MONITORING AND RESTRICTING DIGITAL MARKETING

OF UNHEALTHY PRODUCTS
TO CHILDREN AND ADOLESCENTS

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Report based on the expert meeting on monitoring of digital marketing of unhealthy products
to children and adolescents

WHO European Office for the Prevention and Control of Noncommunicable Diseases (NCD Office)
Moscow, Russian Federation
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Abstract

Despite existing political commitments and policies, the latest evidence shows that children and adolescents are still regularly exposed to digital marketing of many unhealthy products. Such products include alcoholic drinks, foods high in saturated fat, salt and free sugars (HFSS foods), and tobacco, including new products such as electronic cigarettes (e-cigarettes) and other types of electronic nicotine-delivery systems. As time spent online shifts increasingly to social media and mobile devices, where personalized and targeted advertising predominates, the situation is likely to deteriorate.

The response from governments and public health institutions to this threat to children's well-being is lagging far behind, and efforts are complicated by rapid changes in digital and programmatic marketing strategies. Tools and support are urgently needed to facilitate monitoring and implementation of the WHO recommendations in online settings.

The WHO European Office for the Prevention and Control of Noncommunicable Diseases organized an expert meeting on monitoring of digital marketing of unhealthy products to children and adolescents in June 2018. Based on that meeting, this report aims to provide a tool to support Member States in monitoring digital marketing of unhealthy products to children; the resulting tool – the so-called CLICK monitoring framework – is flexible and can be adapted to national context. The report also describes current digital marketing strategies, the challenges arising from current practices, and some policy options to tackle digital marketing to children and adolescents.

KEYWORDS

Noncommunicable diseases (NCDs)	Nutrition
Digital marketing	Physical Activity
Monitoring	Tobacco
NCD Risk Factors	Child Obesity
NCD Risk Reduction	Children
Alcohol	Adolescents

Foreword

The current era of Sustainable Development Goals provides excellent opportunities to review national and global progress towards the prevention and control of noncommunicable diseases (NCDs); it also allows us to renew and reinforce our commitment to reducing the burden they impose and limiting exposure to risk factors. Restricting marketing of unhealthy products to children and adolescents has been a significant concern to health professionals, governments and parents. Such products include alcoholic drinks, foods high in saturated fat, salt and free sugars (HFSS foods), and tobacco, including new products such as electronic cigarettes (e-cigarettes) and other types of electronic nicotine-delivery systems.

Childhood obesity and marketing of unhealthy products are among the main concerns – digital marketing of these products is a new, global public health challenge that needs to be urgently tackled. As a result, the World Health Organization (WHO) has explicitly called on its Member States to introduce comprehensive restrictions on marketing HFSS foods to children in all media, including digital, and to progressively close any existing regulatory loopholes.

The WHO European Action Plan to reduce the harmful use of alcohol 2012–2020 calls for the protection of children and adolescents, requiring systems to be in place to prevent inappropriate and irresponsible alcohol advertising and marketing, with an indicator for reported exposure to the full range of alcohol marketing.

There is strong regulation derived from Article 13 of WHO's Framework Convention on Tobacco Control, which restricts marketing to all ages and requires clear penalties for breaches of national legislation. However, tobacco advertising, promotion and sponsorship remain a challenge for most countries.

Despite existing political commitments and policies, the latest evidence shows that children and adolescents are still regularly exposed to digital marketing of many unhealthy products, and – as time spent online shifts increasingly to social media and mobile devices where personalized and targeted advertising predominates – the situation is likely to deteriorate. The response by government and public health to this threat to children's well-being is lagging far behind, and efforts are complicated by rapid changes in the digital and programmatic marketing strategies. Tools and support are urgently needed to facilitate monitoring and implementation of the WHO recommendations in online settings.

In June 2018 the WHO European Office for the Prevention and Control of NCDs – an innovative powerhouse for generating solutions to tackle NCDs – organized an expert meeting on monitoring of digital marketing of unhealthy products to children and adolescents. Based on that meeting, this report aims to provide a tool to support Member States in monitoring digital marketing of unhealthy products to children; the resulting tool – the so-called CLICK monitoring framework – is flexible and can be adapted to national context. The report also describes current digital marketing strategies, the challenges arising from current practices, and some policy options to tackle digital marketing to children and adolescents. By means of this new report, the WHO Regional Office for Europe will strengthen technical support for Member States in addressing this important public health issue and contribute to improving the well-being of our children and adolescents.

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through the Life-course

Acknowledgements

Abbreviations

AI	artificial intelligence
ASA	Advertising Standards Authority
AVMSD	Audiovisual Media Services Directive
COPPA	Children's Online Privacy Protection Act
COSI	Childhood Obesity Surveillance Initiative
DMP	data management platform
DSP	demand side platform
eID	electronic ID
EU	European Union
FCTC	Framework Convention on Tobacco Control
GDPR	General Data Protection Regulation
HFSS	high in saturated fat, salt and/or free sugars
NCD	noncommunicable disease
NGO	nongovernmental organization
OECD	Organisation for Economic Co-operation and Development
SSP	supply side platform
UNCRC	United Nations Convention on the Rights of the Child
WHO	World Health Organization

Summary

CLICK
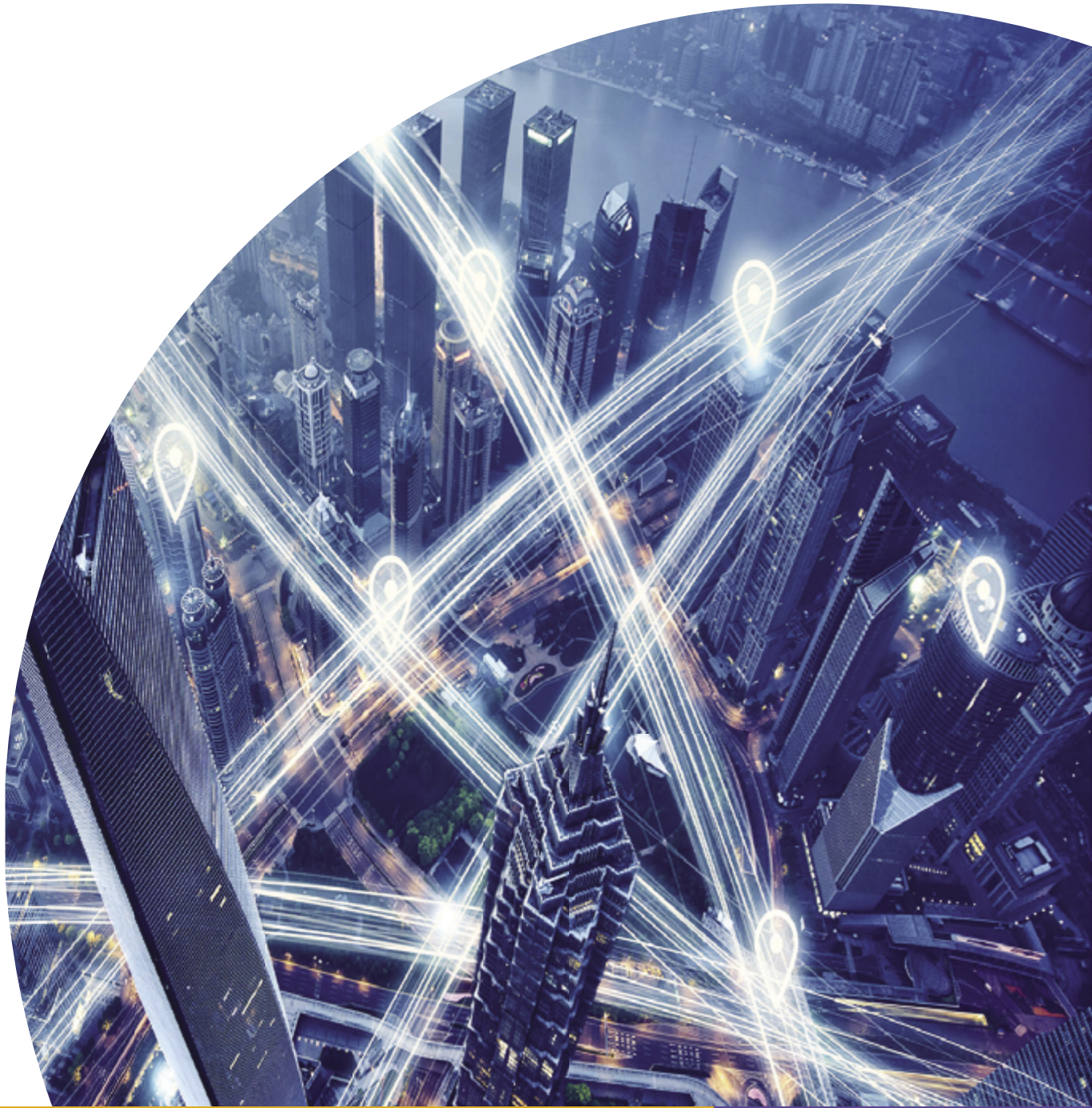
AIMS

Research.
Establish a panel-based or automated e-research methodology that can be implemented in a standard way across Member States of the WHO European Region to benchmark children's exposure to digital marketing of unhealthy products and to highlight the issue to regulators and policy-makers.

Monitor.
Develop the CLICK tool to assess the extent of children's actual exposure to digital marketing on a regular basis, for monitoring and evaluation purposes.

Prevent.
Set out the prerequisites for a technical standard that would allow the establishment of an internationally accepted and regulated age verification system combined with accurate tagging of advertising campaigns; together, these could restrict paid-for advertising of unhealthy products seen by children.

Implement.
Clarify the mandate for governments to put in place national policy frameworks that explicitly implement the age verification and tagging requirements, and clearly state that children should not be exposed to marketing of unhealthy products.

C — Comprehend the digital ecosystem

Map the global, regional and national digital marketing ecosystem and children's website/app usage; alongside this work, set up focus groups to gauge children's and parents/guardians' experience and awareness of marketing techniques and campaigns.

L — Landscape of campaigns

Assess campaigns run by leading national brands by collecting information from advertising agencies and by sampling whole-country social media for relevant content to ascertain what is viewed by different age groups.

I — Investigate exposure

Map exposure to some paid-for digital marketing experienced by a panel of children in each age bracket using an installed smartphone app that (with consent) monitors and aggregates data on children's interaction with advertisements in some websites and social media.

C — Capture on-screen

Use real-time screen capture software on a panel subgroup to assess what a representative sample of children actually sees online on their devices, in order to better understand wider marketing techniques, including user-generated content and product placement.

K — Knowledge sharing

Create user-friendly materials from the research data and develop partnerships with young people, parents, policy-makers and civil society, who together can advocate change, raise awareness and influence policy.

The report also sets out some Proposed Policy Prerequisites that will need to be in place for governments to take effective action: an age-verification system to ensure that advertising for unhealthy products is only viewed by people of an appropriate age, coupled with tagging of marketing campaigns that accurately identify products inappropriate for young age groups.

1. Introduction

1.1 Ongoing calls for action

Noncommunicable diseases (NCDs), such as cardiovascular disease, cancer, chronic respiratory disease and diabetes, are the major cause of death worldwide, accounting for 86% of deaths and 77% of the disease burden in the WHO European Region. Many cases of NCDs could be prevented or delayed by tackling major risk factors beginning in childhood, including poor diet, and alcohol and tobacco use. Marketing of unhealthy products to children is therefore a significant concern to health professionals, governments and parents; such products include alcoholic drinks, foods high in salt, fat and sugar, and tobacco, including new products such as electronic cigarettes (e-cigarettes) and other types of electronic nicotine-delivery system.

Many Member States of the WHO European Region have taken steps to address inappropriate marketing of unhealthy foods and beverages.* However, such measures have often relied on the advertising industry regulating itself, even though reports have indicated that self-regulation is not effective.† It has been over 10 years since the World Health Assembly first called for recommendations on marketing of foods and non-alcoholic beverages to children.[1] The *Set of recommendations on the marketing of foods and non-alcoholic beverages to children*[2] was endorsed in a World Health Assembly resolution in 2010[3], but much remains to be done, as WHO's Commission on Ending Childhood Obesity noted in 2016:

> There is unequivocal evidence that the marketing of unhealthy foods and sugar-sweetened beverages is related to childhood obesity. Despite the increasing number of voluntary efforts by industry, exposure to the marketing of unhealthy foods remains a major issue demanding change that will protect all children equally. Any attempt to tackle childhood obesity should, therefore, include a reduction in exposure of children to, and the power of, marketing.[4]

Marketing of tobacco (to people of any age) on the internet is explicitly banned by European Commission regulations, and the WHO European Action Plan to reduce the harmful use of alcohol 2012–2020 protects children and adolescents in particular, requiring systems to be in place to prevent inappropriate and irresponsible alcohol advertising and marketing. [5]

In spite of such efforts, children are still being regularly exposed to digital marketing of many unhealthy products (Box 1); and, as time spent online shifts increasingly to social media and mobile devices where personalized and targeted advertising predominates, the situation is likely to deteriorate. The response by government and public health to this threat to children's well-being is lagging far behind, and efforts are complicated by rapid changes in the digital and programmatic marketing ecosystem (see section 2). Tools and support are urgently needed to facilitate monitoring and implementation of the WHO recommendations in online settings.

Box 1. What is digital marketing?

Digital marketing is defined in WHO's 2016 report, *Tackling food marketing to children in a digital world: trans-disciplinary perspectives*, as follows: [6]

> Promotional activity, delivered through a digital medium, that seeks to maximize impact through creative and/or analytical methods, including:
> • creative methods to activate implicit emotional persuasion, such as building engagement in social networks (e-Word-of-Mouth); using immersive narratives or social-, entertainment- and humour-based approaches; using "influencers" popular with children, such as YouTube "vloggers" (video bloggers); using augmented reality, online games and virtual environments; or
> • analysis of emotions, responses, preferences, behaviour and location to target specific groups, individuals and particular moments of vulnerability or to maximize the impact of creative methods.

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* See section 1.6.3 for examples of action taken by Member States.
† See, for example, *Evaluating implementation of the WHO Set of recommendations on the marketing of foods and non-alcoholic beverages to children* (Copenhagen: WHO Regional Office for Europe; 2018).

1.2 Digital living: opportunity or threat?

1.2.1 Balancing rights

Children live in an increasingly digital age – living, learning, working and playing in an online as well as offline environment. Technology use is an important aspect of their lives now and in the future [7], and the internet can bring huge benefits: digital participation can facilitate children's rights to access information, to enjoy freedom of assembly, and to lead a social life.

However, these "participation" rights must be balanced with "protection" and "development" rights, such as the rights to be free from economic exploitation, to have one's privacy respected, and to enjoy the highest attainable standard of health.* This balance urgently needs to be addressed to create a positive online environment, supported by parents and government, that mitigates the risks to well-being (Box 2).[8]

Children also have a right to have their voices heard (in an age-appropriate way) in all decisions concerning them.† Recent and proposed data protection regulation across Europe – the General Data Protection Regulation (Box 3) and a Council of Europe recommendation (Box 4) – enshrines the rights of children to adequate protection against the misuse of their customer data, with the parent/guardian providing legal consent for children aged under 13 to 16 (with the age set by Member States).

Box 2. Risks to well-being

- **Content risks:** inaccurate, harmful or illegal content.
- **Contact risks:** inappropriate and unwanted contact between users.
- **Conduct risks:** inappropriate or otherwise harmful behaviour online.
- **Commercial risks:** short- and long-term harms resulting from data extraction, resale and targeting by commercial actors; users being encouraged to give out information that can be used to defraud or cause harm associated with exposure to inappropriate marketing.

Box 3. The General Data Protection Regulation (GDPR) and children's data

The GDPR, adopted across European Union (EU) Member States in 2018, clearly recognizes the rights of the individual to control data that are shared with particular technology companies (as well as acknowledging the value of customer data to the advertising ecosystem). The regulation applies to both data controllers and data processors, and has redefined the parameters of the data economy and, more specifically, of the digital advertising system.

Article 7 requires that consent is informed and explicit for data protection and usage; data controllers must be able to prove consent (i.e. opt-in) and consumers must be able to withdraw consent. Consent is defined as "any freely given, specific, informed and unambiguous indication of the data subject's wishes by which he or she, by a statement or by a clear affirmative action, signifies agreement to the processing of personal data relating to him or her" (or, in the case of Article 8, personal data relating to the child). Consent for children (the age threshold for which varies between Member States) must be given by the child's parent or guardian and must be verifiable.

Under Article 8, personal data relating to the child of the GDPR, it is unlawful to process the personal data of a child (including identifiers such as IP addresses, location data and device IDs) until the child is "at least 16 years old", unless parental consent has been given or if Member States provide for a lower age (which cannot be below 13). Parents of children under 16 have the legal right under the GDPR to set permissions for harvesting, storage and use of children's online identity and usage data, specifically including data used for advertising targeting. In addition, "reasonable efforts" must be made to verify that parental consent is given, "taking into consideration available technology".

Fines for breaching the GDPR can be as high as €20 million, or 4% of a company's global annual turnover in the previous financial year. Efforts are already being made – notably in Ireland (Box 19) and at the Council of Europe (Box 4) – to ensure that children's data cannot be profiled, targeted or tracked, with the threat of fines for non-compliance. Regulations are therefore in place to cover the use of children's data for targeted advertising, but not yet to prevent companies serving advertising of restricted products to children.

Box 4. The Council of Europe and children's personal data

In 2018 the Council of Europe recommended that it should be made illegal to engage in automated processing of children's personal data to profile, analyse or predict their personal preferences, behaviour and attitudes:

> Profiling of children, which is any form of automated processing of personal data which consists of applying a "profile" to a child, particularly in order to take decisions concerning the child or to analyse or predict his or her personal preferences, behaviour and attitudes, should be prohibited by law. In exceptional circumstances, States may lift this restriction when it is in the best interests of the child or if there is an overriding public interest, on the condition that appropriate safeguards are provided for by law.[9]

Should this recommendation be adopted by Member States, it would provide a means by which microtargeting of children by advertisers could be addressed. Although it would not necessarily protect children from advertising of unhealthy foods, which could still be presented to them "contextually" on websites and locations they visited, it might reduce more precise targeting of those more vulnerable to such marketing and advertising.

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* Rights enshrined in the United Nations Convention on the Rights of the Child (UNCRC) (1990), the most widely ratified of all human rights treaties – only the United States is not a party to it.

† Article 12 of the UNCRC: "States Parties shall assure to the child who is capable of forming his or her own views the right to express those views freely in all matters affecting the child, the views of the child being given due weight in accordance with the age and maturity of the child."

1.2.2 Time online

While there is relatively little up-to-date comparative data on children's digital lives, time spent online, including on social media, seems to be rapidly increasing, adding to the time children are exposed to marketing.* Concerns about the possible effects of excessive screen time on children – depriving them of sleep, disrupting lessons and affecting their ability to concentrate – have been raised by public health experts. The shift to mobile screen time accentuates these effects and is less amenable to parental oversight. Social media can have a positive impact on self-esteem and friendships, but they can also contribute to anxiety and depression.

A 2012 study of 15-year-olds in member countries of the Organisation for Economic Co-operation and Development (OECD) found that they use the internet for an average of nearly 2 hours a day and 2.5 hours at weekends (although this varies significantly between countries). A 2017 study in the United Kingdom, meanwhile, showed that between 2013 and 2016 there was a marked increase in the percentage of children online, especially among younger children (Fig. 1). The study found that 12–15-year-olds are online for an average of 21 hours a week, with particularly rapid growth in mobile internet use in younger age groups. It also found that 23% of 8–11-year-olds have a social media profile (despite being below the minimum age set by companies like Facebook) and this rises to 76% among 12-15-year-olds.
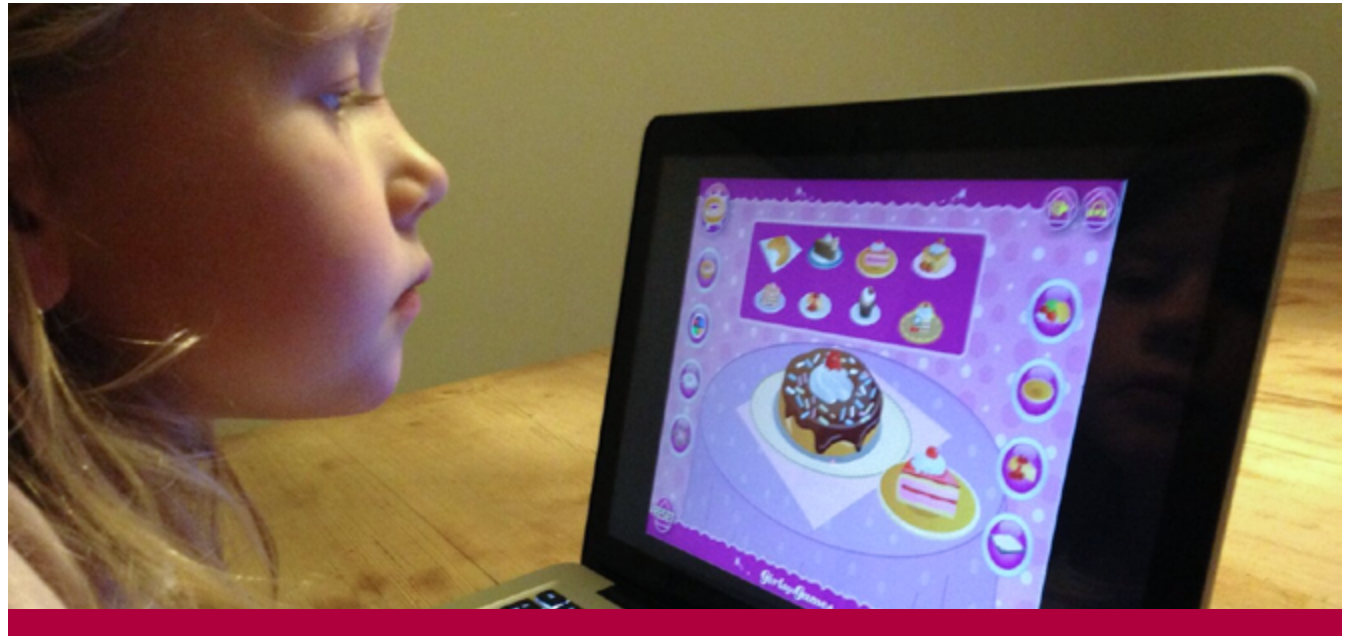
Fig. 1. Percentage of children online in the United Kingdom, 2013 and 2016

- 3–4-year-olds: 33% (2013), 53% (2016)
- 5–7-year-olds: 65% (2013), 79% (2016)
- 8–11-year-olds: 87% (2013), 94% (2016)
- 12–15-year-olds: 97% (2013), 99% (2016)

2013   2016

Source: Ofcom[10]
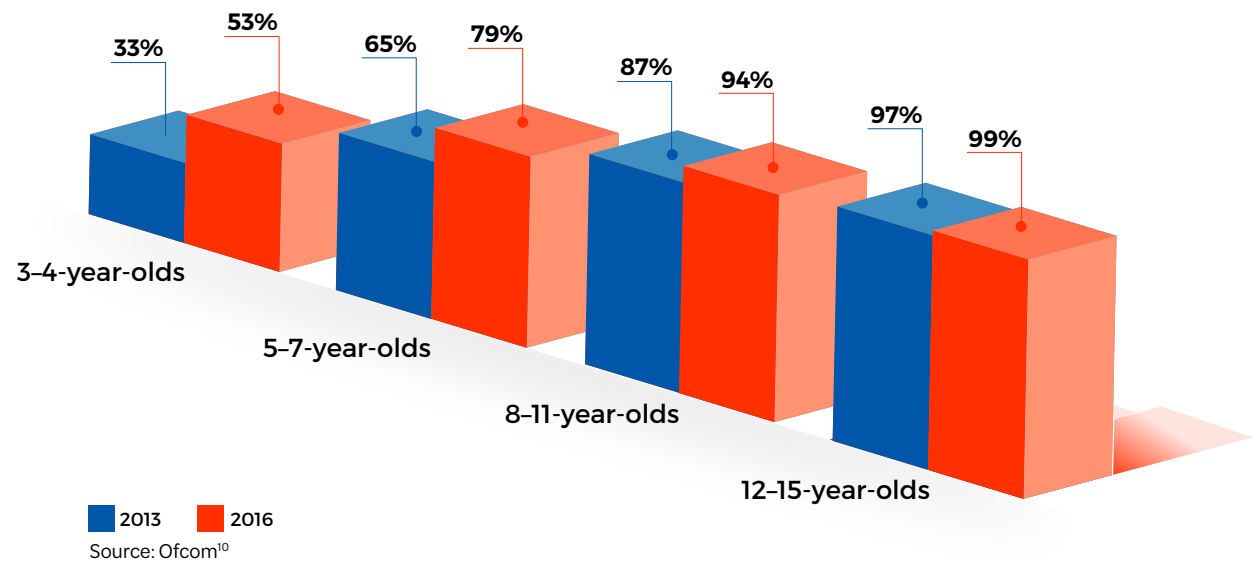
* The latest EU Kids Online survey was carried out in 2018 and is ongoing in 33 countries (http://www.lse.ac.uk/media-and-communications/research/research-projects/eu-kids-online). The Italian survey has been published and the remaining results will be published by national teams when ready, along with cross-country analysis.

1.2.3 Online exposure and vulnerability

Adult concern about children's safety online is often focused on their exposure to inappropriate content, contact issues such as paedophile activity, conduct (bullying and trolling), and – more recently – the commercialization of childhood. When online, children are exposed to digital marketing of unhealthy products, particularly alcohol and foods high in saturated fat, salt and/or free sugars (HFSS products);[11] such exposure may be the result of paid-for advertisements,* product placement, content sharing by peers or the activities of social media influencers.[12] Most existing policies (including self-regulatory policies) impose restrictions on marketing aimed at younger children, but teenagers are heavily targeted by brands in social media. Brands thus reinforce their emotional connections at the developmental stage when interacting with peers and establishing one's identity are paramount.

> "Children are in the middle of a minefield!"
>
> Professor Gerard Hastings, University of Stirling, United Kingdom[†]

In the United Kingdom, a 2016 study found that 73% of 13–17-year-olds follow brands they like in social media and 57% make in-app or in-game purchases.[13] Although some surveys indicate that young people dislike advertising online, they nevertheless interact with it when it features brands they like.

There is a wealth of evidence on alcohol, showing that exposure to alcohol advertising manipulates adolescents by shaping their attitudes, their perceptions and, in particular, their expectations about alcohol use. These then influence their decisions to drink, leading to early drinking initiation and increased alcohol consumption (see section 1.6.1).

Children and adolescents need special protection as their cognitive abilities are still developing; and even after they have acquired cognitive defences similar to those of adults, they may still be less able to recognize the messages that are implicit in marketing communications (Box 5 gives an example of national regulation to counter this tendency).

Box 5. Cognitive ability – the United Kingdom approach

The United Kingdom's Committee of Advertising Practice states that "marketing communications must be obviously identifiable as such" – a stipulation that poses a particular challenge when it comes to younger children whose cognitive development is in its early stages.
The Advertising Standards Agency (ASA) has developed guidance for situations where online marketing communications directed at under-12s are likely to require "enhanced" disclosure to ensure recognition:
> Where an ad is highly immersive or significantly integrated into the surrounding content and unlikely to be identified clearly from the context in which it appears, disclosures should be prominent, interruptive and adequately indicate the commercial intent.

Box 6. The attention economy: the new advertising paradigm

Advertising was first conceived when information was scarce and time was abundant. In the digital age, it is information that is abundant and time that is scarce. Online, our attention is a limited resource that advertisers are competing for. In this "attention economy", any product that is "free" – a website or social media product – is paid for with our attention and with our data.
For example, YouTube's primary metrics focus on time spent on the site, advertisements clicked and autoplay videos watched. Vast amounts of data about users are gathered; users are then targeted by content-selecting algorithms in increasingly sophisticated ways to retain attention and maximize ad views. This cannot be explained as simply meeting demand: it creates demand where it had not previously existed.
There is growing concern that the attention economy is having negative impacts on society and individuals – both short-term, hindering the achievement of specific tasks; and longer-term, inhibiting pursuit of our goals, undermining opportunities for reflection and leisure, distracting us from our "considered selves". Technologists who were instrumental in shaping the parameters of the attention economy are sounding the alarm and calling for alternative approaches. One such organization, the Center for Humane Technology, summarizes the issues on its website as follows:
> [Social media companies and search engines are] caught in a zero-sum race for our finite attention, which they need to make money. Constantly forced to outperform their competitors, they must use increasingly persuasive techniques to keep us glued. They point AI-driven news feeds, content, and notifications at our minds, continually learning how to hook us more deeply – from our own behavior.[15]

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* "Paid-for" advertising comprises marketing material that brands pay to place on publishers' websites; "earned" or "user-generated" content is material shared by users through online platforms, for which no payment is made.
† Throughout this report, quotes in *italics* are comments that were made during the WHO Regional Office for Europe expert meeting (Box 7) on which the report is based.

This is not necessarily a matter of lacking digital literacy: we may simply be overwhelmed by the levels of information competing for our attention in the new "attention economy" (Box 6). Furthermore, development is not a linear process of gains accrued. Even when older children recognize advertising content, they are still susceptible to its persuasive effect, and – for multiple reasons, including peer effects – they may lack the motivation to resist it.[14]

> "If you are hooked in emotionally, then your cognitive capacity doesn't even come on-stream."
>
> Dr Mimi Tatlow-Golden,
>
> The Open University, United Kingdom

Parents may not be effective gatekeepers: they are likely to fail to appreciate the extent to which their children are targeted or assume that they have the capacity to ignore the messages, leading to complacency about what is viewed online. As websites and apps are designed to retain attention, even adults who consider themselves "digital natives" are being psychologically manipulated in ways that are hard to understand and impossible to track.

The huge amount of personal information online is increasingly a commodity that is traded – and exploited. The marketing industry feels that restricting advertising to all audiences would require publishers to find other ways to fund high-quality content. This would potentially lead to more extensive use of subscriptions, which could widen existing inequalities in access, disenfranchising those unable to afford the additional costs and resulting in loss of the benefits of online access. Irrespective of the particular business model used and the benefits available, the commercialization of childhood and/or children's time has attracted various negative reactions from different stakeholders, based on local experience and cultural context.

Unfortunately, the digital ecosystem has not evolved with children in mind; nor has the advertising market been constructed to ensure that controls on use of data (such as the new GDPR) are complied with. It is currently almost impossible to ensure that an advertisement for an unhealthy product will not be sent to a child (as is explained in section 2). There is therefore a need for active regulation of the industry as well as for new technical controls to be put in place. Furthermore, any solution must go beyond advertising that is specifically "targeted at children". The actual exposure of children to marketing of unhealthy products as part of their everyday online experience must be assessed and addressed, as it is the exposure that causes harm,

regardless of the intended audience or the motivations of the advertiser. Some research into digital marketing of unhealthy products has been conducted, but it has typically focused more on the nature of marketing (for example, content analysis) or on children's engagement with marketing through focus groups. To date, efforts to accurately quantify the amount of digital marketing of HFSS foods, alcohol and tobacco, and to estimate children's general exposure and specific targeting, have been less fruitful. It is time to take a more sophisticated and granular approach to assessing the online world that children inhabit and to take appropriate action to ensure that children are appropriately protected online.

1.3 The aim of this report

This report aims to elucidate the rapidly changing digital marketing ecosystem within which action to protect children's online experience must be taken (section 2). It then sets out two practical actions that can feasibly be undertaken:

• the CLICK monitoring framework: a five-step process that is designed to gather data on children's exposure to marketing, providing Member States of the WHO European Region with the evidence they urgently need to call for and catalyse national action (section 3); and

• Proposed Policy Prerequisites: three suggested policy actions that are necessary if regulatory solutions are to be put in place to ensure that children's online experiences do not include marketing of unhealthy products (section 4).

The report explains how to fill the gaps in our knowledge of children's exposure to digital marketing of unhealthy products and suggests ways to strengthen the current, very limited, provisions in place to control targeting of paid-for advertisements. It is directed at government, policy-makers, academics, public health practitioners and civil society – all of whom have an interest in how best to ensure that children's online experience remains health-promoting.

The approach summarized in this report was devised during a multidisciplinary expert meeting held on 5–6 June 2018 by the WHO Regional Office for Europe (Box 7).

Box 7. Expert meeting on monitoring of digital marketing of unhealthy products to children and adolescents, WHO Regional Office for Europe, June 2018

The expert meeting on which the proposals in this report are based was held at the Moscow office of the WHO Regional Office for Europe on 5–6 June 2018. Around 30 experts attended, drawn from the public health, child psychology, marketing and technology sectors of various European countries. The food/beverage, tobacco and alcohol industries were not represented or consulted.

In advance of the meeting, participants were encouraged to set out questions that they wished to see addressed. This significantly improved understanding of the joint aims of the meeting, allowing the presentations to be more focused on the needs of the various sectors represented.

Presentations set out the challenges from the health, technical, monitoring and regulatory perspectives, and some current technological approaches were described, so ensuring that all participants were aware of the current realities and possibilities. Participants then discussed and developed three possible solutions; given the considerable overlap between these three proposals, they have been combined in this report into a single solution. (Some of the ideas that have not been explained here but would be interesting areas for future exploration are briefly set out in in Annex 1.)

"We have all these experts from different sectors such as public health, research, online marketing, regulatory bodies, technology and ethics, because this is a very complex issue which needs an innovative solution."
Dr Kremlin Wickramasinghe, WHO Regional Office for Europe

1.4 A moment of opportunity

A number of factors currently combine to make this an ideal time to take action on the marketing of unhealthy products to children.

• Childhood obesity is a growing concern around the world, and increasing efforts are being made to tackle it through systemwide action across the countries of Europe. Self-regulation and company pledges alone have not succeeded in preventing children from being exposed to marketing of unhealthy products.

• Internationally, 2018 was an important year for NCDs. The Political Declaration of the Third United Nations High-level Meeting on NCDs, approved by the General Assembly in October 2018, includes child obesity, tobacco and alcohol as major priorities for global action over the next few years. Child overweight and obesity was also one of the priorities set during Argentina's presidency of the G20 in 2018.

• While recognizing the benefits of time spent online for educational and other purposes, there is increasing – and increasingly vocal – public and government concern about the dangers of excessive time spent online, particularly for children. Companies are responding to this concern with innovations such as Apple's Screen Time feature, which keeps users informed about the time they spend online and "nudges" them away from spending more time on their devices than they had intended.

• There is growing awareness and concern about the impact that data extracted from children and their online behaviour may have on their mental health, education, future employability and overall well-being.

• Trust in companies' use of personal data has fallen, and many of the platforms and companies most popular with children – Apple, Google, Facebook, etc. – are under increased scrutiny, particularly following the high-profile Cambridge Analytica privacy concerns. One study found that the proportion of people who agree that Facebook is committed to protecting the privacy of their personal information fell from 79% to 27% in the wake of the Cambridge Analytica story.[16]

• The GDPR has imposed constraints on the handling of personal data, including on what constitutes consent to the use of such data and thus how users are targeted with advertisements (Box 3). The advertising technology industry has already been subject to recent GDPR-related rulings, with further rulings anticipated following cases undertaken and complaints lodged in 2018. As a result, the situation is fluid and the industry may be open to new protocols and technologies to enable GDPR-compliant data use. There have been some moves made by holders of data to be more transparent; for example, in June 2018 some major social media companies announced new policies to allow users to source information on how they are targeted with advertisements – although some aspects of these initiatives have been found by researchers to be incomplete or misleading.[17]

• The companies behind the brands have lost faith in the digital marketing ecosystem – the companies themselves see the ecosystem as being in need of reform (see section 2.4).

• Some governments are already making efforts to extend provisions on broadcast advertising to non-broadcast media (some examples, including from the United Kingdom, Norway and Ireland, are given in section 1.6.3).

• The revised EU Audiovisual Media Services Directive (AVMSD) came into force in December 2018; it includes provisions that could be further strengthened to deliver a more robust framework for tackling advertising of unhealthy products to children at the different national levels (Box 21).

1.5 Taking these proposals forward

This report proposes both a monitoring tool (CLICK) and Proposed Policy Prerequisites on age verification and tagging of advertisements that could lead to a significant reduction in children's exposure to advertising of unhealthy products. The next step is to turn these ideas into reality – to identify a small number of countries in Europe in which they can be piloted and where a learning network can be established to share what has worked, and then to refine and improve the approach before its wider rollout.

"We are in a new and emerging regulatory environment, in which WHO has a role in ensuring that technology and policy innovation is harnessed effectively to ensure that brands respect and protect children's right to health. In this digital age, children must be able to participate in a safe and health-promoting online environment."
Dr João Breda, WHO Regional Office for Europe

Ensuring the cooperation of the marketing and regulatory ecosystem will be a major challenge, requiring political will, supranational regulation, coordination between organizations, consistency across borders, and clear repercussions for non-compliance.

1.6 Where are we now?

1.6.1 An example: digital alcohol marketing – practice, evidence and regulation

Practice. The alcohol industry has embraced the opportunities provided by digital media to offer new ways to reach, influence and interact with consumers. This has been achieved through a combination of paid media (e.g. pop-up advertisements), owned media (e.g. branded websites and social media pages), and content co-created with users. Marketing through these new media channels can be targeted at specific audiences, virally spread between users, and accessed in almost any context (i.e. via smartphones); it can also actively recruit users into the marketing process. Such capacities have led to claims that digital marketing may be more powerful and less controllable than traditional alcohol marketing.[18]

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* "Audience size" typically refers to how many people either like or engage with the content (followers on Twitter, likes on Facebook, views or subscribers on YouTube, etc.); "frequency" relates to how often new content is posted or uploaded; and "volume" refers to the overall amount of activity (from all different producers and brands, etc.).

Evidence. Content analysis research, which critically evaluates marketing practice, consistently reports that digital marketing is global and continuous in terms of audience size,* frequency and volume.[19] Research also highlights that alcohol companies use digital and social media in diverse ways as key components of "360 degree" marketing strategies, thereby extending the reach of traditional marketing and sponsorship. Frequently used strategies in digital marketing, particularly on social media, include making references to real-world stories and events (i.e. "real-world tie-ins"); interacting with the audience (for example, through conversations or by encouraging them to create content); and using brand associations to extend the contexts with which alcohol consumption is linked (such as sporting events and popular television shows). Age restriction gateways are neither universally present nor effective, and some content may appeal, explicitly or implicitly, to younger audiences. There is also evidence that some digital marketing may contravene self-regulatory codes of marketing practice, may promote higher-risk consumption either through indirect associations or through stimulated audience content, and may not adequately promote lower-risk drinking.

Survey research consistently reports that young people (from adolescent to young adulthood) are aware of, and willing to participate in, a variety of digital alcohol marketing activity. Early evidence also favours the conclusion that – as with traditional marketing – such exposure is positively associated with consumption and even higher-risk drinking. Qualitative research finds that young people are willing to engage with digital alcohol marketing, both for multinational corporations and for local licensed venues which sell alcohol (such as pubs, bars and nightclubs), and that they regard such marketing as a normal and ubiquitous part of their online environment.[20] Young people also report that the alcohol branding that they see online is considered to hold important cultural and symbolic meaning and that blurring of commercial and user activity enhances the credibility of, and interest in, the marketing message but also creates challenges in identifying marketing content.

Regulation. To date, it is mostly alcohol companies, website operators and the marketing industry that have proactively responded to digital media. In the United Kingdom, for example, the Portman Group (an industry body) set the precedent in 2009 by publishing guidance on marketing through 20 digital channels (including social media, podcasts, online gaming and instant messaging). [21] There are only a few examples of governments adapting existing legislation to include digital alcohol marketing (see also section 1.6.3). In 2008 the French Government extended its marketing legislation (the Loi Évin of 1991) to cover interstitial or intrusive advertising (e.g. pop-ups) and content that might appeal to young people (e.g. videos and animations); and a further ruling in 2012 extended this to intrusive advertising on social networking sites. Despite these changes, however, research still suggests that over half of young people in France reported seeing alcohol marketing on the internet in the previous month. In Finland, the government has prohibited (1) encouraging individuals to engage with, or share, marketing on social media; (2) online competitions; (3) viral marketing; and (4) "advergaming" (i.e. games that promote a particular brand, product or message by integrating it into play). This legislation covers marketing on the internet, games consoles, tablets and mobile phones. Similar restrictive policies are also reported in Norway and Sweden. Nevertheless, as this legislation has only recently been introduced in Finland, its impact on exposure to digital marketing and consumption remains to be evaluated.

1.6.2 Existing restrictions: alcohol and tobacco

Restrictions on alcohol advertising on broadcast (non-digital) media have been subject to self-regulatory codes in most markets, overseen by industry trade associations and based on the principle that alcohol advertising should not be specifically targeted or directed at children. However, in the digital sphere these restrictions are much harder to define, and the same issues that confront HFSS advertising controls affect alcohol advertising: it may not be specifically targeted at children, but it is very difficult to prevent it from appearing on their screens. (See also sections 1.6.3.4 and 1.6.3.5 for Finnish and French efforts to tackle alcohol advertising.)

In most European countries there is a blanket prohibition on advertising tobacco (along with other categories such as guns and pornography) to broadcast and digital audiences. For instance, in the United Kingdom the Tobacco Advertising and Promotion Act (2002) explicitly prohibits most advertising on the internet (beyond retailers' websites). There is strong regulation derived from Article 13 of WHO's Framework Convention on Tobacco Control (FCTC), which restricts marketing to all ages and requires clear penalties for breaches of national legislation. Article 5.3 of the FCTC also prohibits industry involvement in setting public health policy on tobacco, to avoid potential conflicts of interest. However, in spite of the FCTC, tobacco advertising, promotion and sponsorship remain a challenge for most countries. During the Conference of the Parties to the FCTC in October 2018 in Geneva, Switzerland, a decision was adopted on tobacco advertising, promotion and sponsorship, and its depiction in entertainment media. This is a clear indication of the complex reality that exists in countries and the need for further action.Beyond the "surface web", which is accessible to all, there is the "hidden (or deep) web" and the "dark web" of private sites, where it is probable that there is no compliance with restrictions on banned advertising categories. There are also cross-border issues such as those surrounding the EU's AVMSD (Box 21).Despite these challenges, removal of advertisements that are inappropriate to children is a goal that can be achieved through technical alterations to the programmatic advertising system (set out in section 4).

1.6.3 Examples of action taken by Member States of the European Region

A number of Member States have implemented policies and regulations that aim to tackle the issue of children's exposure to marketing of unhealthy foods.*

1.6.3.1 United Kingdom: action on HFSS food advertising in non-broadcast media

In July 2017, after extensive consultation, new ASA rules came into force in the United Kingdom that "ban the inclusion of HFSS product advertisements in children's media and other media where children make up 25% or more of the audience" in non-broadcast media environments. The rules also ban HFSS advertisements from including characters or celebrities in advertisements targeted at younger children.[22] The ASA gives advice on reasonable steps to target age-restricted advertisements online appropriately, including:

- audience composition: marketers promoting HFSS products on their website should ensure they have a sound understanding of the composition of their audience and, ideally, hold data showing that no more than 25% of the audience is under 16; and
- interest-based targeting and additional data points: the ASA expects marketers to make full use of tools such as interest-based targeting or targeting advertisements at users who have a store loyalty card or credit card (and are therefore over 18), particularly given that it is possible for younger users to misreport their age.

The first bans on online marketing (such as advergames) inappropriately targeted at children were levied in July 2018.[23] The ASA's Committee of Advertising Practice has announced a review of these non-broadcast rules, including investigating "media monitoring to assess key media environments popular with children" (which is also the aim of the CLICK framework outlined in section 3 of this report); and "an analysis of ASA and Ofcom enforcement activity in relation to TV ads for HFSS products, with a view to considering their implications for non-broadcast regulation".

1.6.3.2 United Kingdom: Information Commissioner's Office

In the United Kingdom, the Information Commissioner's Office (the country's data protection authority) was required by the Data Protection Act 2018, which supports and supplements implementation of the GDPR, to issue an Age Appropriate Design Code for online services by the end of 2019. The Code should provide guidance on the design standards that online services are expected to meet, if these process personal data and are "likely to be accessed" by children (defined as those under 18 years, as per the UNCRC). The Act requires the Commissioner to have regard to the fact that children have different needs at different ages and refers to the United Kingdom's obligations under the UNCRC – and thus to the obligation to consider the child's "best interests". These parameters – that online settings likely to be accessed by children under 18 years are expected to consider their best interests – provided the basis for external submissions that proposed that no profiling or targeting of children with behavioural advertising should be permitted.[24] At the time of writing this report, it remains to be seen what the Code will advise. If it makes a recommendation that it is contrary to children's "best interests" to be targeted behaviourally by advertisers, the regulatory landscape could change.

1.6.3.3 Ireland: voluntary code of practice

In December 2017 the Department of Health in Ireland issued a voluntary code of practice to limit the promotion, marketing and sponsorship of HFSS foods and to encourage healthy eating.[25] The code includes a specific social media-related provision: "Marketing communications for HFSS food by means of social media shall not target children under the age of 15." It also includes a commitment to monitor "for compliance and effectiveness by a monitoring body designated by the Minister for Health", which would include investigating complaints and taking remedial action. To date, however, no such body has been constituted.

In November 2018, the Houses of the Oireachtas (Irish Parliament) Joint Committee on Children and Youth Affairs issued a report on tackling childhood obesity that recommended that the government should "prioritize the establishment of an independent monitoring body ... so that the compliance with and the effectiveness of this code of practice can be ascertained".[26] However, it remains unclear how and when such action will be taken – or how much practical difference it will make (the effectiveness of such a body will depend on use of a monitoring system such as CLICK).

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* It should be noted that public health experts have argued that these examples have weaknesses and do not provide the full protection required by children (*Evaluating implementation of the WHO Set of recommendations on the marketing of foods and non-alcoholic beverages to children.* Copenhagen: WHO Regional Office for Europe; 2018).

1.6.3.4 Finland: alcohol advertising

In 2015 Finland banned some forms of marketing of alcohol products on social media (although formal monitoring is not currently in place); the prohibition covers (for example) taking part in games and cases where an advertisement uses content produced by consumers. If prohibited advertising is detected, the supervisory authorities provide guidance on correcting the breach; if this is ignored, a provisional prohibition on advertising activities is issued; and if this is not actioned, then the company's business activities may be blocked, requiring corrective action within a set timeframe.Given that children are likely to be exposed to advertisements even if they are not specifically targeted at them, the guidance will currently be of only limited use – and no fines have been issued to date. However, it serves the purpose of normalizing regulation and could pave the way for further regulation internationally. As Ismo Tuominen of the Finnish Ministry of Social Affairs and Health explained in October 2018:

Finland has novel restrictions on new forms of alcohol marketing on social media – and we are aware of the limitations of this regulation, notably that one country alone cannot effectively ban global advertising activities. However, our experience shows that there are ways to target inappropriate advertising methods – i.e. using games and competitions or peer-to-peer sharing of advertising. We are at an important crossroads: these restrictions could set the scene for further regulation, both in Finland and in other countries. In my opinion countries need to try different approaches and share their experiences in an "evolution" process. If more and more countries refuse to just monitor the changes in new advertising techniques, new regulatory inventions are inevitably developed!

1.6.3.5 France: alcohol and tobacco policy

The French law of 1991 on alcohol and tobacco policy (Loi Évin) regulates advertising of tobacco and alcohol products. The law prohibits advertising targeted at young people and requires that alcohol advertisements must include a health warning. A key measure controls advertising contents: advertising contents not specifically permitted are prohibited; and permitted contents include qualities such as origin, composition, means of production and patterns of consumption.*

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* Note that in Finland a "negative" list bans specific forms of advertising, while in France a "positive" list sets out what can be advertised. The latter approach leaves fewer loopholes for exploitation.

1.6.3.6 Norway: self-regulatory scheme and guide

In Norway a self-regulatory scheme covers all forms of marketing specifically aimed at children under 13, including social media (such as chat services, blogging tools and internet communities), games and play sites, and web pages that market products specifically aimed at children. In 2018 the self-regulatory body responsible for overseeing the scheme published a guide on marketing and social media: "It reminds advertisers that, despite the age limits for using social media (typically under 13), they should not automatically assume that an advertisement would not be considered to be targeted at children under 13."[27]

1.6.3.7 Spain: co-regulatory code

In Spain the existing co-regulatory code was updated in 2012 to cover marketing on the internet directed at children under 15. There are rules on content, and marketing to this age group is defined by the type of product, design and attributes of the marketing communication, venue of dissemination, and whether a website has an audience of more than 50% children under 15. However, no nutritional criteria are applied.

2. How media is bought: the digital marketing ecosystem

2.1 The growth in digital marketing

The spend on digital marketing is increasing year on year and has now overtaken the spend on TV advertising, as money follows our eyes onto smaller screens. Digital marketing is also very cheap, relative to TV advertising – although the latter remains very powerful as part of an integrated campaign including digital, mobile and social media. It often takes between four and seven exposures to an advertising message before behaviour is changed (although experimental evidence shows that there can be a change after a single exposure), and digital media can amplify other media by a factor of four. The growth in global mobile advertising has been particularly striking, increasing from an estimated US$20 billion in 2013 to US$200 billion in 2018. Fig. 2 shows the growth in digital advertising spend across EU markets in 2015–2016.

Fig. 2. Growth in digital advertising expenditure in EU markets, 2015–2016

millions of euro (€)
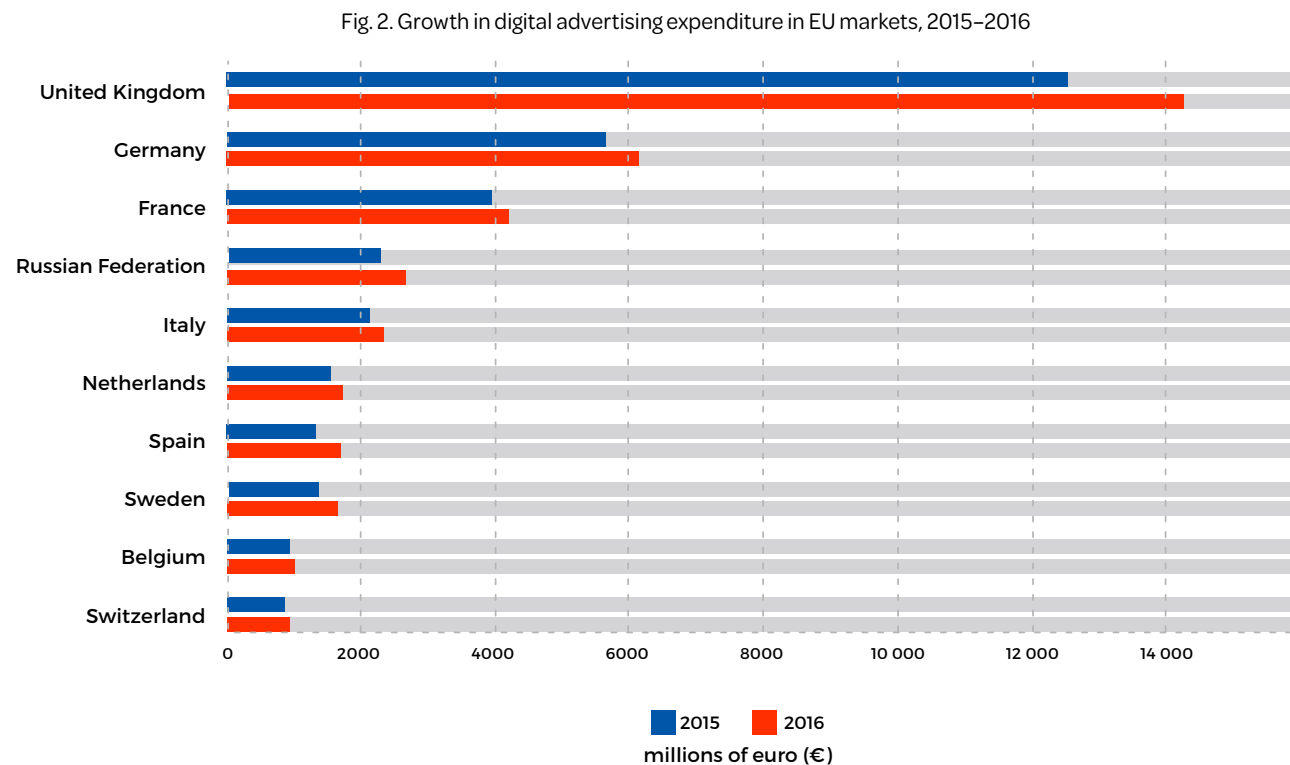
Source: House of Lords Select Committee on Communications[28]

2.2 The original digital marketing system

Until recently, most digital advertising was not targeted at individual users. As in the era of broadcast TV and print advertisements, agencies bought large-scale audiences, often chosen by the content they were consuming, and all consumers of that content would see the same advertisement at the same time. With the advent of digital advertising (on desktop and mobile, and now on TV, audio and outdoor), there is the technical capability to send a different advertisement to each consumer (and to target additionally by context, time, etc.) at the point of content delivery, based on the individual characteristics ("data") of that individual customer or ad impression.The original form of audience media buying still predominates in some EU and other developing markets – buying and selling of digital advertisements takes place directly between advertising agency and publisher and/or their agencies. The ad agency contacts the publisher (a newspaper, for instance) to request placement of a specific number of advertisements on the publisher's site. The publisher sells the ad agency the space and the ad agency sends the publisher the digital assets, which are then added to the publisher's website. Viewing of advertisements ("ad impressions") is on a rotating basis and entirely untargeted: anyone coming onto the publisher's website may (or may not) see a specific advertisement.

2.3 The programmatic marketing system

In recent years there has been a significant global shift towards automated buying and selling of targeted advertising impressions, known as the "programmatic" system of advertising.* This shift is due to the fact that targeted advertisements perform better in terms of driving an action (a "click" on an advertisement or greater "brand awareness"), because only those customers who are the targets of a particular advertisement receive ad impressions from that campaign. The programmatic ecosystem is supported by numerous advertising technology companies, which connect publishers and brand/agency campaigns in real time.

Programmatic advertising uses data about individuals to target appropriate advertisements on an impression-by-impression basis, rather than broadcasting the same advertisements to aggregated audiences. For this reason, programmatic advertising has the potential to be much more efficient from an advertisers' perspective: advertisements should have greater value – higher click-through rates or brand engagement (see Box 8) – because they can be tailored to individual users, who see advertisements that build on existing interests and are more likely to make a purchase.

> ### Box 8. Metrics of advertising reach
>
> - total views (though a large number of views without further conversion is not in itself a sign of effectiveness)
> - click-through rate (the proportion of users who click on a specific link)
> - engagement (likes, comments, etc.)
> - sentiment analysis (see section 3.2.3)

Because the profits in programmatic advertising rely on successfully matching advertisements to individuals' data, accurate personal information has become much more valuable in the digital advertising ecosystem (Box 9). Programmatic media buying began in the United States but now accounts for the greater part of digital advertising spend in most European markets (led by the United Kingdom, France, Sweden and the Netherlands).

> ### Box 9. The value of data
>
> Companies value data because they value information that:
> - delivers consumers advertisements that are targeted;
> - allows media spend to be better targeted at promoting brands;
> - increases the value of space on publishers' sites; and
> - allows ad tech companies to design the technology to deliver (and control) the marketing ecosystem.

Some of the major players, such as Facebook and Amazon, operate their own closed technology systems (Boxes 10 and 22), while other publishers sell their advertising space on the open ecosystem (which is set out in sections 2.3.1–4). There is also an ongoing, massive growth in mobile advertising, which has now surpassed online/desktop display advertising in most markets, as consumers (especially children) spend more time and consume more content on mobile devices. A recent (2017) study on the proportion of time that people spend on different media showed that they spend just 4% of their time on print media, compared with 36% watching TV, 18% on desktop/laptop and 29% on mobile devices.[29] The proportion of advertising spend on mobile devices in the United States is predicted by eMarketer to rise from 33.9% of the total in 2018 to 47.9% in 2022.[30]

> ### Box 10. Beyond programmatic: Facebook, Google and Amazon
>
> Between them, Facebook, Google and Amazon enjoy a large share of the digital media spend, but they operate under closed systems outside the wider programmatic ecosystem. Each controls its own user data and has its own ad technology. This allows them to capture value at all stages of the value chain, and – in theory – it makes them simpler to work with, as they have much greater control and ability to track the advertisements that appear on-screen. However, they operate within "walled gardens" (Box 22) and are generally reluctant to share their information.
>
> The involvement of these online giants will be needed to ensure that advertisements for inappropriate products are not seen by children. There are precedents for this: for example, in June 2018 Facebook took steps to ensure that children in the United States would not see advertisements for gun accessories. However, accurate age verification will be needed to ensure that parents do not inappropriately consent to children joining the platforms before they reach the required age.

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* Note that this section sets out the programmatic marketing system generally – it does not relate specifically to children or to unhealthy product categories.

2.3.1

The supply side: how an advertisement reaches you

Fig. 3. Programmatic ecosystem: supply side

- When you click through to a publisher's website (e.g. a newspaper), as it loads, a request is sent from the website to one of the publisher's chosen supply side platforms (SSPs); the SSPs manage the selling of the publisher's advertising space, with the aim of maximizing the price at which it is sold. This request is known as an "ad impression".
- The request for the advertisement carries an advertising identifier that allows the programmatic ecosystem to identify the person or device by which the ad impression is generated.* These data attributes could include age, gender, home and work location, and online browsing and app usage habits.
- The SSP then submits the ad request to an ad exchange, and the process of selling and buying the ad impression begins. A proportion of these ad impressions will have been pre-sold or allocated to certain campaigns or brands, but most will be available to be bought in real time.

2.3.2

The demand side: where an advertisement comes from

Fig 5: Programmatic ecosystem: demand side
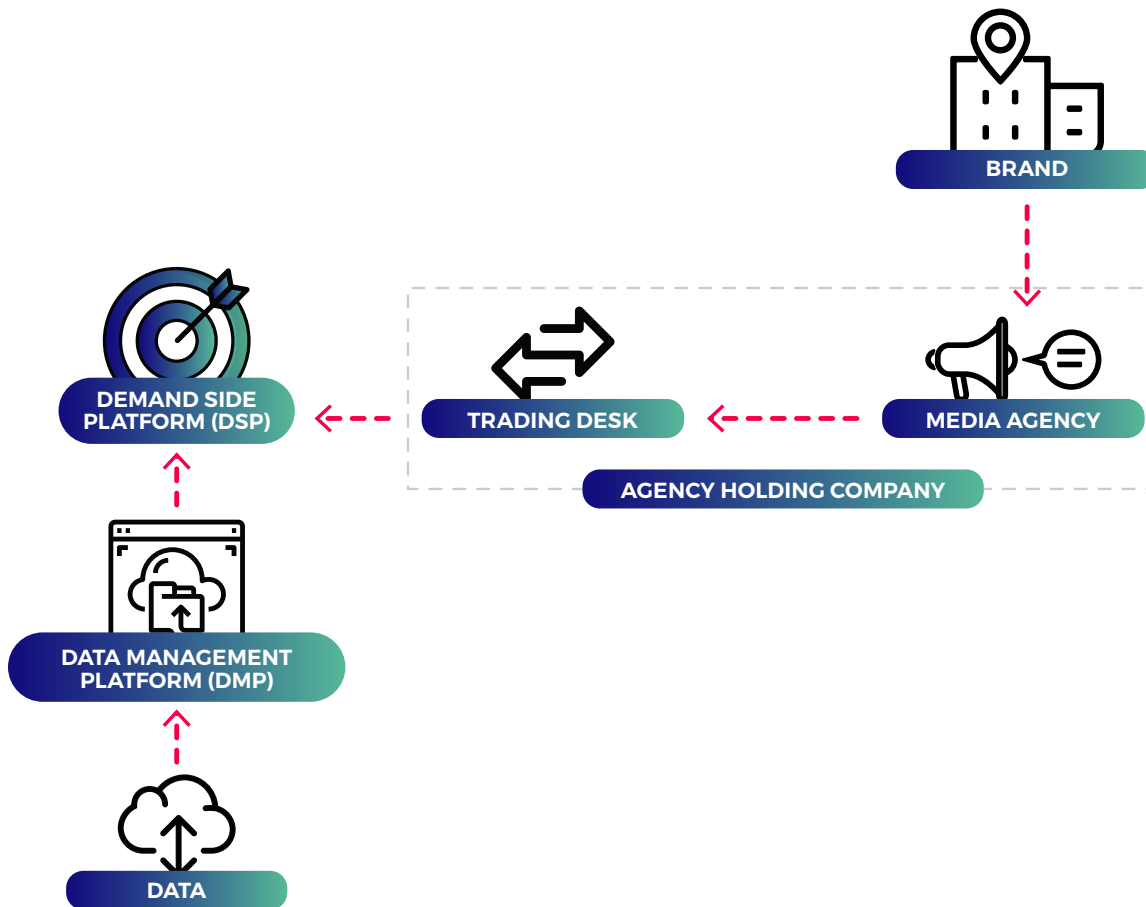
- Brands use media agencies to design and run their advertising campaigns. These agencies have in-house teams called "trading desks". At these trading desks, early-career advertising executives are tasked with ensuring that ad impressions are bought from different ad exchanges and publishers as cheaply and efficiently as possible; essentially, their job is to ensure that advertisements appear on the devices of a suitable target audience at the lowest possible cost to the brand.

- Agency trading desks use technical online tools called demand side platforms (DSPs) to carry out their strategies to buy, serve and track advertisements. The DSP allows the ad executive to tag each ad campaign with information that ensures that the brand's advertisement is sent only to users who are likely to have an interest in buying (e.g.) high-sugar beverages – for example, young people, male or female, who have visited sports or fashion websites in the last three months.

- Once the advertisement has been tagged and the ad impression bought from the publisher, the decision is made about which campaign to send to that device/ad impression by comparing the campaign with data attributes held against that device ID. These data are stored either within the DSP or separately on a data management platform (DMP); this is a library of anything up to about 200 data points about individuals which have been collected from other data sources and "cleaned" (i.e. any data that are incorrect, incomplete, improperly formatted or duplicated are amended or removed). The DSP checks the identifier embedded in the ad tag against the DMP's data about consumers to ensure that the best match is made.

* This identifier is later used by the media agencies through the DSP bidding tools to match against databases of information about particular individuals or devices collected over time by various parties to better enable the targeting of advertising – in this case, to target the ad to your interests as demonstrated by previous internet use.

2.3.3

Supply and demand

Fig. 5. Programmatic ecosystem: supply and demand
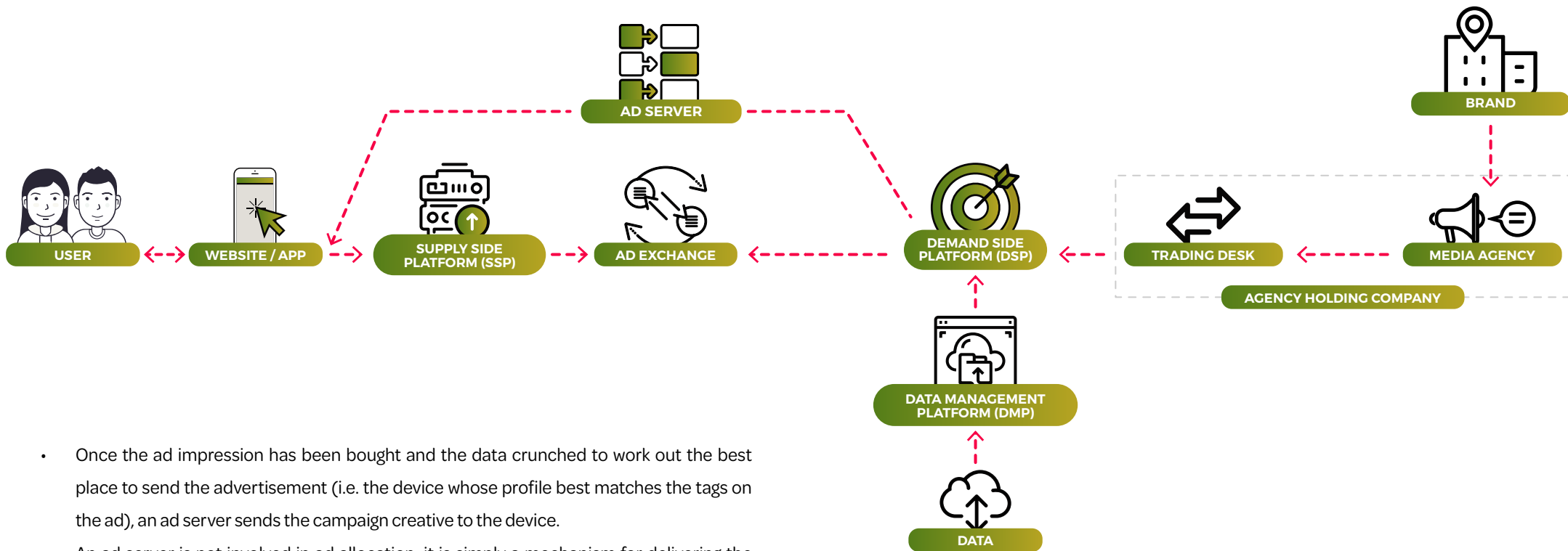
- Once the ad impression has been bought and the data crunched to work out the best place to send the advertisement (i.e. the device whose profile best matches the tags on the ad), an ad server sends the campaign creative to the device.

- An ad server is not involved in ad allocation; it is simply a mechanism for delivering the brand's advertisement to the publisher's webpage on your device. It is not possible to track this process.

- Reconciliation of funds from the brand that are paid to the media agency, DSP, ad exchange, SSP and publisher is done automatically (further explanation of where the money in the system goes is given in Fig. 7).

2.3.4 The bidding process

The process described so far is oversimplified – it is complicated further by a bidding process in which the advertisement you see on your device is selected.

- When the SSP submits an ad request to the ad exchange, the selection process is open to auction: the ad exchange solicits bids to ensure that the ad impression on the publisher's website is sold at the highest price.
- The trading desks, in turn, use bidding strategies to ensure that the advertisements for their many ad campaigns are sold in this auction in the most cost-effective way.

Fig. 6 illustrates the level of complexity involved in this bidding process between the ad exchange and the DSP.

- There are multiple intermediaries at many of the steps of the process: each media agency may use multiple DSPs; each DSP may connect to many ad exchanges; each DMP receives data from many different sources; and each publisher may use many SSPs, which themselves cascade to other SSPs as well as selling to many ad exchanges.
- At each stage, multiple requests are put out, so the actual decision process leading to the advertisement going from the brand to the space on the publisher's page (shown in red on Fig. 6) is almost impossible to monitor or predict – the advertisement on your screen could have appeared there by following countless different routes.*

This means that neither the brand, nor the media agency, nor the publisher can say with certainty which advertisements have been served to whom.

The whole process (requesting content, and choice of content, to whom it will go and at what prices) takes less than 250 milliseconds to complete and is known as real-time bidding. When we are online, there is a very complex bidding process (like the stock exchange) to deliver advertisements to our devices – in other words, to get our attention.

* Fig. A2.1 (in Annex 2) maps out the advertising ecosystem in the United Kingdom.

Fig. 6. Programmatic ecosystem: the bidding process
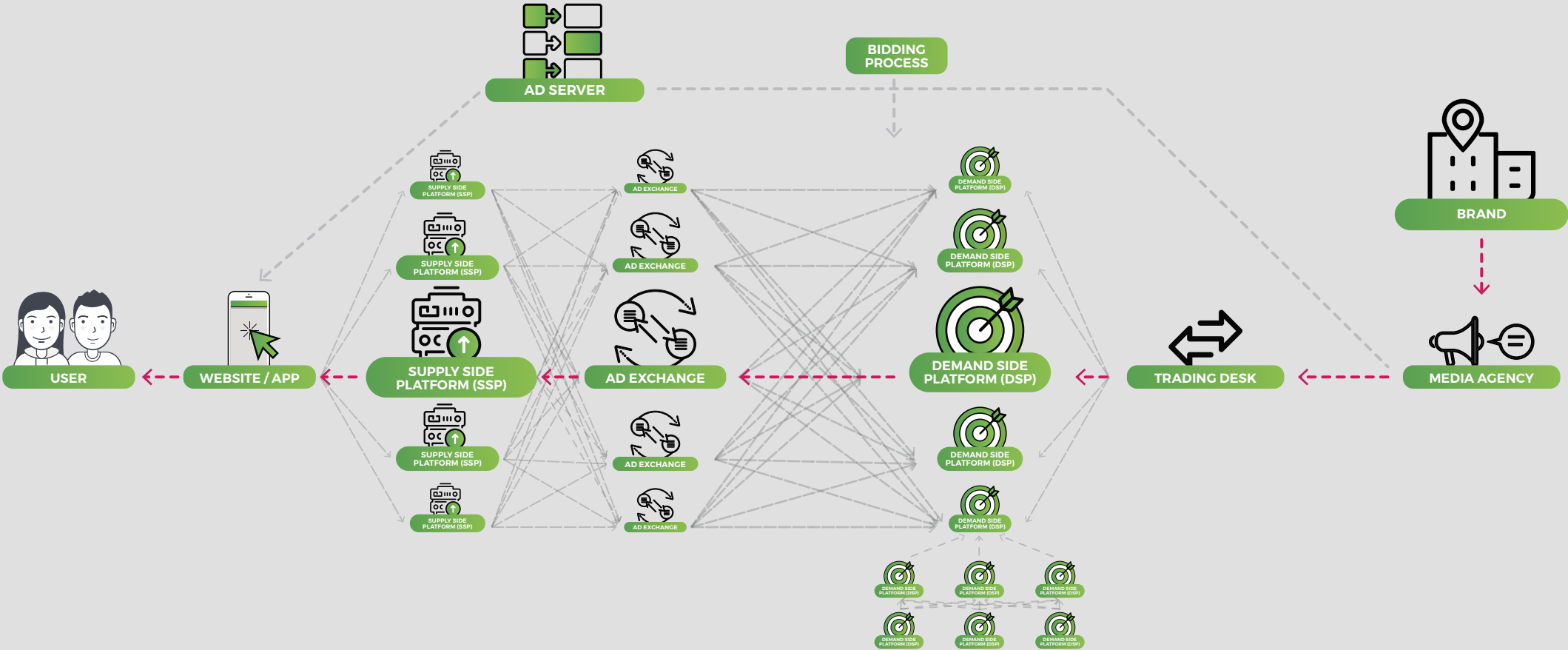
2.4 Limitations of the current programmatic advertising ecosystem

The underlying purpose of programmatic advertising is simply to deliver efficiencies and buying scale for brands, as a real-time market is the most efficient way to balance supply and demand for available advertising inventory. There is no longer the expense of negotiating ad rates, fewer sales people and ad buyers are needed, and use of individual data and a bidding system makes it less likely that a paid-for impression will be wasted. A wasted impression, from the brand perspective, is one that does not lead to positive brand equity or sales.

2.4.1 Problems for brands and publishers

The digital programmatic advertising ecosystem has not evolved smoothly or optimally. It has developed rapidly and unsystematically over the last 10 years, as mobile and digital advertising spend has exploded, with the result that the ad tech ecosystem has become highly fragmented (Fig. 6 gives an indication of this complexity). Ad spend is becoming increasingly focused on Google, Facebook and Amazon, yet publishers and brands/agencies continue to want the option to buy website space outside these "walled gardens" (Box 22). There are also significant inefficiencies and flaws in the structure of the current ecosystem that cause problems for brands and publishers themselves.

2.4.1.1 Cost inefficiencies

There are multiple players across the system, each of which takes a cut of the advertising spend (Fig. 7). Only just over half of every US dollar paid by the brand is received by the publisher, with the rest going to the various intermediary agencies and platforms. The trend is for less to be spent on the intermediaries (DSP and SSP) and more on improved algorithms for targeting data.

2.4.1.2 Systemic inefficiencies Repeat exposure to advertisements.

Because of the complexity of the system, the same advertisements may be sent to a single user on the same website more

Approximate ad spend as a proportion of the total.

Advertiser	Ad agency	DSP	Ad server	Targeting data	SSP	Publisher
100%	6%	12%	1%	9%	15%	58%

Fig. 7. Breakdown of advertising expenditure between publisher and other players

This figure shows how each dollar of advertising spend is distributed among the various players involved, and is based on a 2016 study by the US Association of National Advertisers and others.[31] However, it is more illustrative than precise – and there are indications that targeting data has already risen to 25% of media value, with DSPs declining to 5–8% and SSPs to 5–8%.

↑ **Strong trend**

↑ **Weak trend**

than once, because they have followed different routes through SSP, media agencies and DSP. Although DSPs use a frequency capping feature to prevent the brand from paying more than once for a customer to see the same advertisement, one-to-one matching of customers to advertising is not assured.

Fraud. Advertising fraud is rife. For example, false ad impressions are sent to ad exchanges by "bots" and server farms, which replicate real ad impressions from SSPs. There is also significant inventory fraud where ad space is sold on fraudulent sites that imitate the URL of a domain owner. In some developed markets it is estimated that only about 60% of ad impressions are real, while the proportion of fraudulent advertisements in emerging advertising markets is even higher.

Viewability. This is more an issue for the brand/agency demand side: basically, agencies may buy display advertisements that appear on a website but are "below the fold" (and hence not viewed), or video advertisements may simply be skipped.

Brand safety. This is also a major concern for brands. They want to restrict their advertisements being served in the context of certain content themes or categories, but they do not know on which website or in which context their advertisements are displayed, so the quality of publishers cannot always be guaranteed.

Lack of transparency. As a consequence, there is a major push in the industry towards greater transparency in the supply chain: to put a unique publisher tag on each and every ad impression at source to prevent fraud and reselling of inventory.

2.4.1.3 Privacy issues

There is a tension between the need for customer data privacy (gaining consent under GDPR regulations) and enabling efficient buying of advertising to fund publishers' websites and content production. Processing a user's personal data in compliance with the GDPR requires close cooperation between players across the ecosystem, with consistent standards to determine how data are processed. Currently, however, this cooperation is not adequately in place.

2.4.2 Problems in context of marketing unhealthy products to children

Programmatic marketing is particularly problematic because it continues to deliver marketing of unhealthy products to children. Although the programmatic approach can target advertisements to individuals, there are no reliable "tags" that can link a certain group of people (children) to a certain category of products (unhealthy products). One way to alleviate this problem is ad blocking, but at present most users do not opt in to this facility (Box 11).

Lack of age-verified data. There is no reliable source of verified age data available, either within a specific country or consistently across countries. The widely used practice of using panel-based data is too inaccurate when extrapolated to full populations (its accuracy on age and gender data is estimated at just 35% against a reliable truth set). Mobile network operators, which have age data at least for the person who pays the bills, have yet to work out how to provide this information to the real-time programmatic advertising ecosystem in a secure and scalable way. National registry card schemes and other verified providers of identity data are not yet at scale or the data are not available in real time to advertisers. What is needed is an age-verified data "tag" on an ad impression; this would make it possible to identify which ad impressions were requested by younger age categories when they appeared on the ad exchanges. Currently, therefore – while such tags are not available – there is no reliable way to measure, monitor or prevent serving of particular advertisements to children.

Lack of consistency in tagging. There is also no consistency in the tags used to categorize ad campaigns, either between or within media agencies, which makes it difficult to distinguish the product category being advertised. This means that gathering consistent data about (for example) campaigns for unhealthy products is far from straightforward. Also, compliance with a standardized industry categorization is difficult to enforce: if the ad executives responsible for tagging are simply hoping to increase the reach of a campaign, using very broad tags increases the number of ad impressions bought at auction (although by making an advertisement seem relevant to a larger number of users, they risk making the campaign less well targeted and less effective). Hence, there is little incentive for them to tag accurately.

Also, in order to ensure there is a perfect match between a particular brand/product campaign and a certain age group, both an age tag and a brand category tag need to be attached to each individual ad impression (more on this issue is given in section 4.2).

Fig. 8. Ad blocking in the programmatic ecosystem

USER

WEBSITE / APP

AD BLOCKER

SUPPLY SIDE PLATFORM (SSP)

AD EXCHANGE

DATA MANAGEMENT PLATFORM (DMP)

DEMAND SIDE PLATFORM (DSP)

TRADING DESK

MEDIA AGENCY

AGENCY HOLDING COMPANY

BRAND

Defining "unhealthy" products. A further layer of complexity is that the definition of an unhealthy product may vary between different countries. This is both because countries use different nutrient profiling systems and because they may change their nutrient profiling over time to reflect new dietary recommendations. Basing tagging on a regional nutrient profile system would provide greater consistency. (For more on tagging, see section 5.2.2.)

Lack of transparency. Finally, and crucially: because of the complexity of the system, it is currently impossible for *any* of the organizations involved in this multi-step process (publisher, media agency or brand) to know which advertisements an individual user actually sees on their device. No one – not even the brands themselves – can measure exact exposure to ad campaigns: they cannot assess which people actually view their advertisements, nor where they are, nor on what device they view them. Or – crucially – which of those viewers are children.So, even when companies make voluntary agreements to restrict their marketing to children, in the current ecosystem no brand (or other agent) has the power to fully control the process – and paid-for advertisements continue to be viewed by children online.

Box 11. Ad blocking

Ad blocking of all advertisements on a specific publisher's website on a specific device is relatively straightforward technically (Fig. 8). Users can opt in either to a browser-based ad blocker (e.g. in the Safari or Chrome browsers) or to an app-based ad blocker that can be downloaded on a mobile device; these blacklist particular IP addresses and prevent advertisements appearing (although this only works on http websites, not https). Network-wide ad blocking – telecoms companies preventing all advertisements from reaching users through their mobile network or broadband provider – has been ruled illegal in the EU and in many other markets under net neutrality legislation. It is therefore up to individual consumers to decide whether to install ad-blocking software on their browser or devices. Worldwide, over 615 million devices are now blocking some advertisements; 6% of users in the Russian Federation use an ad blocker, 11% in France, 16% in the United Kingdom and 25% in Denmark.[32]

Ad blocking is only legal if activated by the consumer on the device or at the point of purchase/subscription. Under the GDPR, if a child is under 16, it is necessary for the parent to give consent on behalf of the child – which can extend to parental controls (blocking publishers), ad blocking (blocking ads) or use of data (stopping ad targeting). (To take the example of blocking advertisements on newspaper pages, users would need to opt in separately to block advertisements on The Guardian, The New York Times, Le Monde, etc.) It is also a blunt instrument, blocking all advertisements on each specific publisher's website, whether they are age-appropriate for children or not.

2.5 Putting programmatic advertising to good use

The programmatic ecosystem as it is now organized does not adequately protect children from exposure to advertisements for unhealthy products; it also leaves brands unable to comply with their own voluntary codes of conduct such as the EU Pledge.* There is also currently pressure from brands and agencies for increased transparency and efficiency, as well as calls from publishers to have an increased and fairer share of the overall advertising spend. This climate, combined with new regulation on data privacy and consent, is forcing changes to the programmatic advertising ecosystem, which is now in a state of rapid flux.

One solution could be to set up an advertising system that is specifically geared to the needs of children (Box 12). But this will only be a partial solution, and changes are needed to reform the ecosystem as a whole. Because the rules around mobile and video programmatic advertising are currently being rewritten, now is a perfect opportunity to develop a better system that works in the interests of public health. A crucial part of this involves restricting children's access to inappropriate and harmful advertising; and to this end, it is vital to push for the inclusion of age and brand category tags in the future ecosystem.

Box 12. A programmatic ecosystem for children?

Efforts are currently underway to establish a new programmatic ecosystem specifically for children. Publishers of children's websites are being invited to join the new system, in which only age-appropriate marketing is viewed, advertising for certain products (e.g. HFSS foods and alcohol) is excluded, and user data are not collected.
However, these rules only apply to the specific websites that have joined the ecosystem. They do not cover websites not explicitly aimed at children, and many of these (such as YouTube) are frequently visited by young people, so the impact of the initiative will be limited.

The CLICK tool (section 3) sets out how governments can begin to monitor the extent to which children see digital marketing for unhealthy products. Section 4 then sets out some Proposed Policy Prerequisites for a protocol by which programmatic advertising could be used in such a way as to prevent children from seeing advertisements for inappropriate products, ranging from gambling to tobacco, alcohol, and HFSS foods and beverages.

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* The EU Pledge (http://www.eu-pledge.eu) is a voluntary initiative on the part of food and beverage companies (which together account for over 80% of food and beverage marketing spend in the EU). In the pledge they commit to "No advertising for food and beverage products to children under the age of twelve on TV, print and internet, except for products which fulfil common nutritional criteria"; and "No communication related to products in primary schools, except where specifically requested by, or agreed with, the school administration for educational purposes."
In December 2016, the EU Pledge widened its focus to include product placement, interactive games, and mobile and SMS marketing. However, it has been criticized for being too weak (Huizinga O, Kruse M. Food industry self-regulation scheme "EU Pledge" cannot prevent the marketing of unhealthy foods to children. Obes Med. 2016;1:24–6); and it still does not restrict use of equity brand characters, apply to in-store promotions and packaging, or cover brand marketing. Further pledges exist around the world (there are various databases that list countries that have made such pledges).

3. CLICK: the monitoring framework

Nearly a decade after the 2010 WHO *Set of recommendations on the marketing of foods and non-alcoholic beverages to children*,[33] exposure of children to marketing of many unhealthy products remains ubiquitous. The Political Declaration of the Third High-level Meeting on NCDs, approved in October 2018, commits United Nations Member States to "implement cost-effective and evidence-based interventions to halt the rise of overweight and obesity, in particular, childhood obesity, taking into account WHO recommendations and national priorities"; it also calls on the private sector to commit to "take concrete steps, where relevant, towards eliminating the marketing, advertising and sale of alcoholic products to minors" and to "further reduce exposure of and impact on children of marketing of foods and beverages high in either fats, in particular saturated fats and trans fats sugars or salt, consistent with national legislation, where applicable".

However, there is currently only very limited understanding and monitoring of the extent to which children experience online marketing. Even where voluntary restrictions are in place (such as the Irish voluntary code of practice; see section 1.6.3.3), the complexity of the online marketing

> **"Digital marketing happens everywhere except where parents, teachers and regulators are – and we can't see it. We need to find a way to get access to the experience children are having."**
>
> Dr Mark Grindle, University of the Highlands and Islands, United Kingdom

ecosystem means that it is impossible to know who has seen marketing campaigns for unhealthy products.There is an urgent need for a cost-effective monitoring tool to establish, as far as possible, the reality of children's digital exposure (Box 13). This will make the case to national governments that action is needed to protect children not just from advertisements for HFSS foods, tobacco and alcohol, but also from gambling and other harmful online content.

> **"Monitoring gives us answers for how to regulate."**
>
> Dr Sandra Radoš-Krnel, National Institute of Public Health, Slovenia

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Box 13. What do we need to find out about children's marketing exposure?

- Who is being targeted?
- Who is being reached?
  - age, gender, socioeconomic status, region, device
- By what means (e.g. mobile, video, social, in-game)?
- What is the extent of exposure? – for example:
  - how much time is spent online by children of different ages?
  - what percentage of advertisements viewed by children are for unhealthy products?
  - how many advertisements for unhealthy products are viewed by the average child?
  - what percentage of children of what age are exposed to unhealthy products online?
  - what time of day is advertising being seen?
- What persuasive techniques are being used (the power of marketing)?
- How do children engage with the marketing?

The information would benefit, in particular, from stratification by standardized age band – e.g. ages 3–5, 6–8, 9–12, 13–15, 16–18.

There are, undoubtedly, significant barriers to accurate measurement and assessment of children's exposure to marketing of unhealthy products. To date, outcome measures have largely been self-reported, but recall studies are unreliable, with users often unaware that they are the recipient of advertising (this may be particularly true of children). Objective measurements face major practical challenges, and for this reason are limited to small samples. Panel-based research may significantly skew observed online behaviours during a survey and cause significant inaccuracies when extrapolating to full populations. Experimental designs (such as those using avatars) can only provide a best guess at, or a proxy for, representative children's online behaviour, as they cannot fully mimic children's reactions to advertisements, peers' comments, likes on social media, and so on. Furthermore, platforms such as Facebook keep their data within "walled gardens" and are not willing to share all relevant information (Box 22). It is also important to strike the right balance between the need to gather accurate data and the ethical privacy issues involved in assessing children's online behaviour (see section 5.1.1).

Nevertheless – and in spite of these obstacles – a combination of different methods can give a much deeper insight and richer explanation than is currently available. The aim is not (and cannot be, with the tools available to researchers at present) 100% accuracy, but a stepwise, pragmatic approach that will ensure that evidence is built up over time.

> **"We should be satisfied with generating evidence that raises the red flag about children's exposure."**
>
> Dr Emma Boyland, University of Liverpool, United Kingdom

The data must be trustworthy, because if the information gathered is shown to be unreliable, it will be challenging to rebuild confidence among policy-makers and public health experts. Piloting should be undertaken to demonstrate feasibility and replicability.

This report proposes the five-step CLICK tool to monitor the extent to which children are exposed to marketing of unhealthy products online (Fig. 9), which can be used in all participating markets. The five steps of the tool are explained in sections 3.1–5.

Fig. 9. The Click tool for monitoring children's exposure to marketing of unhealthy products online

CLICK

C — **Comprehend the digital ecosystem**
Map the global, regional and national digital marketing ecosystem and children's website/app usage; alongside this work, set up focus groups to gauge children's and parents/guardians' experience and awareness of marketing techniques and campaigns.

L — **Landscape of campaigns**
Assess campaigns run by leading national brands by collecting information from advertising agencies and by sampling whole-country social media for relevant content to ascertain what is viewed by different age groups.

I — **Investigate exposure**
Map exposure to some paid-for digital marketing experienced by a panel of children in each age bracket using an installed smartphone app that (with consent) monitors and aggregates data on children's interaction with advertisements in some websites and social media.

C — **Capture on-screen**
Use real-time screen capture software on a panel subgroup to assess what a representative sample of children actually sees online on their devices, in order to better understand wider marketing techniques, including user-generated content and product placement.

K — **Knowledge sharing**
Create user-friendly materials from the research data and develop partnerships with young people, parents, policy-makers and civil society, who together can advocate change, raise awareness and influence policy.

3.1 Step 1.

Comprehend the digital ecosystem

Map the global, regional and national digital marketing ecosystem and children's website/app usage; alongside this work, set up focus groups to gauge children's and parents/guardians' experience and awareness of marketing techniquesand campaigns.
Key partners: academic researchers, ministries of health, nongovernmental organizations (NGOs)

The first step is to map the in-country stakeholders and marketing ecosystem and to get an initial understanding of children's online habits.

A proposed template of relevant information is given below (Fig. 10). Although it may not be possible to gather consistent information across countries, capturing as much information as possible will help to build a greater understanding of the ecosystem and the stakeholders who will need to be engaged in the Proposed Policy Prerequisites (section 4).

Stakeholder mapping (with some examples)	
Legislators and policy-makers	
Cross-industry groups and trade associations.	
Ecosystem operators: ad agencies, trading desks, DSPs, DMPs, SSPs.	Information can be provided by the local Interactive Advertising Bureau or Mobile Marketing Association (see Fig. A2.1, in Annex 2, for the situation in the United Kingdom).
National and international regulatory and self-regulatory bodies (e.g. audiovisual regulator and information commissioner).	A list of EU and other European audiovisual regulators has been made available by the European Commission.[34]
Advocacy partners.	For example, consumer organizations and health NGOs (see section 3.5).
Ecosystem information	
HFSS food, alcohol and tobacco sectors.	• Total ad spend by product category and band. • Ad spend on mobile/digital.
Top 10 manufacturers of HFSS food, alcohol and tobacco (by sales volume and/or advertising spend).	• Total ad spend by product category and band. • Ad spend on mobile/digital.
Top 10 unhealthy products/brands consumed by children.[a]	For example, main products consumed, brands – top-selling products serving HFSS, alcohol and tobacco to the population, according to national data.
For the products/brands identified above.	• Total ad spend. • Ad spend on mobile/digital.
Main devices used by children.[a]	For example, iPhone, Samsung mobile phone, iPad.
Main digital platforms (publishers) used by children.[a]	For example, Snapchat, Instagram, Facebook, InContact.
Platform-level usage data for major social media platforms (all ages), measuring reach, profile and time spent on websites and apps.	Can be obtained from relevant agencies in some countries.
Spend by government on public health campaigns on tobacco, alcohol and unhealthy food[b] (or healthy food – e.g. consumption of fruit and vegetables) by category if available.	
Local regulation (HFSS/alcohol/tobacco advertising to children, GDPR, etc.) for each category of products.	List of regulations and key points.

[a] Disaggregated by age.
[b] "Unhealthy food" as defined by the relevant nutrient profile for the region/country.

Interviews with local advertising agencies, publishers and advertising technology companies will help to complete the template. Interviews could also be conducted with other stakeholders, including public health professionals, marketing researchers, policy-makers and others.

Involvement of children themselves should also begin at this initial stage.

- Add relevant questions to national (or EU-level) surveys. For example, it is expected that WHO's Childhood Obesity Surveillance Initiative (COSI) questionnaire will be completed by 300 000 children in 2019;[35] questions on time spent online, device usage, app usage and social media usage/engagement (including the most used social media) could be added at minimal cost.*
- Realization of children's rights includes their right to have their voices heard. This can take place in focus groups and will provide qualitative evidence on young people's understanding of their own exposure to brands and marketing. However, caution is required in

dissemination, as dual-process models of processing indicate that many advertising effects take place outside our conscious awareness.

- As parents need to give consent to data processing on behalf of their children, ascertaining parents' views is also important. They are also voters, so their views are important to policy-makers who make decisions on restricting digital marketing.

Taken together, this first stage should give an initial picture of children's exposure to and knowledge of major brands (particularly those identified in the mapping above), including products that are claimed to be not specifically targeted at children. It should also provide a baseline of data against which subsequent monitoring can be compared. The focus group findings should then inform the way in which subsequent monitoring steps can best be presented to children and families, appealing to children's own interests and concerns in a way that encourages participation in subsequent data-gathering processes.

* The EU Kids Online national reports, due in 2019, will also be relevant.

3.2 Step 2.

Landscape of campaigns

Assess campaigns run by leading national brands by collecting information from advertising agencies and by sampling whole-country social media for relevant content to ascertain what is viewed by different age groups.

Key partners: national governments (legislating), ad agencies and marketers (providing information), academic experts (analysis), civil society organizations (tracking change)

As noted in section 3.1, a scan of national dietary surveys, tobacco surveys and/or other health behaviour surveys and sales data will help to identify the leading brands and unhealthy products* nationally (not just those for which the target consumers are children). The next step is to assess the ad campaigns of the top 10 unhealthy products/brands as a representative sample of the type of advertising to which children are exposed.

3.2.1 Website and brand social media sweep

Manually scanning the websites and social media feeds of major brands gives an initial understanding of in-country and international campaigns. Such a search must go beyond corporate websites, as individual products/campaigns may have their own subsites that contain content aimed at children (or likely to be accessed by children), such as advergames.

Such scanning will inform further investigation and suggest hashtags for use during the data mining stage (section 3.2.3). However, this is not a systematic approach and relevant websites may be missed, so it should be seen only as an initial scoping step, not as a means of gaining a comprehensive picture.

3.2.2 Information from advertising agencies

Given the complexity of the digital marketing ecosystem, even advertising agencies themselves do not have accurate data on where their advertisements appear. However, they can make a best guess and will also have data on the amount of money spent through the online bidding process on each campaign (section 2.3.4). These data will be useful to give an indication of the extent of spend for different categories of products. However, while overall spend is likely to be relatively easy to establish (ad agencies will be willing to give this information), it is likely to be

more challenging to get information on how much is spent on advertising by specific publishers. In addition, lower total costs of advertising over time do not necessarily imply less advertising, as the cost of digital advertising is low.

Systems to gather and share information on campaigns can be regulatory or non-regulatory. Governments can either request or require ad agencies to share information about recent campaigns for unhealthy products to which children will be exposed (this goes beyond products aimed at children because, as already noted, children's exposure to marketing inevitably includes many products primarily targeted at adults). If ad agencies are not willing to share this information voluntarily, legislation could be introduced to require them to do so (see also section 4.3 below). Information gathered would include product type, brand source (does it originate in the home jurisdiction?), language, ad format, devices with which it is compatible, etc.

Further data could be provided by the observatories/hubs that are being established in some countries to manage and share information on industry action such as ad campaigns. Civil society and research bodies have set up observatories to monitor compliance with codes of conduct (for example, alcohol, food, tobacco and gambling restrictions),[†] and WHO is also establishing observatories to monitor tobacco industry behaviour. Information drawn from these organizations could supplement the proposed regulatory approach.

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* As defined either by the national nutrient profile or by the WHO Regional Office for Europe Nutrient Profile Model.
† For example, Stanford University's Tobacco Advertising Resources website (http://tobacco.stanford.edu/tobacco_main/resources.php).

3.2.3 Data mining

Data mining approaches have been developed to scan social media platform content (e.g. on Twitter, Facebook and Instagram) to understand the prevalence and reach of social media brand marketing campaigns. Analysis of social media posts across the social media platforms that are most popular with children can begin to drill down into the content that users see and with which they engage (for example, by using brand or campaign hashtags). Data gathered from social media platforms can be queried for specific time intervals and broken down by demographic (gender, location, etc.); however, it is difficult to disaggregate by age because this is often not known with any accuracy (and parents may have given children permission to use social media below the minimum required age, or children may have done so without parental awareness). Assessing brands and campaigns on social media begins to give insight into what users are interacting with ("liking", sharing, etc.).

There is analytics software available to analyse social media content. This can:

• explore the terms, slogans and hashtags used across relevant topics, times, authors, geographies, languages and demographics;

• perform a sentiment analysis, in which tweet content is categorized according to the occurrence of terms generally perceived as positive, negative or neutral; and

• conduct an emotion analysis, in which tweet content is categorized on the basis of the occurrence of terms pertaining to anger, fear, disgust, joy, surprise and sadness.

A range of keywords or combinations of keywords that describe the relevant terms, slogans and hashtags are used to query and filter out social media posts that are relevant to a specific research question. These can then be filtered by location to find content posted in each of the relevant locations. Overall trends in daily, weekly and monthly volumes of relevant terms, slogans and hashtags

* "Attention" can be indirect – i.e. users with the highest number of followers; or direct – i.e. users with the highest number of mentions (including retweets) and replies.

at regional/national/city level can be examined, and the social media accounts of individuals who are influential in specific areas identified.

By analysing social network structures, the central actors/influencers in marketing efforts may be identified. For example, by scanning Twitter content, promoted tweets and retweeting patterns can be investigated to understand who the central actors are and how marketing messages are being propagated through the platform. This process investigates different types of relationships/messages: a "tweet" – a user tweets without mentioning another user; a "reply to" – a user replies to another user by mentioning them at the beginning of the tweet; and a "mention" – a user mentions another user within the tweet ("mentions" may also include retweets). Network analysis identifies "central users" of Twitter – i.e. those who are most influential or receive the most attention within the network.* These Twitter users can then be checked through their profile and by means of a manual online search. The "centrality" of a user (quantified by the number of individual interactions with other users) and the number of outgoing interactions a user has with others can also be examined. This analysis enables researchers to identify which users

are dominating marketing efforts or discussions; and these users can then be examined to see if they are from companies or from individual user accounts. However, it may be impossible to know for certain if specific influential individuals (such as celebrities) have been paid to promote certain brands.

The advantages of mining social media data are the accessibility and richness of the data it can provide. Many social media platforms can be analysed (e.g. Twitter, Facebook and Instagram). However, there are also possible disadvantages: first, not all children frequent these platforms; second, where they do, their accounts may be set to private, thus raising serious questions over whether it is ethical for researchers to access their data; and third, there may be biases in the type of content communicated by users and subsequently analysed for its content.

Taken together, the website sweep, information from ad agencies and data mining will begin to draw a picture of the ad campaign landscape. This can then be compared with information obtained through the next two CLICK steps, which use technology to take a deeper dive into children's actual online experience.

3.3 Step 3.

Investigate exposure

Map exposure to some paid-for digital marketing experienced by a panel of children in each age bracket using an installed smartphone app that (with consent) monitors and aggregates data on children's interaction with advertisements in some websites and social media.*
Key partners: marketing agencies/universities (recruitment), technology companies (software), researchers (data processing).

The technology already exists to investigate children's exposure to paid-for advertisements on some apps and sites, and this technology has been used both to collect large-scale data (10 000+ users) and on a much smaller scale (e.g. ahead of a focus group). Pre-installed software automatically captures data from individual devices (smartphone, tablet, PC or Mac) that belong to people taking part in opted-in research panels; it does not rely on manual assessment of the content viewed on-screen, which can be a very resource-heavy task.

The data that can currently be captured include:
- the amount of time spent on each platform (this provides valuable information about children's online habits);
- for some apps and sites, the number of advertisements clicked;
- for some apps and sites, the brand advertised in every advertisement with which the child interacts;
- every event – for example, whether a video advertisement is played, paused, skipped after five seconds, etc.;
- whether an advertisement is paid-for or user-generated; and
- the likely content of any banner advertisement (as the campaign URL is embedded within the banner).

The recommended approach does not assess full exposure to advertisements: it can only assess paid-for content on certain channels such as YouTube, as it can only capture advertisements on which children click or where autoplay is enabled (i.e. the advertisement has to be served to the device). However, in spite of these limitations, this method can give an indication of the brands with which children are engaging and an insight into the content that is being shared among peers.

Box 14. Paid-for and user-generated content

- "Paid-for" content is marketing material for which brands pay to appear on publishers' websites."
- Earned" or "user-generated" content is material that is shared by users through online platforms and for which no payment is made. Manual assessment of user-generated material is required to distinguish the content – for instance, to identify a photograph or video of a friend drinking a branded soft drink.

The approach in this report focuses on paid-for advertising.

"The recommendations of influencers or 'vloggers' are trusted by children more than overt brand advertising. And while, in the United Kingdom, the Advertising Standards Agency has warned marketers that failure to clearly signpost advertising is a breach of standards, over a third of marketers do not adhere to this, either because of a lack of awareness or because they do not want to be fully transparent about what they are doing."

Dr Mimi Tatlow-Golden, The Open University, United Kingdom

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* Given current technology, an approach that focuses primarily on children's exposure to paid-for advertisements is more practical and rapid than assessing total brand exposure. However, deep-dive screen capture (section 3.4) will also give an indication of the ubiquity of product placement and peer sharing. Consideration should be given to the limitations of the current methodology when reporting findings.

The process involves the following steps.

1. Define the audience and enrol a sample of children (across all age groups from early childhood to age 17) and their parents. This could be undertaken by a research institute – for example, the research teams that recruit for WHO's COSI scheme, which operates across 40 countries and has reached 350 000 children in the WHO European Region.

   WHO could play a role in facilitating this part of the process: clear information will be required to encourage participation (see section 3.5) and a small financial incentive may also be needed. Using a third-party agency can also be helpful in ensuring compliance across the time period of the study.[*]

2. Gain parental consent and that of the child (as appropriate to the child's age).
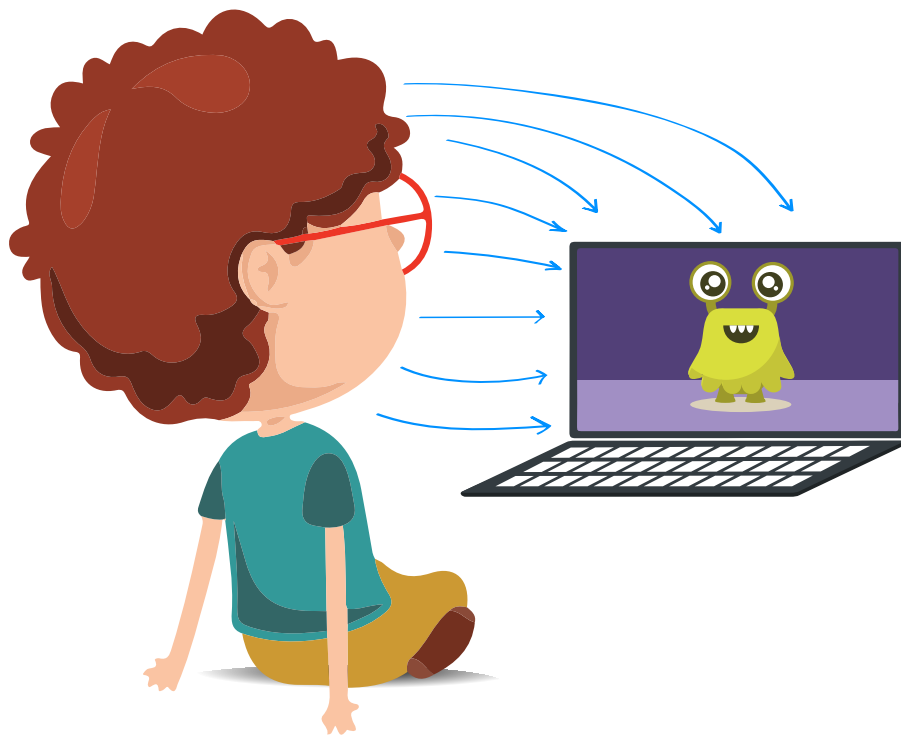
   For consent to be valid and to comply both with requirements of ethics review committees and with data protection laws applicable to each country, there must be full disclosure of the data being gathered, how they will be used and by whom, and how long they will be stored.

3. Install the app (sent by text message or email to the device or devices used by the child) and remotely collect the data. The app must be compatible with the most popular devices among children in the country, as established in section 3.1.

4. Structure the information into a useable format and analyse the anonymized metadata, disaggregated by age group. This is likely to be undertaken by universities that have ethical clearance to work with children.

By the end of this process, each country should have a realistic overview of some of the platforms most commonly used by children, the time they spent on these platforms, and their exposure to paid-for advertisements. However, paid-for content is only part of the story: for a more complete understanding of children's online experiences, we need to look through their eyes at what they actually see on their devices – the aim of the next step in the CLICK process.

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[*] The third-party agency is the only organization that can identify users; by the time the data are passed for analysis (e.g. to an academic partner), they must be anonymized.

3.4 Step 4.

Capture on-screen

Use real-time screen capture software on a panel subgroup to assess what a representative sample of children actually sees online on their devices, in order to better understand wider marketing techniques, including user-generated content and product placement.

Key partners: universities (recruitment), qualitative researchers (focus groups and content analysis), quantitative researchers (data processing and content analysis)
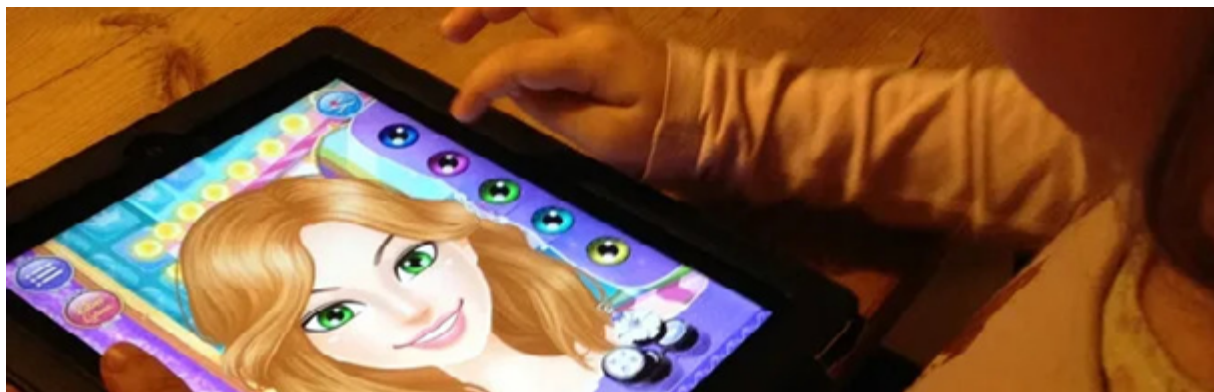
Software is available that offers real-time video capture of all information that is seen on-screen, allowing a much deeper dive into a child's overall online exposure to brands. As it captures all the content a child sees on-screen, it includes "earned impressions" and all campaigns that encourage sharing of user-generated images from peers or from social media influencers such as Instagram celebrities. It can also capture unbranded content and product placement. Experience suggests that older children (aged 12 and over) may be the best target for this research.

This stage of the CLICK process is important, as pilots of this software suggest that earned media exposures are just as prevalent as paid promotions in children's online experience.

This step therefore gives an insight into the pervasiveness of marketing.

In light of privacy and data security concerns, it is absolutely essential that screen capture is only used where there is explicit opt-in consent of the child and (for younger children) parent. Such consent can be revoked at any time.

This procedure requires cataloguing of image and video advertisements into brand and product categories, which can sometimes prove an insurmountable task. Open-source image recognition software is available from Google and others; it is important to note that matching of captured images against an image library is required to categorize the marketing campaigns seen by children.

Box 15. Exposure to ads

The data that can be captured while a child watches a video on YouTube include:
- the length of time for which the child watches video
- the child's location
- the YouTube channel
- the advertisements that autoplay before, during and after the video (time/date/duration stamped)
- the banner advertisements
- any interaction by the child with the advertisements (pause, skip, etc.).

Box 16. Screen capture – a rich data source

Screen capture data include anything that appears on-screen that the child records. From this information, the following can be known or inferred:

- time spent on platforms
- interactions with social media posts (likes, shares, etc.)
- all the advertisements that appear (whether engaged with or not)
- content shared by peers
- content shared by celebrities, bloggers, vloggers, etc.
- content shared by brands on all websites (not just on social media channels)
- product placement on video content.

The process involves the following steps.

1. Enrol a sample of children. The sample should be much smaller than in the previous step (section 3.3), as data analysis is much more resource-intensive.

2. Collect data about children's usual online behaviours (using apps to collect data on time spent online and platforms visited, as well as interviews with participants). This will allow extrapolation from the study data to usual exposures; and confirmation of the amount of time spent online that was actually recorded (i.e. the quality of the data).

3. Carefully explain what data will be gathered – how will the information be used, by whom, and how long will it be stored?

   Instructions (both written and in video form) should be provided to explain what participants should record and, importantly, what they should not record.

4. Gain consent from the child and (depending on the child's age) parental consent. It is essential that all those involved fully understand what information is being captured and what they are consenting to.

5. Install the app, set up to capture online content; the resulting data should be sent regularly to the researchers (for example, using a secure cloud-based server).

6. Send a reminder to the children on the days that they have chosen to record their online usage.

7. Analyse the data, disaggregated by age group – using both qualitative (small focus group discussions on children's online experiences) and quantitative methods. The information can never be fully de-identified because of the nature of the data captured.

   This analysis is likely to be undertaken by universities, which have obtained ethical clearance to work with children on this project (see also section 5.1.1 on ethical considerations).

During the assessment, children may initially modify their behaviour, but pilots suggest that these changes tend to be transient. Screen capture needs to continue for sufficient time for children to revert to normal behaviour, but not for so long as to become overly burdensome (either for the child or for the researcher tasked with evaluating the information).

Gathering information is one thing; turning it into action is another. This requires knowledge sharing, partnerships and advocacy – the next step in the CLICK process.

3.5 Step 5.
Knowledge sharing

Create user-friendly materials from the research data and develop partnerships with young people, parents, policy-makers and civil society, who together can advocate change, raise awareness and influence policy.
Key partners: consumer organizations, youth and public health NGOs, journalists, bloggers, parents' groups, politicians

Regulation of digital marketing of unhealthy product categories is likely to be met with resistance from website publishers, brands and ad agencies. Building public awareness of children's exposure to digital marketing will bolster the political commitment required to implement the Proposed Policy Prerequisites (section 4).

User-friendly narratives can be created from the data (Box 17), appropriate for different audiences – including case studies and infographics. These can then be shared on- and offline with children, parents, policy-makers and civil society, developing partnerships to advocate change, raise awareness and influence policy.

Box 17. Key data for in-country advocacy

- information on children's online habits at different ages
- marketing spend (on- and offline) of the major brands
- how campaigns and brands have been received by children who use social media
- the main paid-for advertisements viewed by children, categorized by brand/campaign and duration
- the extent of earned impressions and user-generated content viewed by children that feature unhealthy products

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The organizations tasked with delivering the new controls required by the Proposed Policy Prerequisites should be alerted to the new direction of travel, giving them time to innovate and so to remain compliant with forthcoming legislation in the new digital landscape.

4.
# Beyond monitoring: the Proposed Policy Prerequisites

The CLICK tool will provide a good estimate of the extent of children's online exposure to digital marketing and lay the foundations for building in-country support for action. But monitoring alone is insufficient: governments have a duty to ensure children's rights are protected and upheld in both the online and offline arenas, and existing protections should be extended in the face of this new threat to children's physical and mental health. The power of programmatic digital media is the way in which it allows individual targeting of ad impressions, so theoretically it should be possible to use the existing advertising technology to eradicate or vastly reduce the amount of advertising for unhealthy products a child receives.

The Proposed Policy Prerequisites together form a three-step process to establish a system within which exposure of children to age-inappropriate marketing would be significantly curtailed:

• **age verification** of online users;
• **tagging** of marketing campaigns to flag up material to which access should be restricted for a young audience; and
• **regulation** to ensure that these data points are combined and consistently applied to prevent serving of restricted-category advertisements to underage ad impressions.

This process is in line with the existing WHO approach,* and could be brought into governments' own national multisector NCD action plans. It would also provide a clear, consistent framework within which companies' obligations to observe new restrictions on retaining children's data under the GDPR (Box 3) could be applied. Once the framework is set up, practical design and delivery can be left to the ecosystem, as technology companies will innovate to create the required systems.

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* For example, the evidence-based Best Buys (which include banning tobacco and alcohol advertising) and the menu of policy options included in the updated Appendix 3 of the WHO Global Action Plan on the Prevention and Control of NCDs (*Tackling NCDs: "Best buys" and other recommended interventions for the prevention and control of noncommunicable diseases.* Geneva: World Health Organization; 2017).
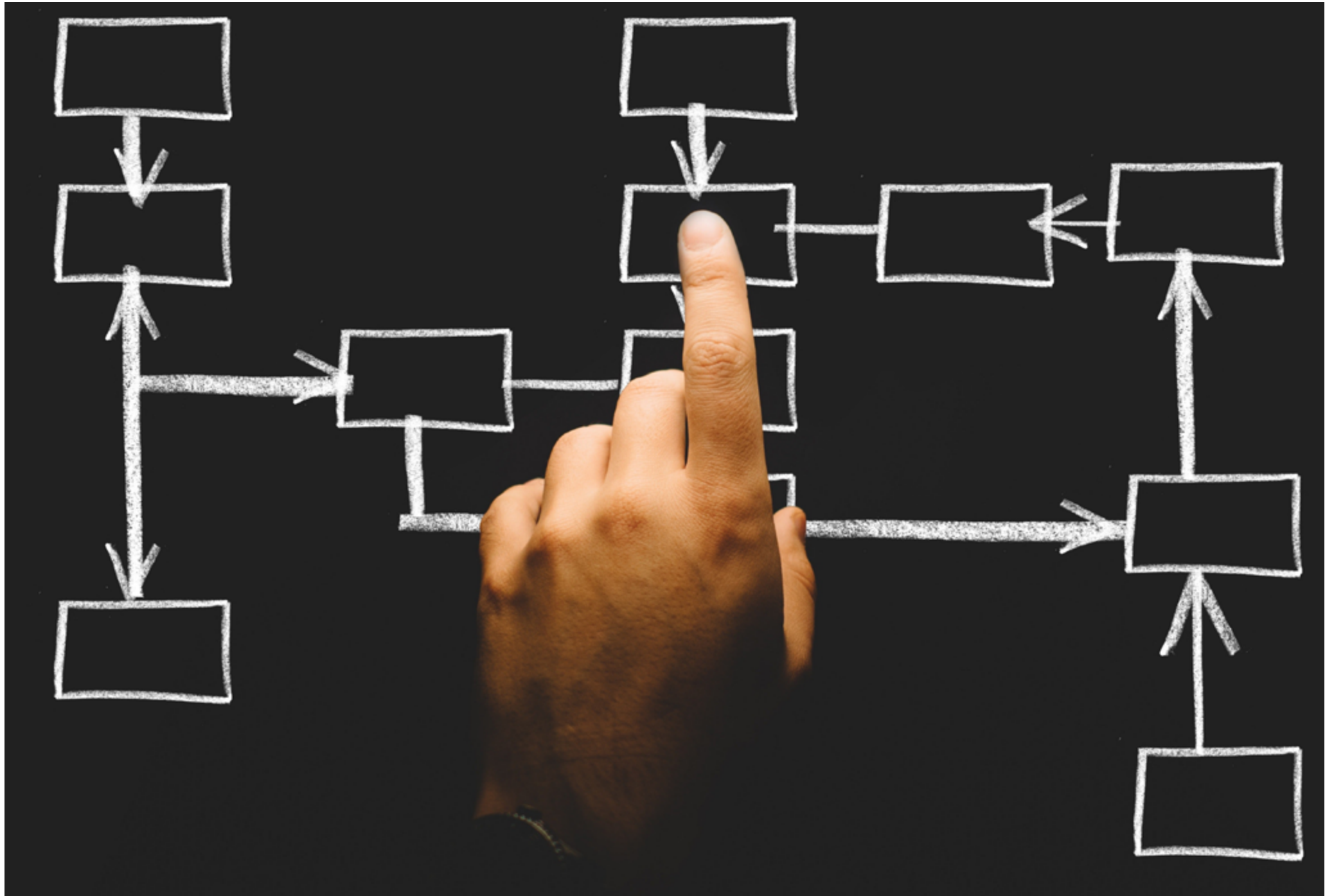
4.1 Age verification

A system needs to be put in place that verifies that each user of a session on a device is either a child or an adult. People do not accurately report their age online when asked to self-report; Ofcom's Children and parents: media use and attitudes report (2017),[36] meanwhile, found that parental awareness of age limits was low (about eight out of 10 parents whose children use Instagram or Snapchat were unaware of the restrictions) and that more than four out of 10 said they would allow their child to use social media before reaching the minimum age required.* The default assumption should be that a user is a child, and the marketing they receive should therefore be restricted unless and until positive verification that they are of an appropriate age is received.†

Fig. 11 sets out the point at which age verification would take place within the advertising ecosystem. Such verification would be required for every user's session on a device, so the publisher of every website would be aware that the user was or was not a child. This could act like an ad block (Fig. 8), immediately preventing all inappropriate content from reaching the child. There is also precedent for age verification requirements in other contexts, such as online gambling (Box 18).

* Brands themselves recognize the shortcomings of self-reporting on age on social media platforms, as evidenced by a beer company that recently pulled its advertisements for no-alcohol beer on Snapchat (Joseph S. "Heineken is still worried about Snapchat's age-gating policies". Digiday UK. 9 August 2018).
† For current views on appropriate age, see Box 23; but note that the UNCRC is clear that a child is anyone aged below 18.

Fig. 11. How tagging and age verification fit into the advertising ecosystem

USER → WEBSITE / APP → SUPPLY SIDE PLATFORM (SSP) → AD EXCHANGE → DEMAND SIDE PLATFORM (DSP) ← TRADING DESK ← MEDIA AGENCY

BRAND

AGENCY HOLDING COMPANY

DATA MANAGEMENT PLATFORM (DMP)

AGE VERIFICATION DATA

TAG CHECKS

CAMPAIGN AD TAGS ADDED
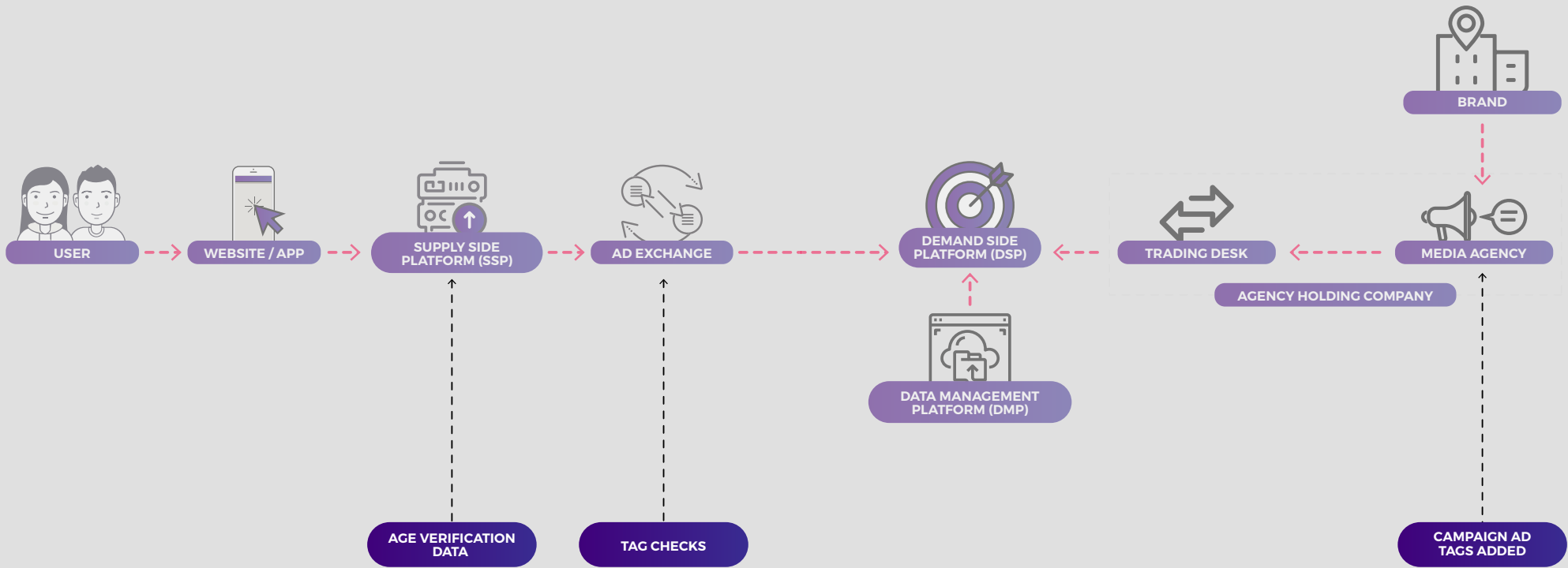
Box 18. Age verification and online gambling in the United Kingdom

In the United Kingdom, gambling operators have adopted the 2005 Know Your Customer requirements, and every transaction on a gambling website or apps such as Camelot requires confirmation that the user is over 18. The website requires offline age verification before a user can access the website but does not prevent marketing images being received.

There are many initiatives focused on achieving scale in establishing identity, but no dominant approach has yet been established, and the data available remain unreliable and lacking in scale:

- panel-based research data, from which extrapolations are made on the basis of lookalike modelling;

- mobile operator-led initiatives under the GSMA (Global System for Mobile Communications Association) Mobile Connect programme, which leverages the fact that mobile phone companies usually require legally verified identification before a SIM card is issued;

- national digital identity initiatives run by governments and outsourced to technology providers; and

- identity-as-a-service providers – i.e. companies through which consumers can legally verify their identity once (with their information then held in the "secure cloud"), and which then provide a service of identify authentication and verification to other companies.

Ireland has already introduced legislation that prohibits processing of data of under-16s (though its implementation is currently paused; see Box 19). At present, however, it is not possible to segment these users, so – if this legislation comes into force – companies will need to react quickly to ensure their compliance with the new law, including age verification. It is also not clear which company will be responsible for delivering accredited age verification data, or what approach it will take.

Verification systems do not need to be onerous – one-time verification is possible. Systems that could be used for age verification are already in place,* and the eIDAS system could also be adapted for this purpose (Box 20). Whatever system is chosen, the age-attributing token must be mutually recognized across borders: verification in one country has to be valid everywhere, either using a single standardized form of verification or through a system that can translate between tags.

Accurate knowledge of users' age is an important – and potentially invaluable – piece of information. Owners of age-verified data (such as mobile phone operators) may be reluctant to allow it to be used by

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Box 19. Ireland and children's data

In Ireland, Section 30 of the Data Protection Bill 2018 (first initiated by the Irish Heart Foundation) was passed and established a ban on processing children's data for profiling or marketing:
    It shall be an offence under this Act for any company or corporate body to process the personal data of a child as defined by Section 29 for the purposes of direct marketing, profiling or micro-targeting.
    Such an offence shall be punishable by an administrative fine ...
At the time of writing, a reworded text to ensure better alignment with the GDPR was being proposed. Should this pass, it will represent a substantive shift in the regulatory environment regarding targeting of children. As Ireland was one of the EU countries that adopted 16 as the age of consent for data processing, the outcome could be protection for teenagers, not just under-13s. (See also section 1.6.3 for some examples of action taken by Member States of the WHO European Region.)

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* A platform was recently adopted in Jersey in the Channel Islands as its official digital identity system. There are several platforms available in countries including Canada and the United Kingdom.

the open programmatic ecosystem, or they may lack the technical capability to do this systematically at scale. But anyone who holds even a single data point is a data controller under the GDPR and is therefore bound by GDPR restrictions on use of children's data, facing fines if that information is used inappropriately. Government, regulators and industry know that it is possible to age-check. It is not the responsibility of public health experts to find technological solutions prior to implementation of regulations. Once the rules are in place, industry and other relevant stakeholders will find solutions, just as they have in similar circumstances in the past.

The market is in the early stages of development. Initiatives such as the United Kingdom's Age Check Certification Scheme are paving the way, but further regulation would incentivize and speed up progress. Furthermore, the cost would be borne by industry as a standard business expense.

Box 20. eID – a route to age verification

An electronic identification (eID) system guarantees unambiguous identification of a person, ensuring that they can get the services to which they are entitled. Since September 2018, the eIDAS (electronic IDentification, Authentication and trust Services) Regulation has ensured mandatory cross-border mutual recognition of national eIDs among EU Member States. This means, for example, that individuals can use eIDs not only to transact with their own government but also to set up a bank account in another country. eIDs include individuals' ages and could be used as the basis of an age verification system. Privacy concerns are paramount in an eID system, with strict restrictions on how data can be used and shared.

4.2 Content tagging

Once effective age checks are established, systems should be put in place to restrict the content to which children are exposed – i.e. to ensure that children only see marketing of age-appropriate products. As Fig. 11 shows, once an age verification system is in place, it can be combined with a system of tagging online advertising content, allowing particular content to be flagged up and blocked, and DSPs to restrict bid responses to age-flagged data. National regulation or policy guidelines will be required to establish exactly what content should be restricted, and to whom. Obvious areas for restriction are gambling services, alcohol and unhealthy foods, while it is important that the system remains porous to material that is appropriate to children, such as healthy foods. There is precedent for this kind of approach. A notable example is film and game classification, such as the Pan European Game Information (PEGI) system for games and the British Board of Film Classification (BBFC) for film/video content in the United Kingdom; under these systems, a particular game or film is tagged with an age rating that can be checked against some form of ID (for example, on entry to a cinema). Tagging of food products should be based on regional-level nutrient profiling, such as the WHO Regional Office for Europe Nutrient Profile Model.* Products that fall into restricted categories should be flagged as inappropriate and blocked from being sent to children by ad agencies. However, as explained in section 2, tagging of online content is currently extremely inconsistent and is not yet done in the case of advertising campaigns. The (often junior) employees in ad agencies who are currently responsible for tagging are likely to use broad tags (i.e. ones that will be assessed by ad exchanges to be relevant to a wide range of users) in an effort to increase the potential reach of a campaign. At present, there is no way of accurately tagging an ad creative† back to a product or brand: there is no standard set of content tags that would allow consistent identification of unhealthy foods. What is needed is a new and consistent system, featuring an age-appropriate flag for each age group, that is supported by local regulators; this would require every ad campaign for unhealthy foods to carry an appropriate tag, using a standardized set of content tags that included brand and product. A formalized tagging system could also have benefits for brands themselves. There is currently significant wastage in advertising expenditure (section 2.4.1.1), and this is partly because lack of consistent tagging significantly increases the chances of an ad impression being seen by someone with no interest in purchasing. Consistent tagging would not only allow children to enjoy a safer and more health-promoting online environment and protect them from inappropriate content; it would also allow more accurate targeting of ad campaigns specifically at adults. However, it is likely that the strategy of many brands is specifically to make their HFSS products more appealing to children; so it is probably not in their overall interests to have such tagging, which will therefore need to be enforced by regulation.

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* Prior to introduction of the WHO Regional Office for Europe Nutrient Profile Model in 2015, in the EU only Denmark, Ireland, Norway and the United Kingdom had developed nutrient profile models that were used to restrict what can be marketed to children.

4.3 Implementation and regulation

Compliance with regulation is a company's first obligation – the starting point for good business practice and reporting. Regulation sets the framework and context in which companies operate and is needed to ensure that they have relevant guidance and are held accountable for a failure to prevent children from seeing inappropriate content from their campaigns. The regulators, both national (audiovisual media regulators and information commissioners) and international, are essential partners in ensuring the effectiveness of the Proposed Policy Prerequisites.* Internationally, advertising codes of practice derive from the International Chamber of Commerce. Self-regulating organizations in each country, such as the ASA in the United Kingdom and the Autorité de régulation professionnelle de la publicité in France, then adapt the code to their own cultural and (where necessary) legal contexts. However, some countries have gone further. Canada, for example, has introduced regulation that requires companies to supply information about their tobacco ad campaigns, and discussions are currently underway to extend such regulation to cover other categories such as HFSS foods. According to a recent policy update from Health Canada, the government department responsible for public health, it "is considering putting in place reporting obligations that would compel industry to provide data on advertising practices on a scheduled basis".[37] Such initiatives could be replicated elsewhere. The revised EU AVMSD acknowledges the need for action and encourages greater cooperation between regulators and industry (Box 21). But while the AVMSD could form a

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Box 21. The revised Audiovisual Media Service Directive (AVMSD)

The EU's revision of the AVMSD came into force in December 2018.[38] The directive already contained rules on alcohol and tobacco – for example, that alcohol advertising should not be aimed at minors or show minors consuming alcohol. The revised provisions are intended to bring it into alignment with the changed media environment.

Although the revised AVMSD takes a somewhat more proactive line than in the past with respect to unhealthy foods and beverages, and recognizes (in its recitals) the WHO Regional Office for Europe Nutrient Profile Model, it does not impose the mandatory restrictions recommended by WHO. It states that EU Member States "shall encourage the use of co-regulation and the fostering of self-regulation through codes of conduct … regarding inappropriate audiovisual commercial communications" for unhealthy foods in children's programmes (this is stronger than the previous wording: "shall encourage media service providers to develop codes of conduct"). The aim is "to effectively reduce the exposure of children to audiovisual commercial communications for such food and beverages" and to provide that the positive quality of unhealthy food and beverages is not emphasized.

In general, under a co-regulatory approach, both state and industry-funded regulators control adherence to the rules by industry players. The industry self-regulatory body usually has some autonomy in applying the regulatory measures, while the state regulator has oversight of the system as a whole.

However, the new draft of the AVMSD still falls short of WHO's 2010 *Set of recommendations on the marketing of foods and non-alcoholic beverages to children*,[39] and there are some clear omissions (for example, the lack of a definition of "child"). The directive provides a minimum standard and leaves Member States "free to require media service providers under their jurisdiction to comply with more detailed or stricter rules", but their freedom to do so is constrained because Member States may only impose standards exceeding the minimum level of protection on audiovisual media service providers established in their own jurisdiction. For example, Sweden tried to introduce stronger restrictions on alcohol advertising than the United Kingdom, and in 2011 initiated a complaint about the United Kingdom's broadcasting into Sweden of alcohol advertisements. The European Commission ruled in January 2018 that Sweden could not derogate from the Country of Origin principle, rejecting Sweden's argument that broadcasters had established themselves in the United Kingdom to get around the Swedish rules. †

"The default position should be that alcohol producers should not be allowed to market their product unless they can prove that children are not exposed. In other words, the responsibility for data collection lies with the industry, and it is the industry responsibility to ensure that the data collection systems are fit for purpose and the data on exposure is transparent."

Professor Nick Sheron, Public Health England

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* Identifying the relevant national and international regulators is the first step of the CLICK process (section 3.1).
† For a summary of the limitations of existing EU provisions to restrict HFSS food marketing to children, see *Evaluating implementation of the WHO Set of recommendations on the marketing of foods and non-alcoholic beverages to children* (Copenhagen: WHO Regional Office for Europe; 2018).

basis for discussions and additional provisions in the different EU countries, the Proposed Policy Prerequisites would require Member States to go beyond a co-regulatory approach and to take a consistent stance on the legal obligation to accurately tag media content and to ensure that inappropriate content does not reach children. Regulators will need to agree that an age tag is a "legitimate interest" and so becomes a blanket rule, no longer requiring opt-in consent under the GDPR. Regulators will also need to enforce use of consistent tagging by ad agencies.

Once the pilot age verification and tagging systems have been established, independent or government researchers should assess the new systems, rerunning the CLICK process (and requiring companies to submit data on their campaigns) so that the impact it has had on children's exposure can be evaluated.

If it is found, over time, that children are still viewing significant amounts of inappropriate content, it will be an indication that a selective approach to marketing to children is not working – in other words, the harm caused by exposure to unhealthy material is outweighing the benefit gained from exposure to age-appropriate material. At this point, a blanket ban on all marketing to children should be considered, using age verification to block all marketing messages, regardless of their content.

Regulation will require regular checks (using the steps set out in CLICK) to ensure that children are seeing fewer marketing campaigns, and there must be a threat of fines and/or a ban on data processing for non-compliance, in addition to censure by civil society organizations. If there are significant repercussions for non-compliance, industry will have a strong incentive to come up with effective solutions..

5.
Challenges:
practical and ethical

5.1 Monitoring challenges

5.1.1 Ethical challenges

Ethical considerations are crucial with respect to both tracking paid-for exposure and screen capture.[40] Review by an ethics board is required; a data governance board should be set up; and a set of policies and procedures should be developed. These should establish how the research team would respond if risky behaviours were detected (such as evidence of sexual grooming or interaction with suicidal ideation websites), where threatening behaviour was detected or if leaks of children's personal data were to occur.

Screen capture raises further issues of consent, by both parent and child, as it has the potential to be significantly more intrusive. For example, personal correspondence may inadvertently be recorded. The challenge is to capture advertisements and marketing, rather than the whole-screen experience; and it is essential to be very clear with those taking part how the information gathered will be used and how data will be stored and destroyed.

Privacy concerns may also complicate recruitment to the studies. Using established WHO partners as a recruitment stream, such as the recruitment partner for COSI, could be helpful.

5.1.2 Practical challenges

A significant current challenge is that data on the reach of marketing campaigns are anything but robust – brands, ad agencies and publishers do not themselves know who they are actually reaching. The CLICK framework will go some way to compensating for this, and implementation of the Proposed Policy Prerequisites should ensure that companies, as well as governments and regulators, have much improved knowledge of where their advertisements go in practice and more control over them.

Data analysis is currently very resource-heavy. Artificial intelligence (AI) options, such as an open-source AI tool from Google, can already be used to assess video information. This tool compares the screen images against an image bank, but accuracy is currently limited, so human input is necessary to assess information, and this is difficult to scale in a cost-effective way. This approach works well to identify marketing for a select group of brands but not for marketing exposure overall, because the number of possible brands and brand collateral (equity characters, trademarked colours, etc.) is simply too large to match against. Experience in this field suggests that manually coding advertisements is less time-consuming and more complete.

There is no guarantee that children use only the devices owned by them or that they own the devices they use – or that parents or siblings will not borrow a child's device and skew the results of the study (although children are often very protective of their devices). If parents and others fully understand the needs of the study, this can be prevented; and in the future, facial recognition software could be used to ensure that it is the child, rather than another family member, who is using the device.

The cost of studies into ad exposure and screen capture is likely to be dependent on the number of devices covered and the period of time over which data are gathered (probably 1–3 months for the software to capture paid-for ad data and a few days for the much deeper-dive screen capture).

Reconfiguration of social media platforms, without advance notice, may mean that the software currently used by researchers is no longer able to collect the relevant data. This strengthens the case for regulation to require data to be supplied.

Platforms such as Google, Facebook and Amazon are in a much better position to track advertisements, because they use ad tech within their own platforms (Box 10); they are also both publisher (website owner) and technology provider, and they own their own datasets. However, they operate within "walled gardens", rarely sharing their data with external researchers (Box 22). Many businesses with high-quality data choose not to make this information widely accessible in the ecosystem because of valid concerns about data leakage.

Box 22. Walled gardens

Certain media owners, predominantly social media sites, have decided it is not in their interest to share usage data from their platforms via measurement bodies as most other media owners do. In practice, this means they are not willing to place tags within their content or in advertisements that appear on their sites. Many walled gardens include a technical setting called "certificate pinning" that makes it impossible for researchers to intercept in-app usage data from these services, and therefore to assess ad-related data points.
These decisions are commercial and made at the highest level. Any discussion between WHO and these companies about accessing their data would need to be at a very senior level.

Any tools used must be able to adapt to different national contexts, particularly as most of the information gathered to date on the impact of marketing of unhealthy foods has come from English-speaking countries; more representative data are urgently needed. Any data mining tool must have the capacity to cope with all the languages of the pilot countries and with the forms of social media most commonly used by children. A further complication is that markets in different countries are at very different stages of the switch to programmatic advertising; for example, in 2017 it accounted for 85% of digital marketing in the Netherlands compared to just 41% in Poland.[41]

User-generated content – such as that produced by influencers (on Instagram and elsewhere), through peer-to-peer sharing, or by "child ambassadors" operating on behalf of brands – plays a significant role in children's online experience, and young people are more likely to trust this kind of content than other types of media they consume. However, it is currently very hard to track and its impact hard to assess. Using CLICK can give some insights (assessing campaigns on social media and by means of screen capture), but this is an important area for future investigation, perhaps using new AI technology as it becomes more sophisticated and reliable.

Moving away from targeting advertising at children may lead to heavier targeting of parents and families, which will also have an impact on children.

A final challenge is to make the case for extending responsibility for viewing advertisements for harmful products beyond children (despite their right, as they get older, to be active in decisions that affect them) and potentially beyond their parents (who will have only limited understanding of the way in which the digital ecosystem targets children and the extent of the advertising to which children are exposed). This is not a matter of excessive control exerted by authorities – what is sometimes described as the "nanny state". On the contrary, under the UNCRC, governments have a well-established responsibility to uphold children's rights and protect them from harm, and also to support parents in their responsibility to do so.

5.2 Challenges facing the Proposed Policy Prerequisites

5.2.1 Age verification

Despite the availability of age verification platforms, the adoption of a single platform at national level and the process of parents' opting in or out of restrictions set by government are likely to face several practical challenges.

Currently, the age range to which marketing should be restricted varies between countries, but consistency in this respect would be very valuable. The aim should be a consistent international framework, with a consistent definition of "child" (such as that given in the UNCRC) and specific age bands used on a consistent basis (Box 23).

Box 23. How young is too young?

The age below which parents have to provide consent to data processing varies from country to country.
The US Children's Online Privacy Protection Act (COPPA) is widely regarded as too lenient, applying only to children under 13.
For data privacy purposes, the GDPR age for consent is "at least 16 years old"– unless parental consent has been given or if Member States provide for a lower age (which should not be below 13).
A "minor" under EU law is anyone aged under 18, but the revised AVMSD refers to "children", which does not have a common definition across all EU Member States. Using "child" is therefore more flexible but less harmonized.
However, the UNCRC states that a child is anyone below the age of 18. And there is some justification for this, in the context of marketing: despite growing cognitive abilities in the teenage years, development in other domains (such as increased independence and adolescent changes in responses to peer interactions) can in fact increase susceptibility to HFSS marketing.[42]

A complicating factor is whether parents could consent to opt their children out of the restrictions once they have been set by the regulators. Evidence suggests that parents are largely unaware of the risks to their children and are quick to provide permission, such as allowing them to access social media platforms when they are below the age at which they are formally allowed to do so. Careful consideration should be given to the protective responsibilities of parents and governments: understanding is limited, and there may be intense "pester power" to be allowed to join platforms.

5.2.2 Tagging

Nutrient profiling of products may need to be adjusted nationally. For example, a product might be produced to slightly different recipes for different markets, with the result that it fell into a different nutrient-profiling category across borders. There may be significant lobbying from HFSS brands to reclassify certain products as healthy, and there could also be a drive towards further reformulation. (Note that tagging is of the advertising creative, not of the content per se – i.e. it covers only paid-for advertising.)

5.2.3 General challenges

Delivery of the Proposed Policy Prerequisites will require international coordination and cooperation, with the involvement of international as well as national regulators. International regulation is, however, possible – as the AVMSD in the EU has shown (Box 21).

> **"The AVMSD sets the minimum standards that everyone would achieve – but national policy-makers can always go above and beyond the European framework, if they wish to introduce more strict regulatory measures."**
>
> Dr Lubos Kuklis,
> European Regulators Group for Audiovisual Media Services

Appropriate sanctions must be set, such as those that have been put in place for the GDPR, where fines of €20 million, or 4% of a business's global annual turnover in the previous financial year, can be levied. It is not enough to rely on the censure of civil society and the media for failure to comply.

Government policy on digital marketing must keep up to date with technological changes over time; these include new social media and emerging "immersive" technologies (Box 24), and new, targeted advertising formats such as those on streamed programming through the TV, out-of-home, in-car and audio. Children's exposure to marketing should be periodically assessed, and age restrictions and tagging adjusted to take these new realities into account.

Box 24. New distractions

The advertising industry has long worked to achieve unconscious, emotional effects, and digital marketing has learnt further lessons about interactive engagement from the gaming industry. Identification with content and characters in all media can build a strong emotional connection. Techniques to stimulate engagement in social media, as well as in advergames and immersive technologies, aim to go further and achieve active participation, moving beyond what users see and hear and into what they do.

Immersive technologies, such as virtual and augmented reality (where characters appear in the room with users), are developing fast; the distinction between the real and the virtual is becoming blurred. When "flow" starts, users lose a sense of time and of who they are – and it is in this gap (of which users are unaware) that brands can make their strongest connections.

Finally, monitoring using CLICK can assess whether the changes arising from the Proposed Policy Prerequisites have made a difference in practice. Even if the regulatory aim is achieved – if children are no longer exposed to paid-for digital advertising – brands may switch their spending to different forms of marketing. For example, tobacco advertising was banned on TV in the United Kingdom in the 1960s, but marketing spend transferred elsewhere, and there was no impact on smoking prevalence.

6. Steps to delivery

6.1 Refine CLICK and the Proposed Policy Prerequisites

> **Box 25. A multisector approach**
>
> The CLICK framework and the Proposed Policy Prerequisites cannot come to fruition without the involvement and cooperation of numerous partners – government; public sector bodies including regulators, academics and researchers; civil society; the IT and ad industries; and, ultimately, the brands themselves.
> Exposure of children to advertising is a cross-border issue, so it is not enough to establish national systems: where marketing is global, the response must be global too. For this reason, international bodies – including WHO – have a key role to play.

- To ensure that the CLICK tool and the Proposed Policy Prerequisites are fit for purpose, hold further discussions with experts across all relevant fields, building on the enthusiasm generated by the initial expert meeting (Box 7). Detailed, practical advice is needed from those with experience of working within the digital marketing industry. Deep technical expertise should be sought to undertake a feasibility analysis, looking at the future technology landscape and how it can be put to best use (this could include machine learning, web scraping, and using AI techniques to classify advertisements).

- Start conversations with public organizations (policy-makers and regulators) as soon as possible, to ensure that there is a good understanding of the need for action and to set out the proposed future trajectory established by CLICK and the Proposed Policy Prerequisites.

- Work with academic partners who can provide support through ethics approvals and help design the methods and protocols; they can also act as implementation partners in research, analysis and reporting.

- Form an advisory group, consisting of experts who are most committed and willing to share their expertise. This group could meet every six months, hosted by WHO, to ensure that CLICK and the Proposed Policy Prerequisites continue to be dynamic and comprehensive over time, reacting swiftly to changes in technology and new evidence.

- Consider the potential benefits and risks of involving ad agencies and major brands, which will need to be involved if the initiative is to move to scale. In addition, researchers working in this field may consider initiating dialogue with the three companies that are seeing the biggest growth in global ad spend (outside China and Japan) and which have the best access to individuals' online data: Google, Facebook and Amazon. One route to this may be through the World Wide Web Consortium, an international community that works to develop web standards. The Time Well Spent Movement (an initiative of the Center for Humane Technology; see Box 6) could also be a partner in this approach.

6.2 Pilot in select countries

- Three or four countries should be chosen to pilot CLICK and the Proposed Policy Prerequisites. Ideally, the pilot countries should be relatively mature in terms of the proportion of their ad market that is programmatic, as this is the clear direction of travel: where they have gone, others will follow. It could also be of benefit to select countries with existing legislation that could be supplemented by the Proposed Policy Prerequisites.

- WHO and the newly formed advisory group should provide appropriate support for the selected countries to run CLICK and the Proposed Policy Prerequisites, including assistance in drafting relevant regulation. At this stage, the Proposed Policy Prerequisites will be regulated through national bodies only and so will have a less comprehensive effect than when supranational regulation is in place, because there is more chance of advertisements coming in from other markets. However, the pilots will provide an indication of what can be achieved, building evidence of effectiveness for national governments and supranational regulators (e.g. at the level of the EU or the Eurasian Economic Union).

6.3 Share experiences

- Establish a learning network between the pilot countries, coordinated by WHO and with input from the advisory group, to share both positive and negative experiences in a confidential and supportive environment, and to use feedback to hone the process for future rollout in other markets.
- Publish examples of the data gathered from CLICK in the pilot countries, including the extent of marketing to children, the major players, the sources of information, and comparisons between different markets and regulatory systems. This will build the case to civil society, the media and governments that concerted international action is required – and challenge the industry to deliver real improvements.
- Find academic partners that are willing to identify, write and disseminate examples of industry practice. Relevant examples will include both companies that are making positive changes in response to public concern and those that, conversely, are launching legislative challenges to the proposed changes (how these challenges are being addressed should also be considered).
- Compare the HFSS food marketing ecosystem with the alcohol and tobacco ecosystems – for example, what has been the effect of legislation derived from the FCTC?

6.4 Role of the WHO Regional Office for Europe

WHO can play a key role in establishing the new Proposed Policy Prerequisites, because the issue to be addressed extends across borders. Although the proposed pilots will be country-based, it will not be enough to establish national systems: where marketing is global, the response must also be global.

WHO is well placed to:

- help develop a viable policy framework with regulators (internationally and nationally) and governments, including developing criteria for governments and assisting in drafting regulation;
- make the case for action to civil society;
- establish and host the advisory group (section 6.1) and learning network (section 6.3);
- review data and publish advertising market information available to countries;
- advocate and provide assistance to develop and maintain the "HFSS" tag for advertising creative; and
- produce an annual survey of compliance against new policy guidelines in WHO Member States.

7. Conclusion

This report builds on the WHO expert meeting held in June 2018, which provided good, clear steps that we can follow to start monitoring the marketing of unhealthy products to which our children are exposed.

In brief, the key lessons from the meeting were:

• there is strong evidence that digital advertising influences behaviour;
• the current ecosystem, though designed to target individual ad impressions, would prevent companies making beneficial changes, even if they wanted to; and
• a tool is needed to monitor children's exposure to digital marketing for the purposes of informing policy development in this area

Public health stakeholders should lobby governments to make this happen and explain the mechanism by which it could be achieved. New partners, including advocacy groups and consumer organizations, should be involved in the process.

The proposed monitoring tool, CLICK, is a practical and important first move in the current context; it consists of five achievable steps by which digital marketing to children can be monitored.

• Digital marketing strategies and exposure of children and young people to digital marketing of HFSS, tobacco and alcoholic products can be monitored by means of the CLICK tool.
• Member States can establish national cohorts as part of their ongoing studies (such as COSI) or through new initiatives to collect data over an appropriate period of time (1–3 months) by installing an application on devices accessed by children in the recruited sample.

In addition, restriction of digital marketing of unhealthy products to children can be implemented with reasonable success using current technology.

• New laws introduced in the WHO European Region demand appropriate and accurate age verification processes to be in place, using an internationally certified approach. These new laws address one of the major barriers that policy-makers previously faced – differentiating between adults and children online, a vital first step in the process of restricting marketing to children.
• Stakeholders should develop a comparable system to tag the content of online paid advertisements. This would allow the delivery servers to block advertisements for HFSS, tobacco and alcoholic products for users below a certain age, as identified by the age verification process.

Ongoing monitoring of digital marketing is required to track the implementation and efficacy of the proposed restrictions and to tackle other (unpaid-for) marketing strategies and campaigns, including user-generated content and activities on social media. In this way, regulations can be updated to fill gaps that are found to exist.

The need to address the issue of children's digital exposure to unsuitable advertising is increasingly recognized, and now is the perfect time to take action. The rules governing the mobile and video programmatic ecosystem are currently being rewritten and data use is being increasingly regulated. These factors, which are already driving change in the advertising industry, can be combined in the near future to ensure that the new standards and ways of working deliver on health objectives, enhancing the well-being of all – especially children and young people – in the digital world.

"This is a moving target, which will require vigilance and flexibility. We have the technology and methods that could do this, so let's use it to create national policies."

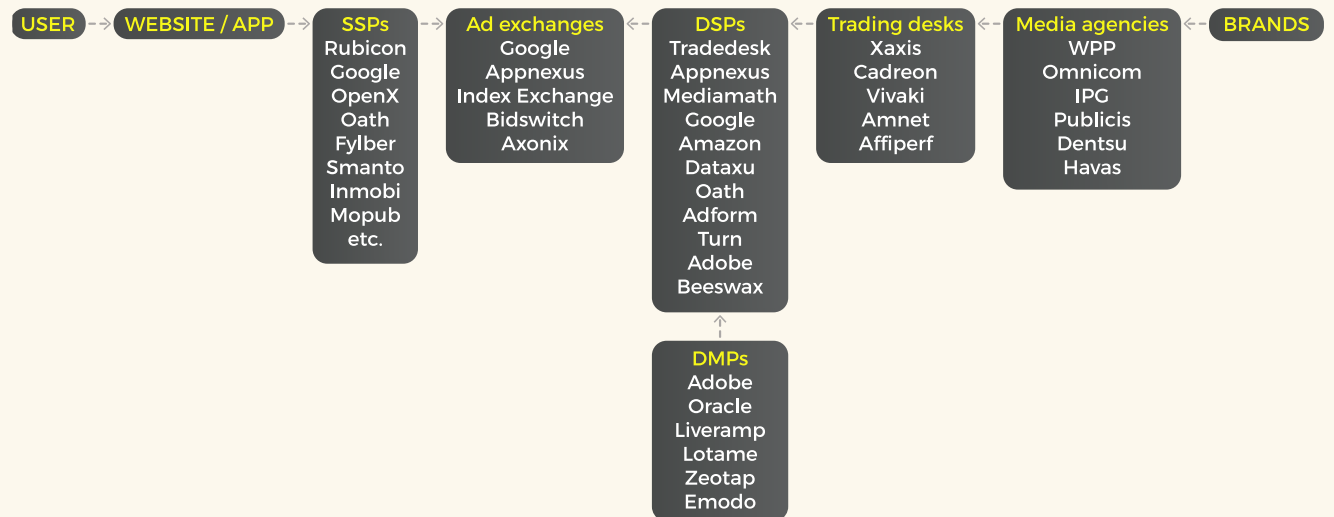Dr João Breda, WHO Regional Office for Europe

Annex 1. Further ideas

During the WHO expert meeting held in June 2018, many more ideas were suggested than it was appropriate to include at this stage of the development of the CLICK tool and the Proposed Policy Prerequisites. However, many of these ideas could be taken forward in the future, building on developments in regulation, technology and research techniques.

Extending the CLICK framework	
Comprehend the digital ecosystem	• Check for product placement or brand marketing on the social media accounts of the vloggers in each country who are most popular with particular age groups. • Survey parents to find out what brands are most likely to be subject to "pester power" – and whether this varies between different markets. • Develop protocols for introducing questions on digital behaviour into COSI and other surveys of children and adolescents. • Research manufacturers' own documentation for insights into their strategies and priorities (this has been revealing for tobacco). • Review where company pledges (voluntary codes of conduct) are in place and how they have been implemented in a number of countries, to identify key lessons.
Landscape of campaigns	• Ad blockers collect the URLs of blocked websites, so harvest this information and assess the content that would otherwise have reached children online, including the reach of specific campaigns.
Investigate exposure	• As technology improves to allow effective imitation of children's online behaviour, use child avatars to capture the level of exposure to advertisements. • Use of facial recognition technology will ensure that the user of the device is a child (i.e. the research subject) rather than another family member – image-recognition age verification technology has already been developed. However, application of these technologies will come with associated privacy concerns.
Capture on-screen	• As AI develops, use improved techniques to classify advertisements captured on-screen, matching on-screen images to an existing database of online advertisements. This may be much less resource-intensive, allowing this stage to be rolled out to a larger subset of devices.
Knowledge sharing	• Consider how best to communicate the effects of digital marketing and the impact of the "attention economy" to children, beyond those who take part in the studies. • Identify ways to communicate the ecosystem and its effects to parents. • Build on the assessment of campaigns in individual countries to compare brands' behaviour in different jurisdictions. • Consider using CLICK to benchmark companies' behaviour – a good "hook" that can be used by the media to build pressure for change.
Additional steps	• Combine monitoring of marketing with monitoring of data on actual behaviour – for example, the consequences of exposure to marketing on purchasing patterns. • Use the results of the first CLICK tool scan to provide a baseline – repeat the process after the Proposed Policy Prerequisites have been put in place to assess its impact.
Proposed Policy Prerequisites	
Age verification	• Consider using blockchain as a solution for age verification.
Tagging	• Tagging is of the advertising creative, not of the content per se – i.e. it covers only paid-for advertising. In future, tagging may be required for social/user-generated content.
Regulation	• Ensure that regulation keeps pace with technological changes, particularly immersive technologies, virtual reality, outdoor advertisements, and technology that can add brands to products on-screen (e.g. automatically adding a soft drink brand to a can that appears on-screen, so different viewers of the programme see a different product). • Restrictions on the ability of children to purchase HFSS products in retail stores may be necessary in tandem with restrictions on advertising, if a real difference to consumption patterns is to be made.
Other suggestions	
Engaging with industry	• Given the high percentage of spend and time spent by children on online platforms, consider a joint initiative supported by Facebook, Google, Snapchat, Amazon, Microsoft, etc., to help understand the extent of the issue on their platforms, as appropriate and fully cognisant of potential conflicts of interest.
Engagement	• Consider further research, as new methods become available, into how children interact with all forms of marketing.
Sustainability	• Access funder(s) who are willing to finance development of the Proposed Policy Prerequisites as a long-term regional/global solution.

Annex 2. Whole ecosystem in the United Kingdom

Fig. A2.1 shows the complexity of the programmatic ecosystem, mapped out for a single country – the United Kingdom. This ecosystem will change rapidly over time, but it is useful as an example of the kind of data that need to be gathered for the first stage of the CLICK tool. (Note, too, that the ecosystem would look very different in countries such as India and China.)

Fig. A2.1. The programmatic ecosystem in the United Kingdom

Annex 3. Online sources of industry information

Some information sources useful in researching marketing campaigns (digital and non-digital) are given below.

Academic	**ABI/INFORM**	Database of worldwide business information e.g. *Journal of Advertising Research, Journal of Consumer Research, Journal of International Economics, Journal of Marketing, Journal of the Academy of Marketing Science, American Journal of Public Health, Journal of Public Policy and Marketing*
	Business & Industry	International business information e.g. *Marketing Week, Advertising Age, Campaign*
	Emerald	Management journals e.g. *British Food Journal, European Journal of Marketing, Nutrition and Food Science, Journal of Consumer Marketing, International Journal of Social Economics, Marketing Intelligence and Planning*
	Eric	Educational research Ad hoc government reports and publications, books, *Family and Consumer Sciences Research Journal, Journal of Communication, Journal of Consumer Education*
Practitioner	**WARC**	Advice on advertising and marketing issues – over 60 000 articles, best practice, case studies and insights across key marketing topics https://www.warc.com/Welcome
	EBSCO Business Source Premier	Business related e-books, journals and magazines, as well as tools for searching across all library resources https://www.ebsco.com/products/research-databases/business-source-premier
	IBIS World	Industry market research and industry risk ratings https://www.ibisworld.co.uk/
	eMarketer	Market-research company: insights and trends related to digital marketing, media and commerce https://www.emarketer.com/
Industry organisations	**Internet Advertising Bureau**	Non-profit trade association for digital advertising – e.g. to develop standards and set out best practice and research https://www.iabuk.com
	Mobile Marketing Association	Non-profit trade association for the mobile media ecosystem (e.g. brand marketers, agencies, enabling technologies, media companies) https://www.mmaglobal.com

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