations, special price, links	N/A

Review of reviews	Brownbill AL, Miller CL, Braunack-Mayer AJ[70]	2018	Social media (Facebook)	Australia	Brand-owned media	Young people	Sugary drinks (soda, sports drinks, and energy drinks)	Photos and videos, calls to action, hashtags, various themes (sporting prowess, masculinity, the outdoors, fun, happiness, friendship)	N/A
Review of reviews	Vassallo AJ, Kelly B, Zhang L, Wang Z, Young S, Freeman B[71]	2018	Social media (Instagram)	Australia	Brand-owned media	Not specified	Coffee, energy drinks, sweets/cookies/ice cream, fast food, sports drinks	Professional images	N/A
Review of reviews	Vandevijvere S, Aitken C, Swinburn B[72]	2018	Social media (Facebook), video sharing (YouTube)	New Zealand	Brand-owned media	Adolescents (13-18 years)	Packaged foods, fast food, beverages (classified for occasional consumption only)	Videos, famous sportsperson/team, premium offers, competitions, arts and crafts, requesting engagement (like, comment, tag, share posts)	N/A
Review of reviews	Vandevijvere S, Sagar K, Kelly B, Swinburn BA[73]	2017	Website	New Zealand	Digital media type and brand-owned media	Children and adolescents (6-17 years)	Food brand websites: Sweet snacks, mixed meal dishes, cereals; Non-food brand sites: sweet snacks, mixed meals, cereals	Brand websites: advercation, viral marketing, cookies, free downloadable items, promotional characters, designated children's sections, advergaming, television advertisements, competitions/giveaways, children's designated area	N/A
Review of reviews	Hurwitz LB, Montague H, Wartella E[74]	2017	Website	US	Brand-owned media	Children	Not reported	Advergames, static images, videos, comics/ebooks, downloads, contests, art activities	N/A
Review of reviews	Boelsen-Robinson T, Backholer K, Peeters A[75]	2015	Social media (Facebook), websites, mobile apps	Australia	Brand-owned media	Children and adolescents	Fast food, soda, chocolate/candy	Indirect product association, branding, featured third parties, healthy messages	N/A
Review of reviews	Freeman B, Kelly B, Baur L, et al.[76]	2014	Social media (Facebook)	Australia	Brand-owned media	Adolescents	Fast-food, sugary drinks, chocolate/candy	Branding elements, photos, user-generated content, competitions/prizes/giveaways, apps, videos, links, allow post by others, celebrities, sponsorships/partnerships, children's characters, quizzes/polls, sportspeople, corporate social responsibility, branded characters, offers, events, games, price promotions.	N/A
Review of reviews	Cheyne AD, Dorfman L, Bukofzer E, Harris JL[77]	2013	Website	US	Brand-owned media	Children (2-11 years)	Sugary cereals	Advergames (music, invitations to play again, game scores, recommendations for other games), videos (commercials, webisodes), licensed characters, sweepstakes, information gathering (polls, quizzes on child preferences), share with friends, desktop wallpapers/screen savers, level of immersion	N/A

Table C2. Exposure Studies

Source	Author	Year	Digital media	Country	Participants	Race/ethnicity, SES	Data collection method	Exposure	Top foods marketed examined	Creative/other techniques identified
Recent lit search	Nieto C, Espinosa F, Valero-Morales I, et al.[127]	2023	Smartphone usage	Mexico	6-19 years (N=347)	Majority ethnicity (99%); SES: low (1.5%), medium (25%), high (69%)	Screen recording	70% exposed; 2.7 exp/hr; 8/day; 47.3/wk	90% not permitted by PAHO and Mexican nutrient profile models	Paid (62%), organic (30%), influencer (9%); consumption/purchase incentive, invitation to interact, brand character, celebrity (18.2%), competition/contest, licensed character, physical activity
Recent lit search	Amson A, Pauzé E, Remedios L, Pritchard M, Potvin Kent M[128]	2023	Social media (Facebook, Instagram, Snapchat, Twitter), video sharing (YouTube)	Canada	12-16 years (N=62)	Race: White (65%); Income: <100k (26%), 100-150k (21%), >150k (31%)	Screen recording	76% exposed; 2 exp/10 min	Excessive total fat: 67% girls, 35% boys	Appeal to achievement, influencer, appeal to athleticism, quizzes/surveys/polls
Recent lit search	van der Bend DLM, Jakstas T, van Kleef E, Shrewsbury VA, Bucher T[129]	2022	Social media (Instagram, Snapchat, Twitch, Pinterest), video sharing (YouTube, TikTok)	Australia	13-16 years (N=35)	SES: low (37%), medium (54%), high (9%)	Screen recording	12.0/10 min (non-core: 6.0/10 min); also measured awareness and liking	Only non-core foods (57%); only core foods (13%)	Unidentified content source (38%). Of identified sources: embedded in entertainment (36%), celebrity-generated (26%), owned posts (<5%)
Recent lit search	Kelly B, Bosward R, Freeman B[130]	2021	Smartphone usage, "relevant web-based platforms," including social media and food apps	Australia	13-17 years (N=95)	SES: low (15%), medium (26%), high (51%)	Screen recording	17.4 food promotions/hr, 168.4 exp/wk	Products not permitted to be marketed using nutrient profiling criteria: 59%	Earned media impressions (59%), brand-owned media (16%), paid advertisements (25%)
Recent lit search	Kidd B, Mackay S, Swinburn B, Lutteroth C, Vandevijvere S[131]	2021	Social media (Facebook)	New Zealand	16-18 years (N=34)	Not reported	Screen recording	4% exposed (food ads); 4.8/hr non-permitted foods	98% not permitted; including fast food, sugary drinks, snacks	Promotional characters, premium offers, gift/ collectable, limited edition
Recent lit search	Ram N, Yang X, Cho MJ, et al.[132]	2022	Smartphone usage	US	14-15 years (N=4)	Latino/Hispanic (100%)	Screen recording (500k screen shots)	Exposure to food-related content varied greatly by individual and day	Branded sugary and caffeinated drinks; fewer branded food images/texts	Content sentiment (positive/negative valence), texts vs. images, shared content,
Review of reviews	Qutteina Y, Hallez L, Mennes N, de Backer C, Smits T[78]	2019	Social media (Instagram, Facebook, Messenger, Snapchat), video sharing (YouTube)	Belgium	12-18 years (N=21)	Not reported	Screen recording	14 branded food images/ participant; 49% earned, 40% paid	Non-core (67% of images), including soft drinks, cake, fries, pizza, sweets	Social context (hanging with friends, eating at restaurants and celebrating with food) (49%); images with food (96%), brand logo only (4%)
Review of reviews	Potvin Kent M, Pauzé E, Roy E, de Billy N, Czoli C[79]	2019	Social media (Facebook, Instagram, Snapchat, Twitter), video sharing (YouTube)	Canada	7-16 years (N=101)	Race: White (70%); Income: <100k (25%), 100-150k (22%), >150k (34%)	Screen recording	72% exposed; est. 30 exp/ wk (children), 189 exp/wk (adolescents)	Fast food, sugary drinks, candy/chocolate	Advertisements (47%), embedded in user-generated content (19%), in celebrity-generated content (17%), in other content (34%)
Recent lit search	Acton RB, Bagnato M, Remedios L, et al.[133]	2023	Online, platforms not specified	Canada	10-17 years (N=3780)	Race: White (70%), East/ Southeast Asian (9%), mixed/other ethnicities (8%)	Self-reported	31%-41% recalled 1+ online marketing/wk	Fast food, snacks, sugary drinks, desserts/treats, sugary cereals, fruit or vegetables	Not reported
Recent lit search	Elliott C, Truman E, Black JE[134]	2023	Social media (Instagram, Facebook Twitter, Snapchat), video sharing (YouTube, TikTok), websites, gaming platforms	Canada	13-17 years (N=309)	Not reported	Self-reported	6 teen-targeted mktg/week; 80% on social media	Beverages, fast food, candy/chocolate, snacks, food delivery	Visual style (52%), special offer (29%), celebrities (12%)
Recent lit search	Ellison K, Truman E, Elliott C[135]	2023	Instagram	Canada	13-17 years (N=57)	Not reported	Self-reported	2.5 ads/participant/week	Snack foods, candy, chocolate, cookies, chips, restaurants	Visual style: bold focus, bespoke, absurd, everyday, and sensory

Recent lit search	Parnell SA, Mandzufas J, Howard J, Gannett AT, Trapp GSA[136]	2023	Online/Internet, social media (not specified)	Australia	7-12 years (N=3688)	Not reported	Self-reported	82% saw energy drink marketing online; 62% on social media	Energy drinks	Not reported
Recent lit search	Yang CY, Chang FC, Rutherford R, et al.[137]	2022	Online (platforms not specified)	Taiwan	12-14 years (N=2613)	Not reported	Self-reported	75% reported exposure in past year	Energy drinks	Not reported
Recent lit search	Demers-Potvin É, White M, Potvin Kent M, et al.[138]	2022	Social media (Instagram, Facebook, Snapchat, Twitter), video sharing (TikTok, YouTube), gaming apps (smart phone, computers, game consoles), browsing, websites	Australia, Canada, Chile, Mexico, UK, US	10-17 years (N=9171)	Race: Majority (76%); SES: low (16%), middle (38%), high (46%)	Self-reported	Websites/social media (27-60% of participants); gaming (10-17%)	"From all sources of exposure (TV, digital media, and gaming): sugary drinks, fast food "	Not reported
Recent lit search	Elliott C, Truman E, Aponte-Hao S[139]	2022	Social media (Instagram, Facebook, Twitter, Snapchat), video sharing (YouTube, TikTok), websites, gaming platforms	Canada	13-17 years (N=62)	Not reported	Self-reported	7 teen-targeted marketing exp/week; 91% on social media	Candy/chocolate, fast food, snacks, beverages, dairy	Visual style, special offer, teen themes, humor, language, teenaged actor, music, celebrity, animated character
Recent lit search	Fleming-Milici F, Harris JL[140]	2020	Social media (not specified)	US	13-17 years (N = 1564)	Race: White, non-Hispanic (33.3%) , Black, non-Hispanic (21.5%), Hispanic, less-acculturated (21.7%), Hispanic, more-acculturated (21.3%)	Self-reported	Engaged with any food brands on social media (70%); engaged with 5+ brands (35%)	Fast food, sugary drinks, candy, snacks	Not reported
Recent lit search	Potvin Kent M, Pauzé E, Remedios L, et al.[141]	2023	Not specified	Canada	2-12 years	Not reported	Syndicated research data (advertising expenditures)	Digital media accounted for 18% of advertising spending on child-targeted products ($10.3 million $Can)	Candy/chocolate, restaurants, breakfast foods, snacks	Child-targeted products, including characters, children featured, branded gaming apps, brand names with "junior", "mini", "kids" or "children", unusual shapes, names, or flavors/colors, marketed as lunch snacks for children
Recent lit search	Rummo PE, Cassidy O, Wells I, Coffino JA, Bragg MA[142]	2020	Social media (Instagram, Twitter)	US	13-17 years	Not reported	Syndicated research data (adolescent food-brand social media followers)	6.2 million adolescents followed brands	Sugary drinks, low-calorie drinks	Not reported

Table C3. Impact Studies

Source	Author	Year	Digital media	Types of marketing	Country	Participants	Race/ethnicity, SES	Method	Diet-related outcomes		Other outcomes	Independent variables
									Behavioral	Intermediate		
Recent lit search	Folkvord F, Anschütz DJ, Buijzen M[143]	2020	Advergame	Brand/product placement	Netherlands	8+1 years (N=95)	Not reported	Experiment	N/A	Attention to food ads	N/A	Candy vs. non-food advergame
Recent lit search	Norman J, Kelly B, McMahon AT, et al.[144]	2020	Advergame	Character, branding	Australia	7-12 years (N=154)	Not reported	Experiment	N/A	Brand recall, recognition, and attitudes; desire to consume advertised product	N/A	TV ad vs. TV ad + advergame
Recent lit search	Smith R, Kelly B, Yeatman H, et al.[145]	2020	Advergame	Brand/product placement, banner ads, reward video ads	Australia	7-12 years (N=156)	Not reported	Experiment	Food choice and intake (healthy and unhealthy)	Brand attitudes, game enjoyment, ad awareness	N/A	Banner ad, advergame, rewarded video ad, vs. control
Review of reviews	Agante L, Pascoal A[80]	2019	Advergame	Branding, brand logo, product image within a brand-owned advergame	Portugal	6-9 years (N=104)	Not reported	Experiment	N/A	Brand preference, food preference	N/A	0 vs. 1 vs. 5 exposures
Review of reviews	Esmaeilpour F, Heidarzadeh Hanzaee K, Mansourian Y, Khounsiavash M[81]	2018	Advergame	Not specified	Iran	6-11 years (N=330)	Not reported	Experiment	Food choice	N/A	N/A	Food type (healthy, unhealthy) X health knowledge (inactive, active) X ad type (TV, advergame)
Review of reviews	Norman J, Kelly B, McMahon AT, et al.[82]	2018	Advergame	Brand/product placement; TV commercials	Australia	7-12 years (N=160)	Not reported	Experiment	Food intake	N/A	N/A	Media type (TV, TV+advergame) X ad type (food, non-food)
Review of reviews	Putnam M, Cotto C, Calvert S[83]	2018	Advergame	Character, product placement	US	4-5 years (N=132)	Caucasian (35%), Hispanic (30%), other/ mixed ethnicity (16%), African American (15%), Asian American (5%)	Experiment	Food choice and intake	Character awareness	N/A	Advergame with no character vs. character holding unhealthy food vs. character holding healthy food
Review of reviews	Folkvord F, Lupiáñez-Villanueva F, Codagnone C, et al.[84]	2017	Advergame	Brand/product placement	Netherlands and Spain	6-12 years (N=597)	Not reported	Experiment	Food intake	N/A	N/A	Food (unhealthy, no food) X ad disclosures (with, without)
Review of reviews	Neyens E, Smits T, Boyland E[85]	2017	Advergame	Branding, product placement, branded characters	Belgium	6-14 years (N=940)	Not reported	Experiment	N/A	Brand attitudes, pester intent	N/A	TV ad vs. advergame vs. no marketing
Review of reviews	Vanwesenbeeck I, Walrave M, Ponnet K[86]	2017	Advergame	Not reported	Belgium	10-12 years (N=279)	Not reported	Experiment	N/A	Brand attitude, purchase intention, attitude towards game	Persuasion knowledge	Advergame: 1) food/low product involvement/neutral brand attitude vs. 2) food /low product involvement/positive brand attitude vs. 3)food/high product involvement/positive brand attitude vs. 4)non-food

Review of reviews	Folkvord F, Anschütz DJ, Buijzen M[87]	2016	Advergame	Brand/product placement	Netherlands	8-10 years (N=270)	Not reported	Experiment	Food intake, choice	N/A	BMI two years later	Advergame/unhealthy snack vs. Advergame/fruit vs. Advergame/non-food vs. No advergame
Review of reviews	Folkvord F, Veling H, Hoeken H[88]	2016	Advergame	Brand/product placement	Netherlands	7-10 years (N=133)	Not reported	Experiment	Food intake	N/A	N/A	Unhealthy snack vs. non-food ad; go/no-go food task (control task)
Review of reviews	Hudders L, Cauberghe V, Panic K[89]	2016	Advergame	Brand/product placement, characters consuming product	Belgium	8-9 years (N=78)	Not reported	Experiment	N/A	Purchase request	Ad literacy (cognitive, affective)	Ad type (TV ad, advergame) X ad literacy training (yes, no)
Review of reviews	Folkvord F, Anschütz DJ, Wiers RW, Buijzen M[90]	2015	Advergame	Brand/product placement	Netherlands	7-10 years (N=92)	Not reported	Experiment	Food intake	Visual attention	N/A	Advergame: Unhealthy snack vs. non-food
Review of reviews	Folkvord F, Anschütz DJ, Nederkoorn C, Westerik H, Buijzen M[91]	2014	Advergame	Brand/product placement	Netherlands	7-10 years (N=261)	Not reported	Experiment	Food intake	N/A	N/A	Advergame type (unhealthy food, non-food) X reward for refraining from eating (yes, no)
Review of reviews	Rifon NJ, Taylor Quilliam E, Paek HJ, Weatherspoon LJ, Kim SK, Smreker KC[92]	2014	Advergame	Brand/product placement, brand character	US	5-10 years (N=276)	Caucasian (55%), multi-racial (24%), Black (13%), Hispanic (5%), Asian (4%)	Experiment	N/A	Brand recall, brand attitude, purchase request	Persuasion knowledge	Type of ad (integrated, background, no brand) vs. type of exposure (active, passive)
Review of reviews	Waiguny MKJ, Nelson MR, Terlutter R[93]	2014	Advergame	Character, product placement	Austria	"study 1: 8-10 years (N=51) study 2: 7-10 years (N=149)"	Not reported	Experiment	N/A	Ad awareness, pester intention	Persuasion knowledge	1) TV ad vs. advergame; 2) played vs. didn't play advergame
Review of reviews	Folkvord F, Anschütz DJ, Buijzen M, Valkenburg PM[94]	2013	Advergame	Brand/product placement	Netherlands	8-10 years (N=270)	Not reported	Experiment	Food intake	N/A	N/A	Advergame: unhealthy snacks vs. fruit vs. non-food
Review of reviews	Panic K, Cauberghe V, De Pelsmacker P[95]	2013	Advergame	Brand/product placement; TV commercials	Belgium	study 1: 7-10 years (N=254) study 2: 7-10 years (N=128)	Not reported	Experiment	N/A	Brand attitudes, purchase request	Persuasion knowledge	1) TV ad vs. advergame without ad cue vs. advergame with ad cue 2) unhealthy food advergame vs. healthy/unhealthy food education advergame
Review of reviews	Shefali, Aggarwal V[96]	2015	Advergame	Brand/product placement	India	5-8 years (N=15)	Not reported	Qualitative	N/A	Attention, recognition, liking, preference, purchase intention	N/A	Playing KFC advergame
Recent lit search	Theben A, Fink R, Folkvord F[146]	2022	Advergame	Brand/product placement	Netherlands	7-13 years (N=123)	Not reported	Experiment	Food intake	N/A	N/A	Healthy food (banana brand) vs. non-food
Recent lit search	Murphy G, Corcoran C, Tatlow-Golden M, Boyland E, Rooney B[147]	2020	Facebook	Brand/product images	Ireland	13-17 years (N=151)	Not reported	Experiment	N/A	Social response to posts, brand recall, attention	N/A	type of food (healthy, unhealthy, non-food) X message source (peer, celebrity, brand)
Review of reviews	Pettigrew S, Tarabashkina L, Roberts M, et al.[97]	2013	Facebook, webpages (brand or third-party not specified)	Images from webpages: branding, product images, brand engagement (social media comments), child featured in ad, athletic and fun themes	Australia	8-14 years (N=1302)	Not reported	Experiment	N/A	Desire to consume, perceived appropriate consumption frequency	N/A	TV ad vs. internet ad vs. control
Recent lit search	De Jans S, Van de Sompel D, De Veirman M, Hudders L[148]	2020	Instagram	Sponsored content, influencer marketing	Belgium	12-18 years (N=131)	Not reported	Experiment	N/A	Ad recognition, brand awareness and liking, attitudes toward the content and influencer	Source of recognition	Brand post vs. sponsored influencer post

Recent lit search	Folkvord F, Bruijne de M[149]	2020	Instagram	Influencer marketing	Netherlands	13-16 years (N=132)	Not reported	Experiment	Food intake	N/A	N/A	Post for vegetable vs. unhealthy snack vs. sunglasses
Recent lit search	Evans R, Christiansen P, Masterson T, et al.[150]	2023	Livestream gaming (Twitch)	Not specified	UK	13-18 years (N=490)	White (76%), Asian (14%), Black (5%), Mixed (3%), Other (1%)	Cross-sectional	Food purchases, consumption	Food attitudes, food preferences	N/A	Recall of unhealthy food marketing
Recent lit search	Pollack CC, Gilbert-Diamond D, Emond JA, et al.[151]	2021	Livestream gaming (Twitch); Video sharing (YouTube)	Not specified	US	Adolescent and young adults (>13 years), 26% <18years (N=621)	White (64%), Asian (23.3%), Black (4%), other (6%). American Indian or Alaska Native (2%),	Cross-sectional	Purchase	Craving	Negative emotions	Recall of food ads
Recent lit search	Carroll JE, Price G, Longacre MR, et al.[152]	2021	Mixed advertisement-supported media: Internet, streaming, apps, gaming	Not specified	US	3-5 years (N=535)	Non-Hispanic white (86.5%)	Cross-sectional	Diet quality	N/A	N/A	Commercial vs. non-commercial media use (parent-reported)
Recent lit search	Gascoyne C, Scully M, Wakefield M, Morley B[153]	2021	Social media (Facebook, Instagram, other).	Not specified	Australia	12-17 years (N=8708)	Not reported	Cross-sectional	Food/beverage intake	N/A	N/A	Exposure and engagement with food ads
Review of reviews	Sampasa-Kanyinga H, Chaput JP, Hamilton HA[98]	2015	Social media (Facebook, Twitter, Instagram, MySpace)	Not specified	Canada	12-17 years (N=9858)	White (60%), Asian (10.7%), other (13.5%), Black (6%),	Cross-sectional	Beverage intake	N/A	Body weight	Social media use
Review of reviews	Baldwin HJ, Freeman B, Kelly B[99]	2018	Social media (Facebook, YouTube)	Brand engagement (interacting with branded content, liking, sharing)	Australia	10-16 years (N=417)	Not reported	Cross-sectional	Food intake	N/A	N/A	Exposure and engagement with food brands
Recent lit search	De Jans S, Spielvogel I, Naderer B, Hudders L[154]	2021	Social media (Instagram)	Influencer marketing	Germany	8-12 years (N=190)	Not reported	Experiment	Food choice	Attitudes towards influencer	N/A	Food type (healthy, unhealthy) X influencer type (sedentary, athletic)
Recent lit search	Bragg M, Lutfeali S, Greene T, Osterman J, Dalton M[155]	2021	Social media (Instagram)	Brand posts	US	13-17 years (N=832)	Black (46.5%); non-Latino White (53.5%)	Experiment		Ad identification, ad liking	N/A	Instagram posts vs. traditional ads
Review of reviews	Coates AE, Hardman CA, Halford JCG, Christiansen P, Boyland EJ[100]	2019	Social media (Instagram)	Influencer profiles	UK	9-11 years (N=178)	85% White British	Experiment	Food intake (healthy and unhealthy)	N/A	N/A	Influencer holding: unhealthy snack vs. healthy snack vs. non-food
Review of reviews	Lofton S[101]	2019	Social media (not specified)	Not specified	US	11-14 years (N=23)	100% African American or Black	Qualitative	Food intake, choices	N/A	N/A	Influencers, celebrities
Recent lit search	Qutteina Y, Hallez L, Raedschelders M, de Backer C, Smits T[156]	2021	Social media (platforms not specified)	Not specified	Belgium	11-19 years (N=1002)	Not reported	Cross-sectional	Food intake	Food attitudes	Social norms, food literacy	Food marketing exposure
Review of reviews	Thaichon P, Quach TN[102]	2016	Social media (platforms not specified)	Posts, images, links, pictures of ads	Australia	11-16 years (N=30)	Not reported	Qualitative	Eating habits	Attitudes, purchase intentions	N/A	Exposure, engagement with marketing
Recent lit search	Critchlow N, Bauld L, Thomas C, Hooper L, Vohra J[157]	2020	Social media (Tumblr, Facebook, Snapchat, Instagram, other); Video sharing (YouTube)	Not specified	UK	11-19 years (N=3348)	White British (77%)	Cross-sectional	HFSS food intake	N/A	N/A	Awareness of HFSS food marketing

Recent lit search	Amson A, Pauzé E, Ramsay T, et al.[158]	2024	Social media, other digital media on smartphone (not specified)	Not specified	Canada	13-17 years (N=16)	White (69%), Black or African Canadian (19%)	Qualitative (structured interviews while using smartphones)		Ad attitudes	N/A	Brand engagement, familial influence
Review of reviews	Smit CR, Buijs L, van Woudenberg TJ, Bevelander KE, Buijzen M[103]	2020	Video sharing (not specified)	Influencer marketing	Netherlands	8-12 years (N=453)	Dutch (>90%)	Cross-sectional	Beverage intake (2 years later)	N/A	N/A	Frequency of watching vlogs
Recent lit search	De Jans S, Hudders L[159]	2022	Video sharing (YouTube)	Sponsored content, influencer marketing	Belgium	10-12 years (N=190)	Not reported	Experiment	Purchase request	Ad recognition, brand recall, brand attitude	Advertising literacy, influencer credibility and admiration, parasocial interaction	Platform-generated ad disclosures (yes, no) X influencer-generated disclosure (none, disclosure: no commercial influence, disclosure: commercial influence)
Recent lit search	Boerman SC, van Reijmersdal EA[160]	2020	Video sharing (YouTube)	Product placements, influencer marketing	Netherlands	8-12 years (N=112)	Not reported	Experiment	N/A	Ad recognition, understanding of selling intent and persuasive intent, brand attitude, product desire	Media attitudes, para-social relationships	Ad disclosures (yes vs no)
Recent lit search	van Reijmersdal EA, Rozendaal E, Hudders L, Vanwesenbeeck I, Cauberghe V, Van Berlo ZMC[161]	2020	Video sharing (YouTube)	Influencer marketing	Netherlands	10-13 years (N=272)	Not reported	Experiment	N/A	Marketing, brand and influencer attitudes, visual attention	N/A	Ad disclosures: no vs. prior to video vs. in video
Recent lit search	van Reijmersdal EA, van Dam S[162]	2020	Video sharing (YouTube)	Sponsored content, influencer marketing, product placement	Netherlands	12-16 years (N=406)	Not reported	Experiment	N/A	Brand attitudes, purchase intention, attitude toward the influencer	N/A	No disclosure vs. disclosure vs. disclosure with ad intent
Review of reviews	Coates AE, Hardman CA, Halford JCG, Christiansen P, Boyland EJ[104]	2019	Video sharing (YouTube)	Influencer marketing	UK	9-11 years (N=151)	Not reported	Experiment	Food intake	N/A	N/A	Food with ad disclosure vs. food without ad disclosure vs. non-food
Recent lit search	Folkvord F, Bevelander KE, Rozendaal E, Hermans R[163]	2019	Video sharing (YouTube)	Influencer marketing	Netherlands	10-13 years (N=127)	Not reported	Cross-sectional	N/A	Perception of marketing influence, attitudes toward influencer	N/A	Marketing recall
Recent lit search	Coates AE, Hardman CA, Halford JCG, Christiansen P, Boyland EJ[164]	2020	Video sharing (YouTube)	Influencer marketing in a Vlog	UK	10-11 years (N=4)	Not reported	Qualitative	N/A	Attitudes toward influencer, marketing	Ad literacy, social uses of marketing, parasocial relationships	N/A
Recent lit search	van Dam S, van Reijmersdal EA[165]	2019	Video sharing (YouTube)	Influencer marketing in a Vlog	Netherlands	12-16 years (N=20)	Not reported	Qualitative	N/A	Attitudes towards marketing and brands	Ad literacy, attitudes about disclosures	Familiarity with influencer videos
Review of reviews	Tarabashkina L, Quester P, Crouch R[105]	2016	Webpages (not specified)	Pop-up ads (content not specified)	Australia	7-13 years (N=354)	Not reported	Experiment	Food choice	Ad awareness, product attitudes	N/A	Pop-up ads with food vs. toys

Appendix D. Policy evaluations

Table D1. Evaluation of industry-led policies

Criteria 1: Policies should cover children of all ages (2-17 years)		
Policy	**Statement**	**Description**
CFBAI[185]	Ads primarily directed to under 13 years	Audience and content-based definitions of child-directed content: • Audience composition in measured media (30%+), including adjacent content (i.e., contextual ads) • Advertising targeted to children: based on age, interest or behavioral data (aimed at individuals <13 years); ads on child-directed sites/channels/content; platform/ content developer id systems • Content that appears to be child-directed based on an evaluation of multiple factors, including (numerous factors cited) • Platform or content developer identification of child-directed content
CARU[186]	National ads primarily directed to under 13 years	Covers ads primarily directed to children "determined by an analysis of relevant factors, no one of which is controlling," including (long list of subjective criteria)
Disney ad guidelines[187]	Users whose profile indicates they are under 18 years	Ads for products that do not meet nutrition guidelines "should be targeted only to adults. For example, the look and feel of the advertising should be adult-oriented and kid-appealing artwork or language cannot be used (e.g., no animated characters)." Nutrition criteria also apply to ads targeting an audience ages 13+ for kids' foods and ads with child actors, kid-appealing artwork or language (i.e., parent-targeted ads).
Google HFSS ads UK/EU[189]	Up to 18 years	Ads for HFSS F&B can only be served to "users with a declared age of 18 and above."
YouTube Kids and "made for kids" content on YouTube Main[188]	Up to 13 years	Video creators are required to designate content as "made for kids" or "not made for kids"; videos designated as "made for kids" treated as "coming from a child."

Criteria 2: Utilize science-based nutrition criteria (when nutrition-focused)		
Policy	**Statement**	**Description**
CFBAI	CFBAI uniform category-specific nutrition criteria (rev. Jan 2020)	Category-specific limits on calories, sat fat, sugar, sodium.
CARU	None	N/A
Disney ad guidelines	Disney Check nutrition criteria[196]	Category-specific limits on calories, sat fat, sugar, sodium; somewhat lower than CFBAI limits in most categories. Desserts, confectionary, soda and drinks with NNS not allowed.
Google HFSS ads UK/EU	Google nutrient profile model	HFSS foods not allowed in ads include sweetened beverages (caloric sweeteners), energy drinks, sweet bakery items, pizza, fried foods, confectionary.
YouTube Kids and "made for kids" content on YouTube Main	No food, beverages or "products related to consumable food and drinks"	Paid food and drink ads are prohibited, regardless of nutrition content.

Criteria 3a: Minimize the risk of migration to other media		
Policy	**Statement**	**Description**
CFBAI	Includes (but not necessarily limited to): company-owned websites; third-party websites, mobile apps or mobile media; platforms (e.g., YouTube); video and computer games; DVDs; word of mouth; product placements and integrations; influencers; licensed characters, celebrities, and movie tie-ins	Comprehensive list of types of advertising. Major loopholes: advertising targeting older children and definitions of "child-directed". Only participating food companies (excludes some major candy and fast-food companies).
CARU	Includes (without limitation): all forms of internet, mobile, other digital media, influencer content and the advertiser's websites, social media channels and apps	Comprehensive list of types of advertising. Major loopholes: advertising targeting older children and definitions of "child-directed". Exclusions: • Local advertising • "Placement or integration of a product, service, character, or brand" in other content "is not within the scope of these guidelines unless such placement or integration constitutes an endorsement"

Disney ad guidelines	Ads on all Disney entertainment properties (including Disney+ streaming, Disney Digital). Also applies to use of Disney characters/assets (e.g., Star Wars, Marvel, Pixel), including in influencer content.	Excludes influencer content that does not contain Disney characters/assets/branding.
Google HFSS ads UK/EU	Paid third-party ads on the Google Display Network, including "millions of websites, apps and Google-owned properties (e.g., YouTube, Gmail)" in UK and EU.	Excludes children who say they are >18 years. Excludes paid influencer and other content marketing.
YouTube Kids and "made for kids" content on YouTube Main	Paid third-party ads only.	Excludes food brands in videos uploaded by users, including influencers and companies.

Criteria 3b: Restrict brand marketing		
Policy	**Statement**	**Description**
CFBAI	Not covered	No specific mention of brand ads. However, companies advertise children's brands with some products that do not meet nutrition standards, including logos in digital media (e.g., Lunchables, Capri Sun).
CARU	Covered	Ad defined as "any commercial message or messaging."
Disney ad guidelines	Covered	Somewhat ambiguous, but no exceptions for branding only.
Google HFSS ads UK/EU	Not covered	Specifically excludes ads with brand logos or company names without "text, imagery, audio or video" of HFSS F&B from requirements. Does include "destination sites" with HFSS F&B (assuming this means links to F&B sites/social media).
YouTube Kids and "made for kids" content on YouTube Main	Covered (in ads only)	Specifically prohibits "branding" content in food ads but does not address branding in video content.

Criteria 4: Restrict unfair and deceptive practices, including use of children's data and stealth marketing		
Policy	**Statement**	**Description**
CFBAI	None	Commitments only refer to foods and beverages present in ads, not creative techniques or messages.
CARU	Ads must be easily identified as advertising, including ads integrated into content of a game or activity. Endorsers and influencers must clearly and conspicuously disclose a material connection to advertisers. Building Guardrails in the Metaverse:[186] 2022 compliance warning, rules apply here too Online sales and in-app/game purchases: Require parent permission for purchases (if reasonable means available); provide means to cancel orders by person responsible for payment; be clear that purchases involve real currency.	Caveats to these rules: • Host selling is prohibited on TV, but not online • Advertising embedded in content is allowed, provided disclosures and "contextual cues" identify it as advertising • Specific Metaverse requirements: avoid blurring ad and non-ad content, clearly disclose influencer and endorser claims, use clear and conspicuous ad disclosures • Some advertising is so "clearly commercial" that disclosures aren't required (e.g., branded websites, social media channels or apps).
Disney ad guidelines	Limits how Disney characters may interact with products. Ads must be easily identifiable and not disguised as editorial content. Third-party technology must be pre-approved.	Text and audio ad disclosures required in ads directed at children under 13 years. Disney characters cannot eat/drink or look at advertised products. Third-party technology only permitted in ads for performance, monitoring, research or verification (no interactive features).
Google HFSS ads UK/EU	None	Commitments only refer to foods and beverages present in ads, not creative techniques or messages.
YouTube Kids and "made for kids" content on YouTube Main	Prohibits engagement features, including "clickable ads", destination URLS, outbound links.	Restrictions apply to content, not users. Excludes branded content (including paid endorsements) in video content.

Criteria 5: Address health disparities		
Policy	**Statement**	**Description**
CFBAI	None	N/A
CARU	"Advertising should reflect the diversity of humanity…. Should not portray or encourage negative social stereotyping, prejudice or discrimination." "Advertisers should strive to create content that is welcoming to children of all races, religions, cultures, genders, sexual orientations, and physical and cognitive abilities."	No reference to demographic targeting or health disparities.
Disney ad guidelines	Prohibits "claims or representations that could be interpreted as wrongfully discriminatory based on race, sex, gender, sexual orientation, religion, nationality, disability or age."	No reference to demographic targeting or health disparities.
Google HFSS ads UK/EU	None	N/A
YouTube Kids and "made for kids" content on YouTube Main	None	N/A

Criteria 6: Required independent monitoring and evaluation		
Policy	**Statement**	**Description**
CFBAI	CFBAI monitors company commitments	Includes "independent" monitoring of covered media, review of ad materials, product information and other information "confidentially" requested by program administrator. Program also responds to inquiries related to compliance (rarely used). CFBAI produces annual "compliance reports"
CARU	CARU monitors "all child-directed media" for compliance	Any person or legal entity may file a complaint. CARU and National Advertising Review Board (NARB) investigate and resolve complaints.
Disney ad guidelines	Pre-approval required for food ad content	No process for external monitoring or complaints.
Google HFSS ads UK/EU	Advertisers must self-declare HFSS F&B campaigns	If Google "becomes aware" that an ad has violated its policy, it will restrict the ad.
YouTube Kids and "made for kids" content on YouTube Main	Ads on YouTube Kids must be pre-approved	No stated process for external monitoring or complaints. Google may override content creators on "made for kids" designation.

Table D2. Current and proposed government policies

Policies to reduce children's exposure to and/or power of digital marketing			
Jurisdiction/ sponsor	**Status**	**Policy**	**Details**
UK	Passed/ not yet implemented	UK Health and Care Act (2022, paused until 2025) would ban all paid-for advertising of HFSS food products online.	Most comprehensive food marketing policy to-date. Uses UK Nutrient Profile Model; covers all ages (including adults). Many forms of marketing not covered, including owned media, brand marketing, and marketing embedded in entertainment; lack of oversight, tracking or monitoring, or meaningful consequences for noncompliance.
U.S. federal agencies (FTC, CDC, FDA, USDA)	Proposed voluntary nutrition guidelines	Interagency Working Group on Food Marketed to Children (IWG). Preliminary Proposed Nutrition Principles to Guide Industry Self-Regulatory Efforts	Science-based nutrition principles for foods that companies should voluntarily refrain from marketing to children ages 2-17, as defined in a previous FTC report to Congress. Proposed guidelines were published for public comment in 2011, but never finalized. These guidelines were intended to inform industry self-regulation.
U.S. Congress	Passed in the Senate; to be introduced in the House	Kids Online Safety and Protection Act (KOSPA). Includes provisions from previously proposed COPPA 2.0 update	Would cover children (including adolescents) under age 17; strengthen data minimization provisions; require verifiable consent for collection of data in all online media directed to children; prohibit targeted advertising; strengthen existing privacy measures, including limits on use of geolocation and biometric data; cover all users that the platform has any indication (included implied or circumstantial) is underage. Allows contextual advertising; does not address content of marketing that appeals to children if no data are collected.
U.S. Congress	Proposed	The American Data Privacy and Protection Act (ADPPA) to regulate how organizations keep and use consumer data (House).	Would regulate collection and use of personal data for all individuals; require opt-out provisions for targeted advertising; and prohibit targeted advertising to children under 17 years. Allows contextual advertising; does not address content of marketing that appeals to children if no data are collected.
U.S. Congress	Proposed	American Privacy Rights Act (APRA) (Senate)	Not yet introduced (alternative to ADPPA). Would limit targeted marketing to children (under 17 years); additionalprovisions TBD. Allows contextual advertising; does not address content of marketing that appeals to children if no data are collected.

NY State	Proposed	The Predatory Marketing Prevention Act (PMPA) would define all unhealthy food advertising targeted to children as "false and misleading."	Provides a mechanism for the NY State AG, city or other affected person to sue food companies for unhealthy food marketing to children. The details of this policy and how it would be implemented are not clear.
USDA	Enacted	School districts must establish a Local School Wellness Policy to promote students' health, well-being, and ability to learn.	Only foods and beverages that meet Smart Snacks in School nutrition standards may be sold or marketed in schools, including "electronic educational materials". No specific guidance regarding marketing/use of children's data on edtech platforms or online curricular materials.
U.S. Congress	Proposed	COPPA 2.0	Would require schools to allow online service providers to use children's data solely for educational purposes. Would prohibit the use of students' data for commercial use.
U.S. states	Enacted in FL, other states considering similar actions	Bans student cellphone use during class time.	Students would not be exposed to digital commercial messages on their own devices during school times. Many schools have "phone-free" policies but require teachers to enforce them. Most make exceptions for students with special needs and provide another means for necessary parent/ student communication.
UN	Enacted	The U.N. General Comment no.25 (2021) on the rights of children (up to age 18) in relation to the digital environment provides guidance for Member States to fulfill their obligations under the U.N Convention on the Rights of the Child (UNCRC).	Makes the best interests of the child a primary consideration when regulating advertising and marketing addressed to and accessible to children; prohibits profiling or targeting of children of any age for commercial purposes on the basis of a digital record of their actual or inferred characteristics, including group or collective data, targeting by association or affinity profiling; Prohibits practices that rely on neuromarketing, emotional analytics, immersive advertising and advertising in virtual and augmented reality environments to promote products, apps and services from engagement directly or indirectly with children. Specific policies must be enacted by Member States. Note: The U.S. is the only country that has not ratified the UNCRC
EU	Enacted	The 2022 EU Digital Services Act, effective 2024, recognizes the rights of the child under the UNCRC.	Bans advertising targeted at children and restricts data harvesting for profiling; requires large platforms to conduct risk assessments for impacts on rights, including those of children.

Data privacy and online safety policies			
Jurisdiction/ sponsor	**Status**	**Policy**	**Details**
United States			
U.S.	Enacted	The U.S. Children's Online Privacy Protection Act (COPPA)	Requires parental permission to collect any personal information from children under age 13. Updated in 2013 to specifically address practices on social media, mobile and other platforms.
U.S. Congress	Proposed	Kids Online Safety and Protection Act (KOSPA) would also impose a "duty of care" for social media platforms. Includes provisions of formerly proposed Kids Online Safety Act (KOSA)	Would cover children (including adolescents) under age 17; require platforms to enable the strongest privacy settings for children by default; provide a dedicated channel to report harmful behavior; prevent and mitigate specific dangers to minors (including bans on advertising illegal products [tobacco, alcohol]; require independent audits and research into how the platforms impact the wellbeing of children; and cover all users that the platform has any indication (included implied or circumstantial) is underage. Duty of care would only cover specific harms (mental health, addictive use, illicit drugs, and sexual exploitation), and not use of other harmful products (including unhealthy food); would only cover children if the platform knows the user is underage; regulates digital platforms, but not marketers (e.g., food companies) or common forms of marketing content that appeal to children.
CA, MD	Enacted	The California Age-Appropriate Design Code Act, modeled on the UK's Age-Appropriate Design Code, will be effective 2024. MD Kids Code passed 4/24. Similar efforts are underway in other states.	Covers services, products and features that children (up to age 18) are likely to access; mandates comprehensive privacy by design features; requires Data Protection Impact Assessments; imposes fees for noncompliance. Implementation of CA law paused due to legal challenge based on First Amendment
NY	Enacted	Safe for Kids Act and Child Data Protection Act	
FTC	Proposed	COPPA, regular rule update	Would strengthen various privacy protections, including data minimization, expanded definition of personal information covered, ed tech, limits on data retention, etc.
FTC	Rulemaking	Request for comment on commercial surveillance and data security Proposed Rulemaking (2022)	Requested comments on FTC's approach to privacy and data security, including harms to children, automated systems, consumer consent, and transparency and disclosure. FTC may use these public comments to propose a rule to address "potential consumer harms arising from lax data security or commercial surveillance practices".

International			
UK	Enacted	UK Age-Appropriate Design Code (AADC) includes 15 standards to protect children's data online.	Covers all online services that are "likely to be accessed by children" up to age 18; requires a comprehensive set of privacy by design features. Required design features are somewhat ambiguous, with room for different interpretations by platforms. Specifically excludes providers of edtech used in schools.
EU	Enacted	The 2016 EU General Data Protection Regulation (GDPR) protects individuals' personal data and their right to privacy.	Requires data privacy by design and default; data protection impact assessments; and transparency. Requires parental consent for children up to age 16. Individual countries may set lower age of consent for children.
Ireland	Enacted	Children Front and Centre: Fundamentals for a Child-Oriented Approach to Data Processing (2021), Ireland's Data Protection Commission	Provides guidance for requirements to implement the EU's GDPR, taking a child rights approach. Protects children in 'mixed use' internet environments where personal data are used to target advertising. This guidance specifically excludes contextual advertising.

Potential solutions to protect children from unfair and deceptive digital food marketing			
Jurisdiction/ sponsor	**Status**	**Policy**	**Details**
U.S. FTC	Enacted	Endorsement and Testimonial Guides requires influencers to disclose brand relationships.	Provides clear guidance for endorsers (including influencers) to disclose all material connections with brands (including payments and free/discounted products) to comply with Section 5 of the FTC Act.
U.S. States	Enacted and proposed	Media literacy bills or resolutions that require media literacy and/or digital citizenship to be taught in K-12 schools have passed in 19 states.	These policies increasingly focus on "digital wellness", including harm from social media and smartphone use and "digital literacy" skills.
U.S. FTC	Recommendations	Protecting Kids from Stealth Advertising in Digital Media: Staff Perspective	Recommends that marketers not blur advertising and other content; holds advertisers, platforms and content creators responsible; and recognizes that parents cannot prevent children's exposure. Recommends information-based solutions, including verbal and written ad disclosures; icons to indicate commercial transactions; education for kids, parents and educators; platform requirements for content creators to self-identify ad content; and parental controls.

Appendix E. Resources for practitioners, educators, parents, and advocates

Marketing to children

Descriptions of the different types of marketing that children are exposed to on their digital devices and other media, including food marketing.

Common Sense Media. Parenting, Media and Everything in Between: *https://www.commonsensemedia.org/articles/online-safety*

- Common Sense Media provides articles for parents and practitioners that address a wide range of topics related to advertising and marketing, including:
  - What is the impact of advertising on kids? *https://www.commonsensemedia.org/articles/what-is-the-impact-of-advertising-on-kids*
  - Parents' Ultimate Guides to digital platforms (including TikTok, YouTube, Minecraft, Roblox)

Fairplay: *https://fairplayforkids.org/resources/?grid_ee703c0-category=for-parents*

- Fairplay is a nonprofit organization that is committed to enhancing children's wellbeing by addressing marketing to children. They provide a number of resources for parents to reduce children's exposure to commercial media.

MediaSmarts. Marketing and Consumerism: *https://mediasmarts.ca/digital-media-literacy/media-issues/marketing-consumerism*

- MediaSmarts, Canada's Centre for Digital Media Literacy, explains why and how young people are targeted by marketers and advertisers, and provides educational resources for parents and teachers such as printable activities and lesson plans.

Raising Children Network. Advertising: how it influences children and teenagers: *https://raisingchildren.net.au/toddlers/play-learning/screen-time-media/advertising-children*

- This parenting website from Australia contains information about common advertising strategies, how advertising influences children and teenagers, and how you can limit the effects of advertising on your child/teen.

Data privacy, age-appropriate design and online safety

Information about the use of children's data and other potentially harmful techniques in digital marketing and resources and tools to help protect children.

Common Sense Media. Parenting, Media and Everything in Between: *https://www.commonsensemedia.org/articles/online-safety*

- Common Sense Media also provides resources for parents and educators dedicated to protecting children online.
  - Who Is Collecting My Kid's Data, And What Are They Doing With It? *https://www.commonsensemedia.org/articles/who-is-collecting-my-kids-data-and-what-are-they-doing-with-it*
  - State of Kids' Privacy Research on why we need to keep kids' data off-limits. *https://www.commonsense.org/education/articles/kids-are-exposed-to-targeted-advertising-across-the-industry*
  - Digital Citizenship Resources for Family Engagement. *https://www.commonsense.org/education/family-resources*

Children and Screens: *https://www.childrenandscreens.org/*

- Children and Screens is a nonprofit organization that aims to understand and address media's impact on child development through research. They provide resources for parents and practitioners, including parenting tips, Q&As, and "Ask the expert" forums, that cover a variety of topics, including privacy and ethical design.

5Rights Foundation: *5rightsfoundation.com*

- 5Rights has three main areas of work: data and privacy, child-centered design, and children's rights. The organization advocates for mandatory rules for the design of digital services.
  - Pathways: How digital design puts children at risk. *https://5rightsfoundation.com/in-action/new-research-shows-children-directly-targeted-with-graphic-content-within-as-little-as-24-hours-of-creating-an-online-social-media-account.html*

Children's Commissioner of England: Who knows what about me? *https://assets.childrenscommissioner.gov.uk/wpuploads/2018/11/who-knows-what-about-me-infographic.pdf*

- This UK report documents key points at which data is collected and potential future implications.

London School of Economics and Political Science. My Privacy UK. My Data and Privacy Online. A toolkit for young people. *https://www.lse.ac.uk/my-privacy-uk*

- This online toolkit provides resources to support children's digital privacy skills and awareness.

Family Online Safety Institute. Tools and Resources for Parents: *https://www.fosi.org/tools-and-resources-for-parents*

- The Family Online Safety Institute provides tools and resources for parents that cover a variety of topics, such as a safer gaming guide and a tool sheet for talking with your kids about online safety.

Digital marketing in schools

Information about digital marketing in schools and guidance for educators on how to protect students.

Fairplay

- Fairplay provides a variety of tools for parents and educators to advocate for commercial-free school policies. It contains templates for letters to school administrators, petitions and opt-out forms, handouts for community and PTA meetings, and more.

- Screens in Schools Action Kit. *https://fairplayforkids.org/pf/screens-in-schools-action-kit/*

Common Sense Media

- Common Sense Media provides privacy evaluations of educational technology products. The evaluations are meant to help inform educators about potential privacy implications of technology available to support teaching and learning.

- Privacy evaluations of educational technology products *https://privacy.commonsense.org/evaluations/1*

National Education Policy Center. Don't Go "Along with Corporate Schemes to Gather up Student Data. *https://nepc.colorado.edu/publication/rd-along-platform*

- This article details the risks of one digital learning tool called Along.

Phone Free Schools Movement: *https://phonefreeschoolsmovement.org/*

- The Phone-Free Schools Movement is a collaborative movement by parents, educators, administrators, and students. A "Phone-Free School Administrator Toolkit" is coming soon.

Advocacy

Resources and opportunities to advocate for protecting children from harmful digital marketing.

Fairplay advocacy campaigns. *https://fairplayforkids.org/campaigns/*

- Fairplay's advocacy campaigns include an FTC complaint against Google and YouTube, as well as a campaign against Meta's planned Instagram from kids app. They provide resources such as sign-on letters to enlist

Fairplay. Screen Time Action Network. *https://fairplayforkids.org/screen-time-action-network/*

- Screen Time Action Network is comprised of practitioners, educators, advocates, and parents who are dedicated to reducing the amount of time kids spend with digital devices.

Bite Back. *Biteback2030.com*

- Bite Back is a youth activist movement based in the United Kingdom that advocates for a healthier food environment in schools and communities.

- "Fuel us. Don't fool us." youth-led countermarketing campaign. *https://www.biteback2030.com/lets-bite-back/fuel-us-dont-fool-us/*

CUNY Urban Food Policy Institute. Countermarketing Hub. *https://youthfoodcountermarketing.org/*

- This youth-focused "Countermarketing Hub" provides resources to bring awareness to deceptive marketing strategies used by food companies. The Hub contains educational tools, teaching materials, and examples of countermarketing.

Appendix F. Expert panel member bios and headshots

Jennifer L. Harris, PhD, MBA
Panel Chair

Dr. Jennifer Harris is a Senior Research Advisor at the UConn Rudd Center for Food Policy & Health, research consultant, and leading international expert on the extent and health impact of food-related marketing. Her current research examines emerging issues in food marketing to youth and their parents, including digital marketing targeting adolescents, targeted marketing to Black and Hispanic youth, and food marketing to parents of young children. Dr. Harris received her M.B.A. in Marketing from The Wharton School. She was a consumer marketing executive for eighteen years before completing her PhD in social psychology at Yale University and establishing the Rudd Center's research group to study food marketing to children in 2008.

Marie A. Bragg, PhD
Panel Member

Marie Bragg earned her PhD in clinical psychology at Yale University and is currently an Assistant Professor in the Department of Population Health at the NYU School of Medicine. She holds affiliate appointments in the Marketing Department at NYU Stern School of Business and in the NYU School of Global Public Health. Her interdisciplinary research examines the influence of social media and unhealthy food marketing on Black and Latinx adolescents' health behaviors. Marie's research team aims to provide policymakers with empirically supported information that can create a more equitable food environment. She has testified on food policy proposals before the New York City Council, the New York State Assembly, and the New York City Department of Health and Mental Hygiene. She also serves as the Director of Diversity Initiatives in the Office of Science and Research at the NYU Grossman School of Medicine.

Omni Cassidy, PhD
Panel Member

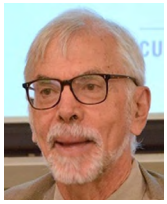
Omni Cassidy, PhD, is an Assistant Professor in the Department of Population Health at NYU Grossman School of Medicine/ Langone Health where she directs the Food, Culture, & Tech Lab. She examines the intersections of food, culture, and technology with a specific focus on how food and beverage companies use advanced digital technologies, such as virtual reality, to market unhealthy products to communities of color. She hopes to eventually leverage advanced digital technologies to develop, improve, and inform novel interventions to address behavior change, shift cultural narratives about food and food sovereignty, and inform policy. Her ultimate goal is to promote food environments that nourish both people and the planet.

Lori Dorfman, DrPH, MPH
Panel Member

Lori Dorfman believes that people who have a stake in the outcome should have a voice in the process. In 1993, she co-founded Berkeley Media Studies Group to put that belief into practice. BMSG studies media portrayals of health issues to support advocates transforming systems to foster racial and health equity. Dr. Dorfman was part of groundbreaking interdisciplinary teams that helped news organizations include public health perspectives in their crime coverage and elevate prevention in our public conversation about sexual violence. With Center for Science in the Public Interest, she co-convenes the Food Marketing Workgroup, a national network dedicated to eliminating harmful food marketing, especially those practices targeting children and youth of color. With the Center for Digital Democracy, Dr. Dorfman identifies harmful digital marketing. Dr. Dorfman is adjunct professor at the University of California, Berkeley, where she teaches Mass Communication in Public Health.

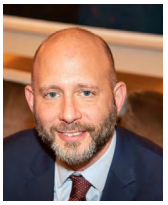
Frances Fleming-Milici, PhD
Panel Member

Dr. Fleming received her PhD from the University of Connecticut. Since 2012, her research has focused on analyzing the amount, type, and nutrition of foods and beverages marketed to children, adolescents, and parents of young children; determining the effects of exposure to food marketing; and examining race/ethnicity differences in rates of exposure and the impact of targeted marketing practices. Her current research focuses on assessing adolescent- and child-directed food marketing on social media and improving the foods and beverages parents feed their children through parent-targeted interventions and policy change.



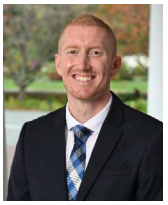
Nicholas Freudenberg, DrPH, MPH
Panel Member

Nicholas Freudenberg is Distinguished Professor at the City University of New York School of Public Health and cofounder and senior faculty fellow at the CUNY Urban Food Policy Institute. For the past four decades, he has developed, evaluated and implemented policies and programs to improve the health and reduce inequitable health outcomes in urban populations. His two most recent books are Lethal But Legal Corporations, Consumption and Protecting Public Health (2015) and At What Cost Modern Capitalism and the Future of Health (2021), both published by Oxford University Press. He is currently writing about the history of health activism in New York City since 1970.



Josh Golin, MA
Panel Member

Josh Golin is Executive Director of Fairplay, the leading independent watchdog of the children's media and marketing industries. Fairplay holds companies accountable for their harmful marketing and platform design choices, and advocates for policies that both protect children when they are online and help young people get the offline time they need to thrive. Under Josh's leadership, Fairplay filed the Federal Trade Commission complaint that led to the FTC's settlement with Google for COPPA violations on YouTube and the international campaign that stopped Meta from releasing a version of Instagram for younger kids. Josh has appeared on Good Morning America, NPR, and Fox & Friends and he's regularly quoted in major publications like The New York Times and The Washington Post. A father of a 14-year-old, Josh regularly speaks to parents, professionals, and policymakers about how to create a healthier media environment for children and teens.



Travis D. Masterson, PhD, MS
Panel Member

Dr. Travis Masterson is the Director of the Health, Ingestive Behavior, and Technology Laboratory and the Broadhurst Career Development Professor for the Study of Health Promotion and Disease Prevention at The Pennsylvania State University. His research focuses on food cue reactivity and how our food environment shapes our food choices and eating behaviors. He uses a variety of novel technologies and methodologies to accomplish this goal including, fMRI, immersive VR, and EMA.

Kathryn Montgomery, PhD, MA
Panel Member

Kathryn Montgomery is Professor Emerita in the School of Communication at American University, where she founded and directed the 3-year interdisciplinary PhD program in Communication. She is also Senior Strategist for the Center for Digital Democracy (CDD). Montgomery's research, writing, and testimony have helped frame the national public policy debate on a range of critical media issues. In the 90s, she spearheaded the campaign that led to passage of the U.S. Children's Online Privacy Protection Act (COPPA). She is author of two books: Target: Prime Time – Advocacy Groups and the Struggle over Entertainment Television (Oxford University Press, 1989); and Generation Digital: Politics, Commerce, and Childhood in the Age of the Internet (MIT Press, 2007). Montgomery's current research focuses on major technology, economic, and policy trends shaping the future of digital media in the Big Data era. Her recent work includes numerous reports and articles on digital food marketing, children's privacy, health wearables, and political microtargeting. She earned a PhD in Film and Television Studies from the University of California, Los Angeles.

Xavier Morales, PhD, MRP
Panel Member

Xavier Morales, Ph.D., MRP, is the executive director of Praxis Project, a national organization dedicated to supporting communities building power for health. Xavier is a longtime advocate for community-driven initiatives to achieve health equity and environmental justice. Taking an expansive view of what constitutes good health and community wellness, he works in partnership to enable opportunities across the social determinants of health. Xavier currently serves on the board of the Urban Peace Initiative, and was until recently, the Chair of City of Berkeley sugar sweetened beverage tax expert panel. Xavier often provides testimony in legislative arenas and is a frequent speaker at health conferences and health justice gatherings. Xavier, a former Peace Corps volunteer (Hungary), is originally from Sanger, California and studied environmental sciences at the University of California, Berkeley and city and regional planning at Cornell University.

Jenny Radesky, MD
Panel Member

Dr. Radesky is the David G. Dickinson Collegiate Professor of Pediatrics at the University of Michigan Medical School. She is Director of the Division of Developmental Behavioral Pediatrics and focuses clinically on autism, neurodiversity, and advocacy. Her NIH-funded research examines the use of mobile and interactive technology by parents and young children, parent-child relationships, and child social-emotional development. She authored the American Academy of Pediatrics (AAP) policy statements Media and Young Minds and Digital Advertising to Children and is a co-Medical Director of the SAMHSA-funded AAP Center of Excellence on Social Media and Youth Mental Health.

Thomas N. Robinson, MD, MPH
Panel Member

Thomas N. Robinson, MD, MPH designs solutions to help children and families improve their health and reduce inequities. Dr. Robinson is the Irving Schulman, MD Endowed Professor in Child Health and Professor of Pediatrics, of Medicine, and, by courtesy, of Epidemiology and Population Health at Stanford University. He directs the Stanford Solutions Science Lab and the Center for Healthy Weight and co-directs the Stanford Screenomics Lab and the Human Screenome Project at Stanford. Dr. Robinson originated the solution-oriented research paradigm, to promote study designs and methods to better inform medical and public health practices and policies. He is known for his pioneering obesity prevention and treatment research, including stealth interventions. Robinson received his B.S. and M.D. from Stanford, M.P.H. in Maternal and Child Health from University of California, Berkeley, Pediatrics training at Children's Hospital, Boston and Harvard Medical School, and post-doctoral training as a Robert Wood Johnson Clinical Scholar.

Mimi Tatlow-Golden, PhD
Panel Member

Mimi Tatlow-Golden, PhD is a Professor of Interdisciplinary Studies of Childhood and Youth at The Open University where she is also Co-Director of the Centre for Children and Young People's Wellbeing and Co-Director of the RUMPUS Fun Research Group. After a first degree in the humanities (BA Hons, History and German, Trinity College Dublin) and a career as a food writer and journalist in Ireland, Mimi completed a psychology PhD at University College Dublin funded by Ireland's Department of Children and Youth Affairs, a critical study of 'self-concept' drawing on children and young people's views. Mimi researched and lectured in psychology, mental health and children's well-being at University College Dublin, Trinity College Dublin, and Dublin City University before joining The Open University in 2016.

Sara Maksi PhD, RD
Panel Research Assistant

Sara Maksi PhD, RD is currently a postdoctoral scholar at The Pennsylvania State University under the advisement of Dr. Masterson in the Health, Ingestive behavior, and Technology lab. Her dissertation research focused on digital food marketing and adolescent eating behavior. Prior to coming to Penn State, she worked as a pediatric dietitian in the areas of diabetes and weight management.

Mary Story, PhD, RD
Panel Convener

Mary Story PhD, RD is Professor in Global Health, and Family Medicine and Community Health at Duke University, and Director for Academic Programs at the Duke Global Health Institute. Prior to coming to Duke in January 2014, she was Senior Associate Dean for Academic and Student Affairs, and Professor in the Division of Epidemiology and Community Health in the School of Public Health, Univ of Minnesota. Since 2005, she has directed the Robert Wood Johnson Foundation national program Healthy Eating Research focused on policy, systems and environmental solutions to improve child nutrition, food and nutrition security and prevent child obesity.She was elected to membership in the National Academy of Medicine (formerly the Institute of Medicine) in 2010. She has over 500 scientific publications in child and adolescent nutrition and obesity. She served on the USDHHS/ USDA 2015-2020 Dietary Guidelines Scientific Advisory Committee. She has received numerous national awards for her research, including The Obesity Society, 2019 Friends of Albert (Mickey) Stunkard Lifetime Achievement Award.

Lindsey Reed, MPH
Panel Convener

Lindsey Reed serves as a Senior Research Analyst for the Healthy Eating Research program and is based at the Duke Global Health Institute at Duke University. In this role, Lindsey provides leadership and expertise in the planning and organizing of research activities to support the mission of HER, including serving as the program lead for all commissioned research sub-grants and as a content expert for special projects. She also assists with review processes for HER's funding opportunities and coordinates the HER working groups. In previous roles, Lindsey developed evaluation tools and metrics to support a city-wide community collaborative seeking to improve health equity in New Orleans. She also served in the Peace Corps in Botswana, and was Operations Manager for an emergency feeding non-profit in rural western North Carolina. Lindsey holds a Masters of Public Health in Nutrition from Tulane University School of Public Health and Tropical Medicine, and a Bachelor of Science in Health Promotion from Appalachian State University

Senthil Ananthan, MPH, MBA
Panel Support

Senthil Ananthan serves as a Research Analyst for Healthy Eating Research and is based at the Duke Global Health Institute at Duke University. In this role, Senthil manages the commissioned research portfolio, assists with review processes for HER's funding opportunities, and coordinates the HER working groups. Prior to coming to Duke, Senthil worked as a Health Equity Fellow for the Food Security Program at Mecklenburg County Public Health. In this role, he contributed to policy, system, and environmental change strategies to improve healthy food access and address COVID-19 and chronic disease health disparities. Senthil has interned for the Food Assistance team at the Center on Budget and Policy Priorities where he monitored legislative developments related to nutrition assistance programs and assisted with research projects. Senthil holds a Master of Public Health and a Master of Business Administration from the University of Alabama at Birmingham and a Bachelor of Science in Economics from Auburn University.

Lauren Dawson, MPH
Panel Support

Lauren Dawson serves as Communications Manager for the Healthy Eating Research program and is based in the Division of Epidemiology and Community Health at the University of Minnesota School of Public Health. Her main responsibilities involve providing communications, technological, and administrative support to the program. Prior to joining Healthy Eating Research, Lauren worked at the Minneapolis Health Department (MHD) with their school-based clinics program through the Centers for Disease Control and Prevention's Public Health Associate Program. Lauren holds a Master of Public Health from the University of Minnesota, and a Bachelor of Science in Social Policy from Northwestern University.

Megan Lott, MPH, RDN
Panel Support

Megan Lott serves as Deputy Director for the Healthy Eating Research program and is based at the Duke Global Health Institute at Duke University. In this role, Megan manages day-to-day program operations, oversees coordination of scientific and administrative processes related to HER-funded research, engages in policy and advocacy collaborations with key partners, and identifies research priorities to advance program goals. Prior to coming to Duke, Megan was at The Pew Charitable Trusts in Washington, D.C. While there, she served as a Senior Associate on the Kids' Safe and Healthful Foods Project, a collaboration between The Pew Charitable Trusts and the Robert Wood Johnson Foundation, which provides nonpartisan analysis and evidence-based recommendations on federal and state policies that affect the safety and healthfulness of school foods. In this role, Megan supported research, policy, and advocacy efforts aimed at improving the school nutrition environment, including managing the first ever Health Impact Assessment to be conducted on a federal rule making process. Other prior experience includes serving as the Associate Policy Director for the Community Food Security Coalition and the National Farm to School Network, where Megan managed federal and state policy initiatives, including advocating for passage of the 2010 Healthy, Hunger-Free Kids Act. Megan is a Registered Dietitian with a BS in Nutrition Sciences and Dietetics from the University of Cincinnati and a Master's in Public Health from the University of North Carolina at Chapel Hill.

Galiya Chenault, BS
Panel Support

Galiya is a graduate student worker at Healthy Eating Research and is pursuing her Master of Science in Global Health (MSGH) at Duke University. She assists with an expert panel on digital food marketing, conducting interviews to identify policy barriers and propose solutions. Originally from Kazakhstan, Galiya has experience working in national nutrition programs and previously interned with an international development agency, focusing on nutrition in developing countries. She earned her Bachelor's degree in Global Health and Public Policy from both Duke Kunshan University and Duke University.

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Healthy Eating Research

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About Healthy Eating Research

Healthy Eating Research (HER) is a national program of the Robert Wood Johnson Foundation. Technical assistance and direction are provided by Duke University under the direction of Mary Story PhD, RD, program director, and Megan Lott, MPH, RDN, deputy director. HER supports research to identify, analyze, and evaluate environmental and policy strategies that can promote healthy eating among children and prevent childhood obesity. Special emphasis is given to research projects that benefit children and adolescents and their families, especially among lower-income and racial and ethnic minority population groups that are at highest risk for poor health and well-being and nutrition-related health disparities. For more information, visit *www.healthyeatingresearch.org* or follow HER on Twitter at *@HEResearch* or Instagram at *@HealthyEatingResearch*.

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