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TOBACCO, ALCOHOL AND HIGH FAT, SALT AND SUGAR FOOD AUDIO-VISUAL CONTENT IN VIDEO ON DEMAND ORIGINAL FILMS AND POPULAR TELEVISED SPORTING EVENTS: IMPLICATIONS FOR PUBLIC HEALTH

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ABSTRACT

Background: Research on the impact of different media is continually developing within the public health field, and audio-visual content has been identified as having potential negative outcomes on viewers through possible contribution to the prevalence of lifestyle behaviours, such as tobacco smoking, alcohol consumption and high fat, sugar and salt (HFSS) food consumption in adults and children. The UK has developed policies to control the accessibility of tobacco and alcohol products since the 1930s, ranging from increased taxes to more stringent advertising restrictions, smoke-free legislation, reinforced health warnings, managing the drinking environment, reducing drunk-driving, and brief interventions and treatment among others. Efforts continue to be made today to lower the number of individuals who engage in harmful use of tobacco and alcohol, including age and marketing controls to reduce advertising exposure to young people. Following these policy interventions, the UK has seen general decreases in tobacco and alcohol consumption among young people. However, the increasing role of media in alcohol and tobacco content exposure is a cause for concern to regulators and public health supporters. The UK government has, however, proposed fewer policies to address increasing levels of obesity in the UK, apart from the Soft Drink Industry Levy and the recently announced watershed ban prohibiting the advertisement of junk food online and before 9pm on TV. The few policies could be because obesity is a multifaceted health issue with no specific contributing factor. Researchers have outlined potential interventions that could help tackle HFSS food consumption, including

restrictions on the number of fast-food outlets, reformulation of foods and drinks, and stricter regulation on the advertising of junk food. Limiting advertising on junk food is more important today than ever as HFSS food promotions become increasingly popular on traditional media, such as television and movies, and non-traditional media channels, including sponsored webpages, third-party sites, and social media among related channels. Research on alcohol, tobacco, and HFSS imagery exposure has been previously undertaken. However, limited studies have compared exposure to alcohol, tobacco, and HFSS imagery within the UK-wide population and there is no contemporary data. The aim of this study was to investigate the extent of broadcast media exposure (specifically television, films, and sports sponsorship) of tobacco, alcohol, and HFSS foods in adults and children.

Objectives: Specific objectives of the study were to analyse and evaluate tobacco, alcohol, and HFSS contents, as well as estimating population exposure to this content (where viewing data is available). Three content analyses were completed: (1) Netflix and Amazon Prime Video original films released and viewed in 2017. (2) FIFA 2018 Men's World Cup broadcast by the British Broadcast Corporation (BBC) and Independent Television Network (ITV). (3) FIFA 2019 Women' World Cup broadcast by the British Broadcast Corporation (BBC) and the Independent Television Network (ITV).

Methods: The study started by sampling films on Netflix and Amazon Prime Video for analysis. The study selected the most popular movies on Netflix and Amazon Prime Video watched by audiences across the UK in 2017, according to IMDb rating statistics. Data collected from Netflix and Amazon Prime Video included instances of tobacco, alcohol, and HFSS imagery appearing in 5-minute intervals. Instance of tobacco use were coded based on imagery, or tobacco appearance in the form of outright use, display of tobacco paraphernalia, inferred tobacco use, or brand appearance. The coding categories for alcohol included actual alcohol use which was defined as on-screen consumption of alcohol products. The type of alcohol product, whether beer, wine, champagne, or spirit was recorded during the coding process. The study was also interested in implied use of alcohol, which was interpreted as visible appearance of alcoholic products without outright consumption. The study also coded implied use of alcohol, which referred to verbal references to alcohol, drunken behaviour, and other appearances depicting alcohol use in the films. The coding process documented the type of HFSS product based on the 'Big Five' categories: pre-sugared breakfast cereals, confectionery, savoury snacks, soft drinks, and fast-food outlets. All episodes of tobacco, alcohol or HFSS consumption within the 5-minute period were recorded as one event irrespective of the number of appearances within that interval. However, where one episode appeared over a transition between one 5-minute periods to another 5-minute period, it was counted as two separate episodes. However, multiple branding information appearing within a 5-minute interval were counted separately. Data collected were initially recorded using Microsoft

Excel prior to analysis using SPSS or Graph Pad Prism statistical software. Cumulative frequencies were used during statistical analysis. The cumulative frequencies were used to determine the number of observations above or below a certain value in the collected data set. The study calculated cumulative frequencies for visuals occurring in five-minute intervals within the selected Netflix and Amazon Prime Video films.

Next, the study selected matches for the FIFA 2018 Men's World Cup and the 2019 Women's World Cup. For the FIFA 2018 Men's World Cup, matches involving England, Saudi Arabia, Russia, and the final match were selected for analysis. The matches involving England and the final game were selected since they had the potential of high viewership and were relevant to the UK. Saudi Arabia and Russia were selected due to the strict alcohol promotion regulations in the countries; Russia was also the host country of the FIFA World Cup 2018. For the 2019 Women's World Cup, all matches from Group D, which included England and the final match were selected for coding due to the likelihood that they would draw high viewership. Group A matches featuring France, except three that were not available, were also selected for coding. After selecting the men's and women's matches, all billboard advertisements which occurred during the two halves as well as during the period between the first and the second halves were coded. After watching the matches and encountering the adverts the data has been collected, including the appearance of logos for the selected brands "McDonald's", "Coca-Cola", "Powerade" and "Budweiser", which were indications of advertisements for these brands in the men's and women's matches.

For each appearance, the start and end time (in minutes and seconds i.e., 6:30-6:54) and match period (first half, second half, extra time and penalties) were recorded. Visual occurrences of each brand that appeared in clear, uninterrupted view on the screen received a single count in each instance. The duration of each continuous visual appearance was timed to the nearest second. Population exposure estimates of imagery content in the selected matches were used to approximate gross and per capita impressions. Per capita gross impressions were derived based on the frequency and duration of appearances (to the nearest second) of branding within the selected matches. Appearances overlapping between intervals were coded in the two intervals. To estimate UK population exposure to branding content, this study analysed the distribution of branding appearances and used that distribution to compute cumulative gross and per capita impressions. Gross impressions were determined by multiplying the estimate of the UK population who had watched the men's and women's FIFA World Cup matches by the number of branding occurrences in each match. Per capita gross impressions of were obtained by dividing the total number of gross HFSS branding appearances across all the matches in the sample by the total population in the UK.

Results: Results of the study provided evidence that original films on VOD services, such as Netflix and Amazon Prime Video, are likely to be a source of potential exposure to alcohol in the UK. Potential harmful exposure refers to the extent to which the target audience in the UK encountered certain alcohol, tobacco, or HFSS imagery in the selected movies, likely to have contributed to

increased used of these products. There was no major difference in alcohol, tobacco and HFSS imagery observed in movies selected from Amazon Prime Video and Netflix. The total percentage of alcohol and HFSS intervals were the same on each service, but the proportion of tobacco content on Amazon Prime Video was slightly higher. The most frequently consumed tobacco product were cigarettes (14.8%), represented in most films containing tobacco. Findings on the 2018 FIFA World Cup showed about 3.7 billion gross branded alcohol impressions to UK viewers. The study also revealed that an estimated 354 million alcohol impressions were delivered to children in the UK. Upon analysing the films and sporting events, the findings confirmed the presence of high HFSS content. HFSS brands were also evident in the 2018 FIFA men's World Cup (1806 brand appearances) with popular advertising brands being Coca Cola (25.7% of the total brand appearances), McDonald's (33.3% of total brand appearances), Budweiser (30.4% of total brand appearances) and Powerade (10.5% of total brand appearances), as well as in the 2019 women's FIFA World Cup (1104 brand appearances) with the main advertising brands being Coca Cola (62.04% of the brand appearances) and Powerade (37.95% of brand appearances). The 13 matches analysed in the men's game delivered an estimated 6.7 billion gross branded HFSS impressions, with the estimated total HFSS food impressions delivered to viewers varying across the selected matches. The highest per capita impressions (1.8 billion) were in the game between Tunisia and England, and the lowest per capita impressions (7.9 million) were in the match between Panama and Tunisia. Gross per capita impressions delivered to children across the entire

13 matches was 852 million. The 10 matches in the women's game delivered an estimated 2.5 billion gross branded HFSS of total impressions. The highest HFSS food impressions (532.67 million) were in the match between England and Scotland, and the lowest (74.26 million) were in the match between Scotland and Argentina. The total of the branded HFSS child impressions was 164 million over the 10 matches. Study findings show that VOD services and the 2018 Men's and 2019 Women's World Cup are a significant source of exposure to alcohol, tobacco, and HFSS imagery to all age groups of individuals in the UK and are likely to aid HFSS consumption.

Conclusion: The current study found that instances of alcohol, tobacco, and HFSS imagery were prevalent in original Netflix and Amazon Prime Video films, as well as the 2018 and 2019 FIFA World Cup. Potential regular and prolonged exposure to alcohol, tobacco, and HFSS imagery is a major risk factor likely to influence behaviour towards the consumption of these products among the young people. Specifically, the frequency of display and the proportion of programming time containing such imagery represents a source of exposure to alcohol, tobacco, and HFSS products. The possibility that being exposed can lead to behaviour change is supported by the heuristic model and the social learning theory, which theorize that people learn or acquire new patterns of behaviour by either observing or imitating other people. These findings show that stricter regulations need to be applied to prohibit alcohol, tobacco, and HFSS imagery. In view of the changing viewing habits of adolescents, there is a need for the regulation of

tobacco, alcohol and HFSS imagery in original content from VOD services, whether this be updating the European audio-visual media services directive to ensure that regulations specifically include alcohol, tobacco and HFSS content, or ensuring that the current UK regulations which cover Amazon Prime Video are applied across Europe. Given the potential influence of brand appearances in FIFA World Cup events on food choices and alcohol consumption among children and young adults, it is important that the current regulations on alcohol and HFSS advertisement include televised sporting events, which are currently unregulated.

TABLE OF CONTENTS

CHAPTER ONE 19

BACKGROUND OF THE STUDY 19

1.0 Introduction 19

1.1 Tobacco Use and Smoking 20

1.1.1 Prevalence of tobacco use and smoking. 20

1.1.2 Health implications of tobacco use and smoking 23

1.1.3 Health implications of passive or second-hand smoking 25

1.1.4 Economic impacts of smoking 28

1.1.5 Public health policies on smoking 29

1.2 Alcohol Consumption 32

1.2.1 Historical background of alcohol consumption 32

1.2.2 Prevalence of alcohol consumption 33

1.2.3 Alcohol dependence and misuse 36

1.2.4 Health impact of alcohol consumption 37

1.2.5 Social and economic impacts of alcohol consumption 38

1.2.6 Public health interventions and policies on alcohol consumption 41

1.3 High Fat, Sugar and Salt (HFSS) Food Consumption 43

1.3.1 General overview of HFSS foods 43

1.3.2 Trends in HFSS diet consumption 44

1.3.3 Drivers of HFSS eating 47

1.3.4 Health and economic impacts of unhealthy diet 49

1.3.5 Policies and strategies for promoting healthy eating. 50

1.4 Influence of Media on Tobacco, Alcohol and HFSS Consumption 53

1.4.1 Media and tobacco smoking 53

1.4.2 Media and alcohol consumption 60

1.4.3 Media and consumption of high fat, salt and sugar (HFSS) foods 63

1.5 Social Learning Theory and exposure to tobacco, alcohol and HFSS media contents 68

1.6 Regulation of media exposure 70

1.7 National and international legislative context 71

1.8 Statement of the problem 74

1.9 Aim and Objectives of the Study 75
1.10 Key Terms 76
CHAPTER TWO 79
METHODS 79
2.0 Introduction 79
2.1 Methods for Films 79
2.1.1 Sampling of films 79
2.1.3 Coding of films 80
2.1.4 Method of data collection for films 84
2.1.5 Method of data analysis for films 85
2.2 Methods for Sporting Events (FIFA 2018 Men's World Cup and 2019 Women's World Cup) 86
2.2.1 Selection of matches and broadcasting stations 86
2.2.2 Coding of sporting events 88
2.2.3 Method of data collection for FIFA World Cup 89
2.2.4 Method of data analysis for Men's and Women's FIFA World Cup 89
CHAPTER THREE 91
CONTENT ANALYSIS OF NETFLIX AND AMAZON PRIME VIDEO ORIGINAL FILMS IN THE UK FOR ALCOHOL, TOBACCO AND HFSS FOOD IMAGERY 91
3.1 Introduction 91
3.2 Summary of Methods 93
3.3 Results 95
3.3.1 Characteristics of movies analysed 95
3.3.2 Alcohol in movies 98
3.3.4 Tobacco in movies 101
3.3.5 High fat, salt, and sugar (HFSS) foods in movies 101
3.3.6 Comparison of alcohol, tobacco and HFSS imagery in Amazon Prime Video and Netflix movies 102
3.4 Discussion 103
3.4.1 Summary of findings 103

3.4.2 Relationship with previous studies 104
3.4.3 Strengths and Limitations of the study 106
3.4.4 Implications for practice 109
3.4.5 Implications for future studies 111
3.4.6 Conclusion 111
CHAPTER FOUR.....113
POPULATION EXPOSURE TO ALCOHOL AND JUNK FOOD ADVERTISING DURING THE 2018 FIFA WORLD CUP.....113
4.1. Introduction..... 113
4.2 Summary of Method 114
4.3 Results..... 118
4.3.1 Match characteristics and viewership 118
4.3.2 Analysis of brand appearance 120
4.3.3 Analysis of impressions 127
4.4 Discussion..... 134
4.4.1 Summary of findings..... 134
4.4.2 Relationship with existing literature 135
4.4.3 Strengths and limitations of the study..... 138
4.4.4 Implication for practice..... 141
4.4.5 Implication for future studies..... 141
4.4.6 Conclusion 143
CHAPTER FIVE 144
POPULATION EXPOSURE TO JUNK FOOD ADVERTISING DURING THE 2019 FIFA WOMEN'S WORLD CUP: IMPLICATIONS FOR PUBLIC HEALTH 144
5.1 Introduction..... 144
5.2 Summary of methods 145
5.3 Results..... 147
5.3.1 Analysis of brand appearance 147
5.3.2 Analysis of impressions 150

5.4 Discussion 152
5.4.1 Summary of findings 152
5.4.2 Relationship with existing literature 152
5.4.3 Strengths and limitations of the study 155
5.4.4 Implications for practice and future studies 158
CHAPTER SIX 160
DISCUSSION AND CONCLUSION 160
6.1 Summary of Study 160
6.2 Broad Implications 161
6.2.1 Exposure to Alcohol Content 161
6.2.2 Exposure to HFSS Foods 169
6.2.3 Exposure to Tobacco 175
6.4 Limitations 178
6.5 Future Actions 180
6.6 Recommendations 184
REFERENCES 186

Publications arising from the thesis

1. Alfayad K., R.L. Murray, J. Britton, and A.B. Barker, Content analysis of Netflix and Amazon Prime Instant Video original films in the UK for alcohol, tobacco and junk food imagery. Journal of Public Health. 2021 Mar 02; fdab022. doi: https://doi.org/10.1093/pubmed/fdab022.
2. Alfayad K. R.L. Murray, J. Britton, and A.B. Barker, Population exposure to alcohol and junk food advertising during the 2018 FIFA World Cup: Implications for public health.

Presentations

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List of Figures

Figure 1. The percentage of regular smokers in England between 1974 and 2020. 21
Figure 2 - Alcohol consumption in 2018, a comparison between various countries and the world 34
Figure 3: Pattern of alcohol consumption prior to the Opinions and Lifestyle Survey 2005 – 2017 (46). 35
Figure 4: Alcohol-related hospital admission in the UK between 2006/07 and 2016/2017 (46) 38
Figure 5: Analysis of selected movies by genre and BBFC rating. 96
Figure 6: Summary of data on actual consumption, inferred consumption and reference to alcohol, tobacco and HFSS in all films selected for analysis 98
Figure 7: Summary of data on actual consumption, inferred consumption and reference to alcohol, tobacco and HFSS in movies selected from Netflix and Amazon Prime Video . 99
Figure 8. Powerade advert during the 2018 FIFA World Cup in the match between France and Croatia. 116
Figure 9. McDonald's ad during the 2018 FIFA World Cup France vs Croatia game. .. 117
Figure 10. Screenshot of a 2018 Budweiser World Cup Campaign during the France vs Croatia Match 117
Figure 11. Coca Cola World Cup 2018 advertising during the Russia vs. Saudi Arabia match 123
Figure 12: Per capita impression of HFSS in selected matches during the FIFA 2018 World Cup 132
Figure 13: Per capita impression of alcohol in selected matches during the FIFA 2018 World Cup 133
Figure 14. FIFA Women's World Cup 2019 showing Coca-Cola advert during the England vs USA match 148
Figure 15. Screenshot of Powerade ad during a 2019 FIFA Women's World Cup between England vs USA 148

List of Tables

Table 1: Summary of IMDb classification and BBFC rating of selected movies 96
Table 2: Details of data on imagery of alcohol, tobacco and HFSS from all selected movies 99
Table 3: Proportion of intervals containing content on each service 103
Table 4: Characteristics of the thirteen matches recorded 119
Table 5: Match by match analysis of adverts for McDonald's, Coca-Cola, Powerade, and Budweiser 121
Table 6: Duration, appearances, and comparison between Group A and G 125
Table 7: Location, frequency, and duration (seconds) of brand appearance during the thirteen selected matches of the 2018 FIFA World Cup 125
Table 8: Gross and per capita total impressions of cumulative HFSS and alcohol appearances by population group and match 129
Table 9: Gross and per capita child impressions of cumulative HFSS and alcohol appearances by population group and match 130

Table 10: Results of Brands' appearances and durations 149
Table 11: Results of the games by pitch side 149
Table 12: Gross and per capita total impressions of cumulative HFSS appearances by population group and match 150
Table 13: Gross and per capita child (<16) impressions of cumulative HFSS appearances by population group and match 151

LIST OF ABBREVIATIONS

1. APS – Annual Population Survey
2. ASA – Advertising Standards Agency
3. ASH – Action on Smoking and Health
4. BAC – Blood Alcohol Concentration
5. BBC – British Broadcast Corporation
6. BBFC – British Board of Film Classification
7. BMI – Body Mass Index
8. COPD – Chronic Obstructive Pulmonary Disease
9. CVDs – Cardiovascular Diseases
10. DALY – Disability-Adjusted Life Year
11. FIFA - International Federation of Association Football
12. HFSS – High in Fat, Salt, or Sugar foods.
13. IMDb – Internet Movie Databases
14. ITV – Independent Television Network
15. NHS – National Health Service
16. Ofcom – Office of Communications
17. ONS – Office of National Statistics
18. PG – Parental Guidance
19. Rated R – Restricted
20. UK – United Kingdom
21. VOD – Video-on-demand
22. WHO – World Health Organization
23. WHO FCTC – The World Health Organization Framework Convention on Tobacco Control.

CHAPTER ONE

BACKGROUND OF THE STUDY

1.0 Introduction

Unhealthy lifestyle behaviours such as tobacco smoking, alcohol consumption, and unhealthy diet are risk factors for many human diseases [1–3]. This has partly led to the description of diseases linked to the way people live their lives as lifestyle diseases [4]. Promoting the awareness of the impact of lifestyle behaviour on the health and wellbeing of adults was previously recognized as an effective health promotion strategy as it was believed that diseases arising from these habits are only common in adults [5]. Many of these adult problems develop as a result of habits formed in childhood. Prior scholarly work has demonstrated that childhood experiences affect individual health in adulthood. Individuals who encounter various adverse childhood experiences early in their childhood are at an increased risk of developing certain behaviours as they mature into adulthood [6,7]. For instance, past research has linked adverse childhood experiences, consisting child abuse and household dysfunction to the overall use of tobacco products [8–10], alcohol misuse [11,12], and HFSS food consumption [13]. These habits can further be exacerbated by exposure to TV. Consequently, it has been reported that exposure to contents in the media may promote their use as well as lifestyle diseases accompanying such consumptions [5].

In line with the objectives of this study, this literature review will broadly examine the contribution of media to the prevalence of lifestyle behaviours such as tobacco smoking, alcohol consumption and HFSS food consumption in adults and children.

Specifically, the prevalence of these behaviours among children and adults globally as well as in the United Kingdom (UK) will be reviewed alongside other key concepts such as the health and economic impact of smoking, alcohol consumption and HFSS food consumption. This review will also document evidence of the wider social impact of these behaviours and public health policies relating to behaviours covered in this review.

1.1 Tobacco Use and Smoking

1.1.1 Prevalence of tobacco use and smoking.

According to the World Health Organisation (WHO), about 1.3 billion people globally smoke tobacco as of 2022 [14]. Available evidence also indicates a global reduction in tobacco smoking in many countries due to the increase in the use of e-cigarettes[15,16]. However, smoking is still prevalent in many regions of the world and indeed increasing prevalence of tobacco smoking has been highlighted in some African countries (such as South Africa)[17] and Eastern Mediterranean countries (such as Saudi Arabia) [18,19]. The global trend and projections for tobacco use produced by the WHO predicts that global prevalence rate will go down by 30% by 2025, relative to 2010 [20]. Despite this overall prediction for a reduction in smoking prevalence, prevalence rates are likely to remain high in low and middle-income countries, where the burden of diseases and death related to tobacco use is heaviest [14].

In the UK, the overall prevalence of tobacco smoking is decreasing like many other parts of the world [21]. The 2019 Annual Population Survey (APS) indicates that there

are 6.9 million tobacco smokers in the UK [21] and the proportion of smokers in the UK has fallen from 14.7% in 2018 to 14.1% in 2019 [21]. According to the 2019 APS, the proportion of tobacco smokers aged 18 or over is 13.9% in England, 15.5% in Wales, 15.4% in Scotland, and 15.6% in Northern Ireland [21]. Available data also indicate a declining trend in the proportion of children who have never smoked in the UK [22]. As of 2016, data shows that 19% of pupils reported to have tried smoking at least once, statistics that tally with those reported earlier in 2014 [23]. Nonetheless, the statistics indicate a progressive decline over the years since 1996. Figure 1 shows the trend in the percentage of regular smokers in the UK observed between 1974 and 2020. It is uncertain, however, if this data takes vaping that is increasingly becoming popular in the UK into consideration [24,25].

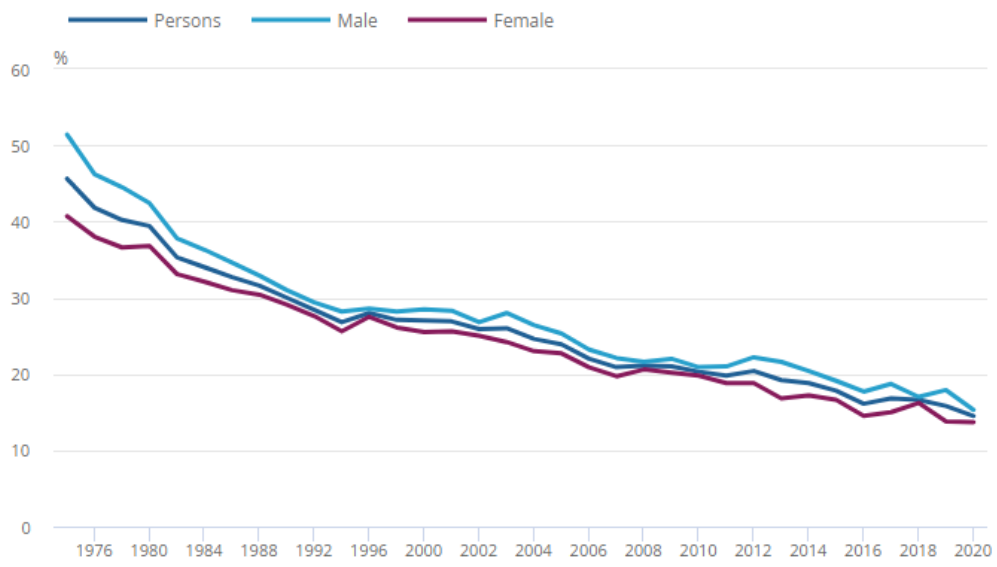


Figure 1. The percentage of regular smokers in England between 1974 and 2020.

Figure is based on data provided by NHS Digital 2019, available from *https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/dru*

gusealcoholandsmoking/bulletins/smokingprevalenceintheukandtheimpactofdatacollectionchanges/2020#:~:text=Current%20smokers%20in%20Great%20Britain,downward%20trend%20seen%20since%201974.

The prevalence of tobacco and use is largely influenced by socio-economic factors, such as relationship status and the level of education. Recent statistics by the ONS revealed that around 1 in 4 people working in routine and manual occupations smoked, in comparison to 1 in 10 people in professional and managerial occupations [26]. The statistics further reveal that 23.4% of individuals working in regular and manual occupations (for instance, laborers or care workers) smoked in 2019 [26]. This number is much higher than those in managerial and professional occupations (9.3%) and intermediate occupations (14.1%) who smoked during the same period. However, the percentage of smokers across the different socio-economic groups has declined significantly since 2014 [26]. The data insinuates that people are less likely to smoke as their personal income increases.

Data from the US shows that 21.3% of the adults use tobacco products each day or on some days, but variations exist from a socioeconomic perspective [27]. Tobacco use is believed to rise to 32.2% among households earning less than $20,000 each year, and further decreases to 12.1% in households earning more than $100,000 each year [27]. These findings are further supported by a study by Perelman et al.[28] examining the link between personal income and smoking among adolescents across six European cities. Findings from the study indicate that the personal income of adolescents is positively related to smoking behavior.

However, the link between the intensity of smoking and personal income was weaker among low socio-economic status adolescents [28].

1.1.2 Health implications of tobacco use and smoking

Tobacco smoking has serious health implications [29]. According to the WHO [14], tobacco is the only legal substance that is capable of killing its users even when used as prescribed by the manufacturer. Tobacco use is also strongly linked with morbidity, disability, and deaths from non-communicable diseases. For instance, studies have shown that tobacco smoking accounts for about 90% of all lung cancer death in the United States of America [30,31] and about 80% of deaths resulting from chronic obstructive pulmonary disease (COPD) [32,33]. According to the Centres for Disease Control and Prevention [34], smoking affects almost every organ within the body and can prevent conception in women [35,36], reduce fertility in men [37,38], affect bone health [39], reduce immune response [40] and increased risks of infection such as covid-19 [41], cardiovascular diseases [42], lung cancer [30] and is a significant risk factor for impaired glucose metabolism which characterizes type 2 diabetes [43]. In the UK, the Office of National Statistics (ONS) reported that smoking accounted for 37% of deaths from respiratory diseases as well as 26% of cancer-related deaths in 2016 [26]. Within the same period, it was reported that smoking-related (defined as death resulting from diseases or ailments caused by smoking) hospital admissions in the UK rose by 2% from 474,300 in 2015/2016 to 484,700 in 2016/2017 [26]. Major morbidities linked to tobacco smoking, in the order of their prevalence; include respiratory diseases, problems with the circulatory system, cancer and digestive

system diseases. Smokers have increased risks of developing heart diseases, stroke and lung cancer [44]. Moreover, it has been estimated that smoking increases the chance of developing coronary heart disease and stroke by 2 - 4 times [44] and the risk of developing lung cancer is increased 25-fold in men and 25.7- fold in women. With respect to developing cardiovascular diseases, it has been shown that smoking leads to damage in blood vessels with the attendant effects on blood pressure [44]. It is therefore not surprising that an estimated 6 million people die annually due to tobacco use globally including approximately 600,000 people due to passive (or second hand) smoking [1]. According to the ONS [26,44], tobacco smoking accounted for 77,900 deaths per year in the UK between 2016 and 2018 represents a 2% decrease in the figure recorded in 2015 and a 7% decrease from the figure recorded in 2006.

Evidence has shown significant health risks of tobacco use in children and adolescents. Most of these studies suggest that passive exposure to tobacco causes an increase in the number and severity of respiratory illnesses [45–47]. In one study[45], the authors examined the use of tobacco and exposure to smoke among children. The findings reveal cognitive differences as well as behaviour-control disorders among elementary school children subjected to prenatal and postnatal exposure to tobacco. In another study[46], the researchers used a sample from Finland and Russia to examine the effect of tobacco smoke on the health of children. Hugg et al., carried out a population-based cross-sectional study in the towns surrounding Imatra in Finland and Svetogorsk in Russia. The sample featured 512 Finnish and 581

Russian school children ranging in age between 7 and 16 years. The findings showed varying rates of tobacco smoke exposure between Finland and Russia. High exposure to maternal smoking during pregnancy was linked to a high risk of asthma (adjusted OR 3.51). Maternal smoking during infancy was also tied to allergic conjunctivitis among children (adjusted OR 4.53). Based on the findings, Hugg et al.[46] conclude that the smoking behaviour of parents and environmental tobacco smoke exposure during childhood resulted in adverse health effects. Concerning the health effects of actual tobacco use in children, an earlier study by Chilmonczyk et al.[48] noted a link between exposure to environmental tobacco smoke and pulmonary morbidity among children diagnosed with asthma. The relative risks for the highest exposure category were 1.8 (95% CI, 1.4-2.2.) for reported exposure and 1.7 (95%CI, 1.4 – 2.1) for exposure denoted by cotinine levels.[48] Milberger et al.[49] studied an early start of cigarette smoking among children and adolescents and the contribution of this behaviour to attention-deficit hyperactivity disorder (ADHD). Using a sample of boys ranging in age between 6 and 17 years, the findings revealed that an early start of cigarette smoking was associated with ADHD.[49] These findings imply the significance of smoking prevention and cessation programs for children.

1.1.3 Health implications of passive or second-hand smoking

According to the National Health Service (NHS) [50], passive smoking refers to the involuntary inhalation of smoke from other people's cigarette. Ferrante et al [51] reported that exposure to this second-hand smoke is enough to cause significant health problems and represent one of the ways through which smoking can

negatively impact on the health and wellbeing of other people. For instance, children can easily be exposed second-hand smokes in the house or car if they have parents who are smokers; leading to conditions such as asthma, respiratory tract infections, meningitis and cot deaths [52,53]. Moreover, it has been shown that about 165,000 new cases of disease among children in the UK can be attributed to exposure to secondary smoke [54].

Smoking during pregnancy can also have significant health implications for the unborn child and even after the child is born. Research evidence suggests that smoking during pregnancy increases the risks for preterm birth, still birth, ectopic pregnancy, low birth weight and congenital defects in children [55]. According to Alberg et al [56], the concentration of toxic substances in tobacco smoke is four times higher in second-hand smoke. It has also been shown that there is a relationship between exposure to secondary smoke and the risk of developing lung cancer [57].

Apart from children, exposure to second-hand smoke is believed to also have a significant impact on adults. The WHO, as cited by Yousuf et al.[58] approximates that 1 billion people who smoke globally contribute to 880,000 second-hand smoke (SHS) related deaths among non-smokers each year [58]. Exposure to second-hand smoke has been linked to more extensive coronary artery disease, as well as a 20-30% increase in cardiovascular events compared to those not exposed to the smoke [58–60]. Venn and Britton[60] note in their study that individuals exposed to second-hand smoke have disproportionately increased levels of 2 biomarkers of cardiovascular

disease risk, homocysteine, and fibrinogen. Besides, second-hand smoke has been linked to an increase in lung cancer [58,61,62]. Asomaning et al.[61] note that all the individuals exposed to second-hand smoke have an increased risk of lung cancer. They further note that individuals first exposed before age 25 have a higher chance of contracting lung cancer compared to those who get exposed after 25 years of age. Together, these studies suggest that exposure to second-hand smoke has significant health effects on adults and can lead to many smoking-related diseases.

Additionally, second-hand smoke exposure results in a major financial burden to the economy. However, studies on the cost implications of second-hand smoke exposure on adults, especially in the UK remain ambiguous. One of the most recent studies attempting to quantify the financial burden of second-hand smoking was conducted in Greece [63]. The study used the cost-of-illness method to judge the economic cost of second-hand smoke (SHS) exposure. The findings estimated the total economic cost of second hand exposure in Greece to be more than double the proceeds from tobacco taxes [63]. In a study investigating the effectiveness of a complex intervention meant to reduce second hand smoking exposure, estimates the long-term costs of treating SHS as £5.7 million per year, including an additional £5.6 million in lost productivity annually [64]. Overall, SHS is a cost to the individual's health and undermines the productivity of the economy, placing an additional burden to the healthcare system.

1.1.4 Economic impacts of smoking

The impact of tobacco smoking on the economy is diverse with negative and positive dimensions [57,65]. However, the negative impact of tobacco smoking is indicative in healthcare costs, labour loss and the cost involved in enforcing tobacco control laws and regulations in countries across the world. According to the WHO [1], annual healthcare costs and labour loss attributable to tobacco smoking is estimated at US$ 1.4 trillion. It has also been reported that healthcare costs resulting from smoking-related diseases amounted to US$467 billion in 2012 and represented 5.7% of the total amount of money spent on health globally for that year [65]. The study further corroborated that the total economic costs of smoking for 2012 equalled 1.8% of the global annual gross domestic product and 40% of this expenditure occurred in developing countries [65].

A report by Action on Smoking and Health (ASH) indicates that in the UK, a smoker who consumes 20 sticks of a premium cigarette brand per day spent £3600 per annum in 2017 while a smoker on a national average of 11 cigarettes per day spent £1800 over the same period [66]. Also, the cost of cigarette has increased significantly over the years. As of 2021, the price of the most expensive packs of cigarettes has increased by 88p, from approximately £12.73 to £13.60 [67]. Consistent with the falling rates of smoking, the Office for National Statistics reported that the national household expenses on tobacco for 2015 was £19.3 billion [68], representing a 1.6% reduction from the figure for 1985. This is consistent with the declining rates of smoking. Moreover, the HM Treasury reported in 2014 that the total annual cost of smoking to the society in the UK, including NHS costs for smoking-related

disease treatment and labour loss due to death, sick leave and smoking breaks, was £12.9 billion [69]. The cost of enforcing tobacco control measures in the UK is also huge, recently, the All-Party Parliamentary Group on Smoking and Health proposed a budgetary increase of £100 million a year for the enforcement of tobacco control measures [66]. Moreover, it was reported that a total of 1.2 million items were prescribed in England to help people stop smoking in 2015/2016 while a total of £5.3 million was spent on mass media anti-smoking awareness campaigns over the same period [66].

Tobacco smoking, on the other hand, has positive effects on the economy. In addition to huge revenues generated from tobacco sales worldwide, tobacco taxes have been reported as a source of huge revenue for governments across the globe. According to Jha and Peto [70], tobacco taxes raised total global government revenue of US$269 billion in 2013/2014 while only US$1 billion of this amount was invested in tobacco control over the same period. Jha and Peto [70] also indicated that increasing tobacco taxes by 300% will significantly reduce its consumption by a third and increase government revenue by the same proportion. In the UK, a net revenue of £9.5 billion was generated in the year 2015/2016 from tobacco taxes [66], amounting to about 2% of total government revenue for that period.

1.1.5 Public health policies on smoking

The rapid increase that occurred previously in prevalence of tobacco use together with its attendant health and economic impacts motivated demands for and the establishment of policies and regulations for the control of tobacco use [71]. Other

contributory factors to the explosive nature of tobacco consumption include advances in global marketing which provides good platforms for multi- and transnational promotion and sale of tobacco products [72]. In addition, an upsurge in the spate of illegal tobacco products (such as contrabands, counterfeits and illicit whites) significantly contributed to the need for control measures to be put in place nationally and globally [71,72]. Initial regulatory responses focused on demand reduction by placing higher taxes and carefully planned bans on tobacco products and their advertising on public platforms.

Prior to the adoption of the World Health Organization Framework Convention on Tobacco Control (WHO FCTC) in 2005, the Tobacco Products Directive, established in May 2001, was the extant law which regulated tobacco products across the European Union [73]. Among others, the directive regulated the amount of tar, nicotine and carbon monoxide that cigarettes can contain and mandated cigarette manufacturers to disclose details and purposes of materials added to tobacco products [74]. The directive also clearly prescribed how health warning on products must be written. The Directive was reviewed in 2014 to include measures which currently regulates the use of electronic cigarettes. Among other measures, the 2014 Directive introduced new labelling requirements for novel tobacco as well as other smoking products made from herbs. It also instituted a tracking system for all legal tobacco supply chains within the EU [72,73].

Following a series of discussions among member states, the WHO established the WHO FCTC in 2003. This first negotiated treaty on tobacco control came into force in 2005 [75]. In addition to affirming the right of the public to a high standard of health, the treaty represents a change in approach to tobacco control by placing emphasis on addictive substances while addressing issues around both the demand and supply of tobacco products. The treaty makes provisions for strategies to reduce tobacco demand by recommending price and non-price measures as well as tax regimes that discourage tobacco demand (Article 6 – 14) [75]. Non-tax measures contained in the treaty demand protection of the public from exposure to environmental tobacco smoking, content regulation and disclosure for tobacco products as well as clear regulations with respect to the packaging and labelling of tobacco-based products [75]. In addition, the treaty makes provisions for increased education and promotion of public awareness as well as measures regulating the advertising and sponsorship. Measures to promote cessation and inhibit dependence on tobacco use were also covered by the treaty [72]. Articles 15 to 17 of the treaty focus on the regulation of tobacco supply and cover issues relating to illegal tobacco trade, access of people under the age of 16 to tobacco products as well as support programmes for other economically viable behaviours as alternative for tobacco-based businesses [75]. This treaty was adopted by the European Union Council and ratified by its member states in 2004 [72].

In addition to these EU-wide policies and programmes to control tobacco use, the UK government launched a bespoke tobacco control plan in 2014. This plan aimed

at reducing the prevalence of tobacco smoking in England to 18.5% in adults, 12% in residents aged 15 and to 11% in pregnant women by 2015 [72]. Other undertakings within the plan include the ban on cigarette sales from vending machines and its display at point of sale as well as plans to standardize tobacco packaging. The success of this plan in England led to its replication or establishment of similar programmes in Wales (targeted reducing tobacco smoking to 16% by 2020), Scotland (developed new strategy to reduce smoking to 5% by 2034) and in Northern Ireland (launched a 10-year control strategy in 2012) [76].

"Towards a smoke-free generation" is the current policy initiative of the UK government to control tobacco use in England. This policy aims to build on the achievement of the 2014 Tobacco control plan and sets an ambitious plan to reduce the national prevalence of smoking to 5% or below by 2022 [77]. Specifically, the policy's target includes reducing the prevalence of smoking among people aged 15 to 3%, 12% in adults and 6% or less in pregnant women [77]. The policy strongly supports actions that prevent smoking and those who encourage smokers to quit while seeking to eliminate regional and socio-economic factors that promote smoking.

1.2 Alcohol Consumption

1.2.1 Historical background of alcohol consumption

The consumption of alcohol, either as historical habits or as a component or regular diet, has been reported as a practice that is common in many societies across the

globe [78]. The use of fermented beverages has also been reported as part of common practices in many parts of the world prior to modernization and civilization. Under these circumstances, alcohol was produced in small scale and drinking was occasional; often during festivals or special communal occasions [79]. The production of alcohol in large quantity and as a commercial commodity evolved as a consequence of technological advances leading to the establishment of distilleries and transportation mechanisms [80]. Over the years, increases in alcohol production and availability laid the foundation for public health problems arising from alcohol dependence and misuse [79]. By the 19th century, the disastrous impact of alcohol consumption on industrial productivity together with the attendant social and health problems became rampant in many countries across the globe [80].

1.2.2 Prevalence of alcohol consumption

The WHO estimates that over 6.2 litres of pure alcohol per person 15 years and older were consumed globally as of 2018 [81]. The average of 6.2 litres per person per year equals to 53 bottles of alcohol. Within these statistics, the unrecorded consumption amounts to close to 26% of the global consumption [81]. Figure 2 shows an interactive map of the annual average alcohol consumption of alcohol, expressed per person aged over 15 years. The figure shows the average alcohol consumption worldwide as 6.18 litres, and for the UK as 11.45 litres.

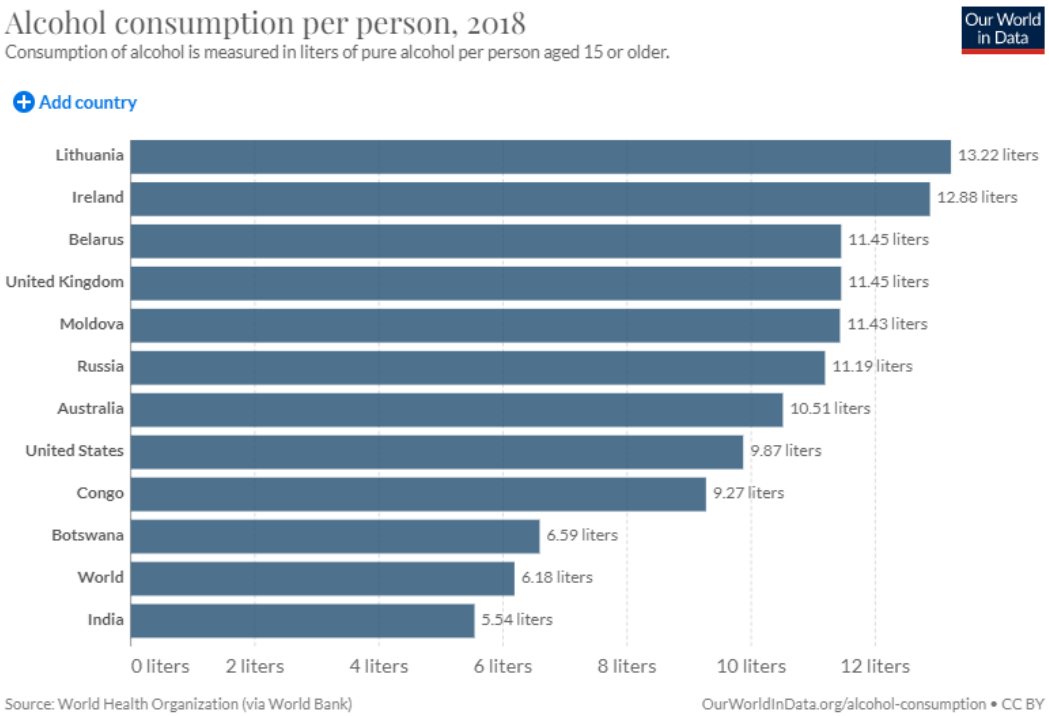


Figure 2 - Alcohol consumption in 2018, a comparison between various countries and the worldAvailable from, https://ourworldindata.org/alcohol-consumption

The Opinions and Lifestyle Survey, conducted by the Office of National Statistics, is a self-report tool used annually to collect data on alcohol consumption in the UK. The trend in alcohol consumption pattern in the UK between 2005 and 2017 is indicated in Figure 2.

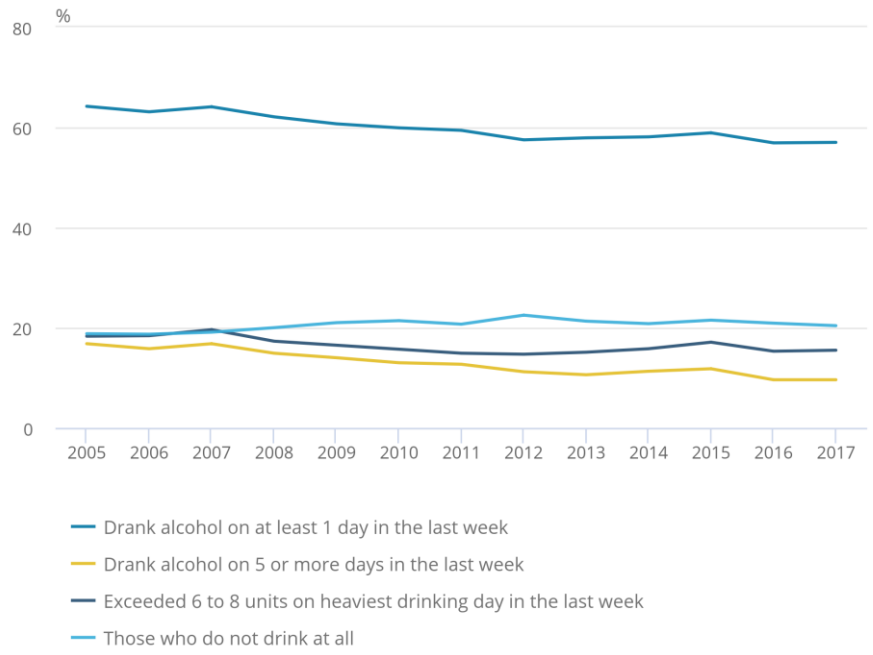


Figure 3: Pattern of alcohol consumption prior to the Opinions and Lifestyle Survey 2005 – 2017 (46).

Data collected for 2017 indicated that 30 million respondents (58% of total sample) drank alcohol prior to participation in the survey with about 8 million people reporting that they binge on their heaviest day of drinking which is about consuming 4 or more drinks for women and 5 or more drinks for men in approximately 2 hours, and that brings blood alcohol concentration (BAC) to 0.08 g/dl [43,82]. The report also indicated that though people aged 16 – 24 are less likely to drink in the UK compared to other age groups, they drink more heavily whenever they do. A clear linkage between income and excessive drinking was also established in the report and it was indicated that people earning £40,000 per annum or more are more likely to indulge in binge drinking in England.

1.2.3 Alcohol dependence and misuse

In England, recent data shows that there were an estimated 602,391 dependent drinkers as of 2018/19. Among these individuals, 82% were not accessing any treatment [83]. Even though signs or symptoms which could be used to distinguish between dependence on and social alcohol drinking have been reported, making a distinction between the two is always difficult [84]. Alcoholism or alcohol misuse has been described as a condition resulting in frequent consumption of alcohol to a point that an individual finds it difficult to live a normal and healthy life [84]. Characteristic features of this condition include uncontrollable appetite for alcohol once drinking begun, manifestation of withdrawal syndrome when alcohol use is stopped which is indicative of physical dependence as well as alcohol tolerance exemplified by the urge to use alcohol excessively in order to achieve effects previously achieved with a smaller amount of alcohol [84]. In 2004, global prevalence rates ranging from 0 to 16% of entire population were reported for alcohol misuse among adults with Eastern Europe having the highest rate [85].

Several individual and societal factors have been implicated as responsible for alcohol dependence [86]. In the first instance, environmental factors including availability of alcohol, existing alcohol control policies and regulations and national economic status have been identified as key contributors to trends in alcohol consumption [87]. In addition, studies have shown that adults and young adults are more susceptible to alcohol misuse compared to other age groups [88,89] while those who started drinking before the age of 14 are more likely to develop

alcohol dependence or abuse later in life [90]. Studies have also suggested a role for family history or genetic predisposition in the series of events leading to alcohol dependence [91]. The contribution of socio-economic status to the development of alcohol dependence has been suggested that people from wealthy socio-economic backgrounds tend to be more low-risk drinkers and people from poor economic backgrounds who are more susceptible to serious health and other attendant consequences of alcohol drinking [92].

1.2.4 Health impact of alcohol consumption

The impact of alcohol consumption on health can be expressed in different dimensions. A significant level of morbidity has also been attributed to alcohol consumption. In 2018, about 5.1% (139 million Disability-Adjusted Life Year, DALY) of the total global disease burden was attributed to alcohol consumption [1]. The link between diseases such as liver cirrhosis, infectious diseases such as HIV [93] and tuberculosis, diabetes, cancers, cardiovascular diseases and injuries has been documented extensively [94]. According to the ONS [95], 337,000 alcohol-related hospital admissions were made in 2016/17 in the UK. The trend in hospital admission due to alcohol consumption over the past 10 years in the UK is increasing (Figure 3).

The ultimate of these effects is mortality arising from alcohol dependence or misuse [1]. According to the WHO, about 3.3 million deaths which is equivalent to 5.9% of global deaths were caused by alcohol consumption [1]. In the UK, it was reported that

5,698 deaths arising from conditions caused by alcohol consumption occurred in 2018. This represents a 2% increase on the data for 2017 and 11% increase compared with the data for 2008 [95].

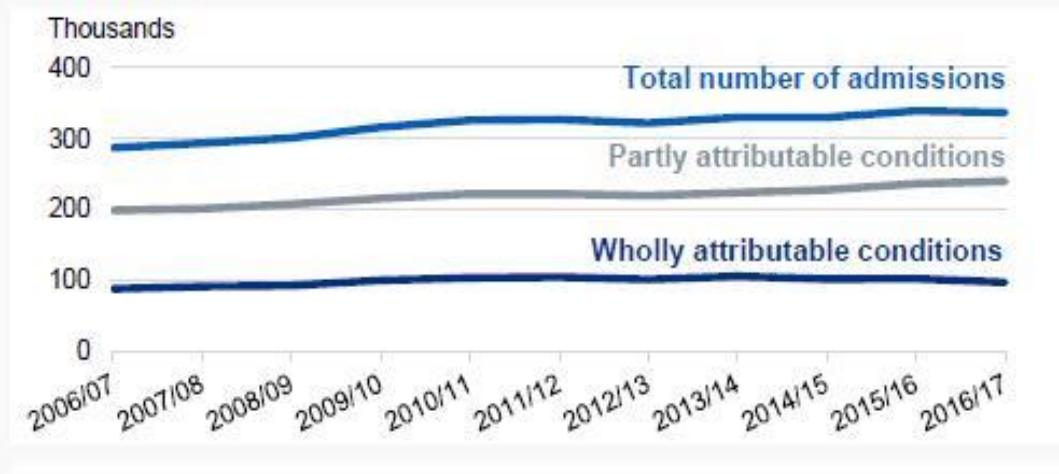


Figure 4: Alcohol-related hospital admission in the UK between 2006/07 and 2016/2017 (46)

The alcohol health harms to children have also been reported in literature. Drinking alcohol can easily damage the health of children regardless of their health [96–99]. Alcohol can interfere with the normal development of crucial organs and functions, including the brain, liver, bones, and hormones. Children who start to drink before the age of 14 have been shown to succumb to a myriad of alcohol related injuries [99], regular involvement in violence, and an increased number of suicidal thoughts and attempts [96]. Alcohol drinking among children has also been linked with risky behaviour [97,98], including violence, engagement with more sexual partners, use of drugs, unwanted pregnancies, drunk driving, and challenges at work [97,98].

1.2.5 Social and economic impacts of alcohol consumption

The social impacts of alcohol consumption can be viewed in terms of how it affects the immediate people around the drinker as well as the society at large. Studies have indicated the possibility of significant impairment of the ability of an alcohol drinker to fully function and fulfil his/her daily responsibilities at work, in the home and within the larger society [100]. Productivity of alcohol drinkers are usually reduced, and this could lead to job loss [100,101]. On the other hand, absence from or lateness to work due to alcohol consumption will increase the burden of co-workers who may have to cover up [101]. At home, the ability of a drinker to provide parental or guardian care is affected [102]. This may lead to maltreatment, abuse or neglect of people (particularly children) who are under the care of the drinker [102]. Break-down in friendships and family relationships may also result as a consequence of alcohol consumption [102].

Alcohol consumption presents numerous costs to the society. When valuing the costs of alcohol to the society, it is more common to focus on the external costs or rather the damages that drinkers cause to others. Though the estimated figures vary, the most common is the claim by the UK government that alcohol consumption costs the society £21 billion annually [103]. The figure is based on a 2003 Cabinet Office Strategy Unit report [104], and consist of NHS costs (£3.5 billion per year), alcohol-related crime (£11 billion per year), and costs to the economy (£7.3 billion per year) [103]. While the government's overreliance on these figures has been criticised, Public Health England (PHE) provide different estimates ranging between £27 billion and £52 billion [105]. PHE's estimates are reliant on a study by

Rehm et al.[106] which aggregated estimates of the external cost of alcohol from various studies in different countries. The findings of the study suggested that the external costs of alcohol consumption range between 1.4% and 2.7% of the national income [106], a recommendation considered by PHE in reaching these recent estimates in 2016.

The fact that alcohol consumption affects the economy significantly cannot be over emphasized. The direct economic costs of alcohol abuse or dependence can be computed from costs incurred by organizations that deal with consequences of alcohol abuse such as hospitals, police, criminal justice system and many other relevant organizations [107,108]. These costs include those required for medical care and drugs for managing diseases resulting from alcohol consumption, ambulatory care and other health related costs. This category of costs has been reported to be equivalent to 9 to 24% of all alcohol related costs [108]. Moreover, when people become drunk with alcohol, they often become unruly and disorderly; leading to increased crime [109]. Therefore, costs incurred by the justice system in managing these behaviours contribute to the economic costs of alcohol consumption. In addition, there are indirect economic costs resulting from alcohol consumption. This could be interpreted in terms of intangible costs of pain and discomfort suffered by the drinker or those close to them [109]. In the past, the total economic cost of alcohol-related harm had been cited as £21bn each year across the UK [110]. However, this figure is generally underestimated and the to be much higher than

this. A recent report estimates the economic burden to be between £27bn and £52bn as of 2016 [110]. These figures represent about 1.3% to 2.7% of the GDP as of 2016.

1.2.6 Public health interventions and policies on alcohol consumption

The tremendous impact of alcohol consumption on the health and well-being of the individual drinker, people in their immediate sphere of life as well as the society at large necessitates the development of appropriate strategies and policies for the regulation of alcohol availability, marketing, and accessibility. Therefore, the reduction of harmful use of alcohol, together with the attendant health, social and economic effects at all levels, is the central aim of alcohol control policies. With a view to strengthen the development and enforcement of effective policies for the regulation of alcohol use at national and regional levels, the WHO developed a Global Strategy, which stipulated key guiding principles for alcohol policies and identifies priority areas as well as actions to mitigate against alcohol misuse globally [111]. Key components of the strategy include that public health interests and clear public health goals must be important factors which inform alcohol policy development and implementation among member states. In addition, the guideline also makes provisions for the protection of people who are at risk of alcohol dependence, people affected by harmful alcohol use as well as support for people who choose to abstain from alcohol [92].

To ensure the effective implementation of the Global Strategy by member states, the WHO facilitated the formation of networks among member nations and hosted capacity building workshops/conferences (such as the 2012 Global Alcohol Policy

Conference in Thailand) on alcohol policy [112]. These interventions were successful as many countries showed an increased level of commitment to the regulation of alcohol use. This manifested in the form of written national alcohol policies in about 66 countries (39%) of WHO member states and stricter blood alcohol limits in many countries, particularly when driving [112].

In the UK, intervention programmes have been established at local, community as well as individual levels with healthcare professionals playing key roles. At the local population level, alcohol was included in the Joint Strategic Needs Assessment of the National Health and Wellbeing Board and commissioned services were established to address population needs in this regard. At the community and individual levels, awareness campaigns to promote lower risk drinking plus initiatives such as alcohol screening and advice services for those whose drinking is above low risk levels were implemented among other interventions [113].

Relevant policies have also been formulated in England, Wales, Scotland, and Northern Ireland with respect to alcohol use. For instance, the Alcohol Strategy was published in England in 2012 (with further amendment in 2013) which addressed issues around minimum unit pricing for alcohol and introduction of regulatory frameworks for alcohol sale [114]. Similar efforts were made in Scotland. In 2009, the Scottish government introduced the "Changing Scotland's Relationship with Alcohol" policy which highlighted a variety of approaches to facilitate reduction in

alcohol consumption, development of positive attitude and choices, provision of support for communities and families as well as improved treatment and support services for those suffering from alcohol dependency. In Wales, the Working Together to Reduce Harm: National Substance Misuse Strategy was produced as a 10-year plan to address harm resulting from the misuse of alcohol and other substances [115]. Similarly, a 5-year plan tagged "New Strategic Direction for Alcohol and Drugs" was introduced in 2011 by the devolved government of Northern Ireland [116]. Despite these policies, alcohol consumption is still prevalent among the populace.

1.3 High Fat, Sugar and Salt (HFSS) Food Consumption

1.3.1 General overview of HFSS foods

Significant changes in eating pattern have been reported over the past four decades [117] and this has been implicated as one of the major contributors to increasing rate of obesity and other associated diseases globally [3]. The most obvious change in this regard is the preference for the consumption of highly processed food among many populations across the globe [118]. HFSS diets are often high-energy, low nutrient diets usually prepared outside the home and served in large portions [119]. Greater consumption of animal-based food products as well as oily and high calorific sweeteners has also been reported in many countries [120]. Due to the nature of these diets, the immediate result of this, within the population, is the consumption of excessive amounts (beyond recommended limits) of components; such as sodium, fat or sugar, leading to health implications such as weight gain and obesity [121]. In

addition, studies have indicated that this is often accompanied by reduced consumption of healthy high-nutrient and low energy alternatives [122].

1.3.2 Trends in HFSS diet consumption

Increased consumption of HFSS food is common in many parts of the world [121]. Studies have indicated that intake of unhealthy beverages such as high energy drinks has increased by 300% in the United States of America between 1970 and 2001 and almost 1 in 2 Americans drink these beverages daily [123]. Though a recent study indicated a decline in the consumption of soda in the US, the intake of other high-energy drinks completely obliterated the little benefit that such decline may portray [124]. Other studies have indicated that the trend in America is replicated in many other countries, including China, Thailand Asian nations [125]. In the UK, available data indicates that the number of British adults likely to buy soft drinks, referring to non-alcoholic drinks such as carbonated and non-carbonated drinks excluding coffee and loose-leaf tea reduced by 5% between 2020 and 2019. While 67% were likely to buy these drinks in 2019, the figure recorded in 2020 was 62% [126]. Age strongly influences the decline in consumption of soft drinks, with the largest decrease being reported among Brits ranging between 40-54 years. There has also been an 8% decrease in the number of younger consumers between 18 and 24 years likely to buy a soft drink between 2019 and 2020[126]. On average, 2018 statistics reveal that Brits consume 322 cans of sugary drinks each year, totalling to about 106.1L or 2L each week[127]. Findings by the National Diet and Nutrition Survey conducted between 2016 and 2019 suggest that the highest mean consumption of sugar among children was among those between 11 and 18 years

(142g/day), with the lowest consumption being among children aged between 1.5 and 3 years (19g/day). Despite the decrease, these values are still above the recommended limit of sugar content consumption of about 5% [126]. The excessive intake can largely be attributed to the high amounts of sugar added to modern diets. Most children consume the extra sugars through pre-packaged products such as fruit juices, fromage frais, yogurts, cakes, chocolate-based confectionery, and pastries among related foods.

According to the WHO [129], the recommended maximum daily salt intake is 5g per person per day. However, available data across the globe indicate a significantly high salt consumption in many countries [129]. Similarly, more-than-normal but significantly varied level of fat consumption have been reported in many regions of the globe with the lowest consumption reported in South East Asian and the highest in Europe [129]. According to the reports of the National Diet and Nutrition Survey, fat consumption in adults in the UK was 12.5% of daily calorie intake, which is slightly higher than the recommended daily limit of 11% [130]. Moreover, the report indicated that only about 31% of people aged 19 to 74 and 8% of people aged 11 to 18 consume the arbitrary recommended 5 portion-a-day of fruits and vegetables [130].

The increased consumption of HFSS has contributed to an increase in the rate of obesity and overweight in the UK. Obesity is commonly described as elevated body fat which is associated with increased weight for height measured as Body Mass Index (BMI) [131]. Individuals with BMI of 30 or above commonly classified as obese

while people with BMI between 25 and 30 are considered as overweight [132]. Statistics documented by the Health Survey of England 2018 estimate the proportion of obese adults as 28% and that of overweight but not obese as 36.2% [131]. The statistics also show that men have an increased chance of being overweight or obese compared to women, with the data identifying 68.2% of men and 60.4% of women [131]. Data collected by Cancer Research UK (CRUK) estimates that more than 42 million adults in the UK are likely to be overweight by 2040, illustrating the magnitude of the issue [133]. 2018 data shows that among children, an estimated 14.4% of reception age children between 4 and 5 years in the UK were obese, with an additional 13.3% being overweight [131]. Between 10 and 11 years, 25.5% of the children were obese while 15.4% were overweight in the same year [131]. These statistics are alarming and illustrate the potential impact of increased consumption of HFSS among adults and children.

The most recent Health Survey for England (HSE) 2019 reveals that close to two-thirds of the English population aged 16 or over have obesity or are overweight. The prevalence of obesity is also higher in men, with 68% of this population being either obese or overweight[134,135]. Emerging evidence also indicates that the prevalence of obesity among children is increasing in the UK, and equally shocking as that recorded among adults [132]. Findings from the recent National Child Measurement Programme (NCMP) conducted between 2018 and 2019 showed that 22.6% of children between 4 and 5 years and 34.3% of children between 10 and 11 were obese[134,136]. Obesity is known as a significant risk factor for other diseases,

including diabetes, cancer, cardiovascular diseases and even infections such as SAR-CoV-2 (Covid-19) infection [137,138]. Specifically, obese children are more likely to have high blood pressure and high cholesterol, which are risk factors for cardiovascular disease [139]. Childhood obesity can also increase the risk of impaired glucose tolerance, insulin resistance, as well as type 2 diabetes. Other conditions related to childhood obesity include psychological issues, low self-esteem, low quality of life, along with social challenges such as bullying and stigma [139]. The economic impact of obesity-related diseases has been partly highlighted in the annual cost of about £6 billion which the National Health Service (NHS) spends in managing these diseases [138].

1.3.3 Drivers of HFSS eating

Several factors have been identified as key drivers of HFSS diets. In the first instance, studies have implicated changes in body metabolism, as people continually consume highly processed food items, which eventually lead to addiction to hyper-palatable high-fat, high-salt food materials [140,141]. Studies implicating biological factors as drivers for unhealthy eating propound that additives such as flavour enhancers are manipulated to an extent that they hype the reward derivable from foods, leading to the body's inability to regulate the intake of these food materials [142]. Furthermore, there is substantial evidence that excessive consumption of foods rich in fat, salt, and sugar promotes binge eating episodes, tolerance and withdrawal indications, and craving-like behaviours [143,144]. According to Bonder et al [140], an increasing body of evidence also indicates that

some food materials have the capacity to elicit responses similar to those produced by addictive drugs and thereby make people to become addicted to the consumption of these food items. Which can modify brain mechanisms in ways that lead to their more obsessive consumption, like drugs of abuse such as heroin and cocaine [143].

In addition to biological factors, certain psychological factors have been identified as drivers of the tendency for the consumption of HFSS food [145]. Research evidence indicates that about 50% of purchase decisions are unplanned and are made when people are already in the shops [146,147]. Therefore, shop owners can leverage on psychological factors to promote intake of HFSS foods. Examples of factors in this regard include encouraging over-eating by offering all-you-can-eat or large portions options in restaurants. Usually, customers visiting restaurants where these options are offered will tend to derive the maximum possible value for money spend and therefore consume more than necessary [146]. In addition, product placement of unhealthy food items around the checkout areas of supermarkets or the use of celebrity figures in the advertising of food products have been identified as drivers of unhealthy food consumption [148,149].

Socioeconomic factors contributing to the tendency for the consumption of unhealthy diets can be viewed from the perspective of income available to an individual, urbanization and the changing pattern of role of women in the family [150]. Studies indicate that HFSS foods are readily available and inexpensive in high-

income countries while neighbourhoods with low socio-economic status are also usually saturated with outlets for cheap, unhealthy food options [151,152].

1.3.4 Health and economic impacts of unhealthy diet

The consumption of unhealthy diets has been recognized as one of the major risk factors for obesity and other non-communicable diseases such as diabetes, cancer and cardiovascular diseases [153]. According to the WHO [154], about 1.9 billion adults (18 years and above) are overweight globally and 650 million of these are obese. The recent data also indicated that about 38 million children are obese globally [154]. Public Health England [130] indicate that about 61.9% of adults and 28% of children in the England are overweight (BM1 between 25 and 29.9) or obese (BMI above 29.9).

In addition, high salt and low fruit consumption have been implicated as risk factors for low life expectancy [155] as well as about 10% of disability-adjusted life years (DALYs) globally [156]. Dietary salt content is directly linked to blood pressure levels and therefore increased dietary salt intake (currently between 9 – 12g per day as opposed to the recommended levels of 5g per day) represents an important risk factor of cardiovascular diseases (CVDs) [157]. The consumption of saturated and trans fats also significantly contribute to the development of many of the non-communicable diseases already highlighted in this section. Non-communicable diseases are a major cause of death in the UK, and play a primary role in the burden of mortality across the population. For instance, 88.8% of deaths in England in 2019 were affiliated with non-communicable diseases [158].

In addition to its contribution to morbidity, the consumption of unhealthy food also contributes to the burden on health systems, the economy as well as the society at large. Obesity, resulting for excessive consumption of unhealthy food can significantly impair people's ability to secure and keep jobs in addition to its effects on self-esteem and mental health of sufferers [159]. A study by Candari et al. has shown that the estimated health-related costs of unhealthy diet ranged from as low as £3.5 per capita (China) to as high as £156 per capita in the UK [160]. Available data indicate that annual economic costs of unhealthy diet is about AU$ 2 billion in Australia [161] and about £6 billion in the UK [157].

1.3.5 Policies and strategies for promoting healthy eating.

Health, social and economic impacts of unhealthy diet highlighted in Section 1.3.4 provide justifications for strategies and policies for encouraging healthy eating at national and global levels. Across the globe, several strategies, ranging from issuing government mandates to placing restriction on sale or supply of particular food items and from charging huge taxes on some food items to discourage its purchase to regulating the marketing and/or labelling of food items, have been practiced in many countries. Government mandate represents the most restrictive policy approach and has been adjudged as an effective means of fostering a change in behaviour at industrial and individual levels, examples of mandate include regulating the type of or the level of particular ingredients that food items supplied in a particular country must possess [117]. On the other hand, national governments

can issue policies, which may not necessarily work like mandates, but resists the availability of certain products in some public places such as schools and hospitals [117]. These are usually used as a means of enforcing national dietary guidelines or prohibit sales of some materials (such as alcohol and junk foods) in places such as schools and prisons [162].

The adoption of tax and pricing policies as a way of discouraging the consumption of certain food items stems from the successful implementation of such policies for the control of tobacco smoking. The approach is also usually accompanied by favourable pricing policies for alternative and healthy food items [163]. This approach has been particularly used extensively in regulating the sale of soda drinks. However, studies have indicated that taxes in the range of 1% to 7% led to insignificant reduction in consumption patterns of soda drinks and its contribution to the development of obesity and diabetes [164,165]. Reports have also indicated that similar taxes have been introduced on several unhealthy or HFSS food items such as candy, in many parts of the globe [166]. In addition to taxes, advertising limits are placed on particular food items, such as those rich in sugar or fat, to resist them from being marketed to children in many countries [167], including the UK [168]. This approach is anchored on the empirically proven threshold that the consumption of these food items in children is greatly influenced by advertising [168]. The effectiveness of this approach is demonstrated by its adoption by several countries around the globe where regulatory policies or outright ban are in place for the advertising of food and drink to children [169].

Appropriate labelling or the mandatory provision of information on key ingredients in food products is a practice that is more widespread than regulation of advertising [170–172]. This approach mandatorily requested food manufacturers to provide labels detailing key information on nutrition in the form of packaged food items [117,171,172]. Results of studies investigating the effectiveness of this strategy have produced conflicting results, indicating effectiveness in some places and no effect in others [170–172]. However, the most widespread opinion about this strategy is that calorie labelling significantly positively influences the choice of food items containing low calories [173].

The system in the UK is not different from what is described above. In addition, a colour labelling system which mimics the traffic light system, using green for low, yellow for moderate and red for high levels of salt, sugar and fats, is being considered in the UK [174,175]. The rationale behind the approach in the UK includes the fact that improved labelling and encouraging businesses to provide information on calorie contents of their food will help people make informed choices about their food and drinks [176]. Other strategies adopted in the UK include the Change4Life programme which offers advice of healthy diet to members of the public as well as the commissioning of the Tackling Obesities: Future Choices report in 2007 which led to the development and the implementation of the Healthy Lives, Healthy People (an action programme to cub obesity in England) in 2011 [177]. Moreover, the government in the UK has proposed the introduction of a programme which

prohibits the advertisement of HFSS in television programmes before 9pm [178,179]. This proposal is based on the assumption that it is the advertisement of HFSS that promote consumption, even though this may lead to increased product placement in television programmes. This is based on the fact that media is a vehicle with increasing significance for the advertising and promotion of food. Media plays an important part in influencing the food choices of consumers.

1.4 Influence of Media on Tobacco, Alcohol and HFSS Consumption

In the context of this study, media refers to communication channels for information sharing and exchange. While this includes printed materials such as books, newspapers, and magazines, audio channels such as radio and music as well as audio visuals channels like movies, television and social media, discussions in this section will largely focus on audio-visual channels, which have been extensively studied for their influence of lifestyle choices covered in this study. However, selective mention of other communication channels (such as printed materials) will be made.

1.4.1 Media and tobacco smoking

The impact of media on tobacco smoking can be diverse and is largely dependent on how media use is applied to the context of tobacco smoking. According to National Cancer Institute [180], media can have both positive and negative effect on users with respect to tobacco smoking. While Morgenstern et al., [181] indicated that media advertisement or portrayal of smoking can significantly influence the

development of smoking habits with every additional 1000 tobacco occurences increasing the adjusted relative risk for initiation of smoking by 13% (95% CI=8%, 17%, $p<0.001$), it has also been shown that media can be used for anti-smoking campaigns, leading to smoking cessation among media users in the UK [182]. However, it has been shown that a link exists between media exposure to smoking and smoking initiation in young adults [183]. Also, this impact is dose-related, such that the probability of smoking initiation is directly proportional to the level of exposure to smoking in the media [183]. It is also known that media exposure to smoking is capable of eliciting smoking irrespective of whether the smoking behaviour is encouraged or glamourised (aOR = 0.70, 95% CI = 0.55-0.91) [184]. This further confirms the seriousness of the impact of media exposure to smoking on young people's development.

Several underlying theories of human behaviour can be used to explain the diverse impact of media on smoking. In the first instance, in line with the heuristic model, the initiation of tobacco smoking can be triggered by media contents, particularly in adolescents [185]. This assumes that behavioural patterns in and identity of young adults are shaped largely by influences they are exposed to directly via media or indirectly via the impact of media on their peers and people in their immediate cycle. According to Morgenstern et al [181], young adults are prone to adopting patterns of behaviour which represent the self-image that they aspire to, particularly during their formative stages of development. Therefore, media feature celebrities or other media entities which portray this identity than significantly motivate changes in behaviour, such as the initiation of smoking [182].

The heuristic model is further strengthened by the social learning theory, which postulates that people learn or acquire new patterns of behaviour by observing or imitating other people [186]. In relation to tobacco smoking, it is possible for people (particularly children or young adults) to initiate smoking through the adoption of behavioural patterns of people they admire. Celebrity lifestyle portrayed via print and audio-visual media channels represent a good example in this regard. Studies have also suggested that media exposure can change the people's views about implications of tobacco use, their view of other people that use tobacco as well as the view of themselves in the context of tobacco smoking. This may eventually lead to their desire to engage in the act of tobacco smoking [182].

Based on the recognition of the role of the media in the development of smoking habits, Donaldson et al [187], Zhu [188] and Kuipers et al [189] have reported that media exposure to tobacco contents affect people's positive attitude and behaviour towards smoking. Other factors, such as dominant cultural values shaped by media use regulations, also partly motivated interests in studying the impact of media exposure on smoking in many of these countries. The majority of these studies particularly focused on investigating how the media has shaped norms about tobacco use in particular settings. Moreover, other studies investigated the influence of social media, devices such as mobile phones as well as the internet in exposing people to tobacco content together with its implication in developing smoking habits [188,190,191]. To further explore the impact of media channels on

tobacco smoking, this section will review research findings on selected media channels in this regard.

1.4.1.1 Movies and tobacco smoking

Prior to the 20th century, cinema viewing was a rare, occasional and a transient event [192]. However, advancement of technology made repeated broadcast of films on television screen or its storage in forms that could be rented or downloaded possible. This, therefore, made films a good avenue for advertisement of goods and services [193]. With respect to tobacco smoking, studies indicate that movies showing famous celebrities using tobacco products are increasing together with the attendant effects of motivating positive feeling about tobacco smoking among viewers [194]. Bennett et al [195] further confirmed the assertion that media exposure to tobacco imagery can motivate the uptake of smoking. According to Mejia et al [185] tobacco smoking in films may be easily associated with features such as glamour, sexual appeal, independence and rebellion without reference to the real impact of smoking on health as well as its consequences such as addiction and death.

Though there is a ban on the advertisement of tobacco products in cinemas in the UK prior to screening of movies, research evidence indicate that people are still significantly exposed to tobacco contents in movies [196], such as smoking by a lead actor. For instance, the WHO Framework Convention on Tobacco Control has a legally binding treaty that necessitates signatory countries or parties to establish evidence-based measures to reduce tobacco use and exposure to tobacco smoke. Despite this regulation, tobacco content is still allowed at the moment. However,

many studies which have investigated smoking content in movies have indicated declining incidence of this phenomenon, even though inconsistencies in the methods of investigation used and other issues such as differing sample sizes and period covered, have been raised [185,197–201]. Though a declining trend of smoking presentation in movies between 1989 and 2008 was reported in the UK[202], studies indicated that while smoking in certain classes of movies are reducing in the US, significant increase of smoking presentation in movies rated R (restricted) and PG (parental guidance) was still present [203,204].

1.4.1.2 Television and smoking

Unlike movies, Sargent & DiFranza [205] indicated that smoking imagery on television is not as prevalent and that most of the exposure is via movie trailers shown on the television. According to Healton et al [206], 14.4% of movie trailers televised between 2001 and 2002 in the USA have tobacco content and 24% of these were trailers of R-rated movies. The study concluded that about 95% of young adults were exposed to at least one tobacco content with 90% seeing three or more contents between 2001 and 2002. In New Zealand, McGee and Ketchel [207] reported that a quarter of all prime time (between 6pm and 10pm) television programmes have tobacco content and that this is equivalent to two smoking contents for every hour of television viewing. Analysis of a television series directed at Children, The Simpsons, in Australia indicated that over 18 episodes, negative reflection of smoking was shown 275 times while neutral and positive depictions of smoking were 504 and 127 occasions respectively [208].

The scenario in the UK is similar to what has been highlighted for other countries in this section. Lyons et al [209] investigated tobacco imagery in five popular and regularly viewed television stations for 3 weeks in 2010 and reported that majority of tobacco branded appearance occurred in films with only 18 occurrences during regular programmes (12 in news and 6 in soaps). Another study by Barker et al [210] conducted a content analysis of all the programmes and advertisements broadcast on the five national UK free-to-air channels in the UK, and reported tobacco content in 33% of all the programmes.

1.4.1.3 Printed materials

Despite some countries enforcing tobacco advertising bans, tobacco imagery in printed materials such as magazines is still common, more so in the UK [210]. However, selected studies indicate that magazines could expose people to images which promote smoking [211]. For instance, studies indicate pockets of tobacco advertising in some Australian magazines despite the ban placed on tobacco advertising in that country since 1992 [212]. Moreover, images of celebrities smoking in photo shoots or pictures taken from everyday events in magazines have been reported in many countries, including the UK [213].

1.4.1.4 Other sources of exposure to tobacco contents

Studies have indicated that the internet and music video clips represent other sources of tobacco imagery. According to the British Medical Association [213], tobacco content in music video vary according to music genre with rap or hip hop having 13% while rock and pop music have 14% and 10% respectively. The

internet is another media which have been reported to contain significant tobacco imagery. Several websites as well as social media sites such as Facebook contain several thousand of unregulated tobacco contents which many people across the world are exposed to [214]. Research evidence also identifies video games as a potential source of exposure to tobacco content [215,216]. In one study[215], high exposure to tobacco content in video games was independently linked with prevailing smoking among girls (OR 1.78; 95% CI 1.02 to 3.09), rather than boys (OR 0.98; 95% CI 0.64 to 1.51) [215]. Similarly, McDaniel and Forsyth[216] conducted a case study on the use of video games as a marketing tool for tobacco products. The findings portrayed video games as useful in facilitating consumer engagement with certain tobacco brands [216].

1.4.1.5 Media and cessation of tobacco use

While many studies focused on how the media contributes to the development of smoking habit, a small number of studies have also indicated that the media can be used to promote anti-smoking behaviours [217]. An increasing body of evidence particularly indicates that anti-smoking campaigns on mass media can significantly help propagate quitting behaviours and the attendant reduction in the prevalence of smoking [217]. In the study by Kaur et al.[218], anti-tobacco advertisements provided 37% of the study participants with inspiration not to use tobacco. Media implicated in this category include graphics as well as campaigns on radio and television [219]. In the UK, media campaigns are also currently been used as one of the major tools to promote cessation of tobacco use and to prevent the initiation of smoking among young adults [220].

1.4.2 Media and alcohol consumption

Currently, the presentation of alcohol in the media is very common in entertainment as well as information media. Reports by the Department of Health [221] and Atkinson, *et al* [222] indicate significant alcohol marketing on television, print media and the websites accessed in the UK. The realization of the importance of media, particularly due to the ubiquitous nature and the level of access that young people have to these media channels partly necessitated the dependence on the media either by the government for anti-alcohol campaigns or by the industry for profit-making purposes [223]. It is also believed information available via these media channels in the UK can influence attitudes of young people with respect to alcohol consumption or otherwise [224,225]. Testament to the effectiveness of this method is the report of correlation between alcohol consumption and the presentation of alcohol-related contents in the media in Netherlands [226] and in the UK [221–225,227]. Therefore, studies which investigate the impact of media depiction of alcohol on the rate of alcohol consumption target media such as television, magazines, films and the internet [228].

According to Jernigan et al [229], the major aim of alcohol marketing is to motivate alcohol consumption consciously or unconsciously via efforts that seeks to make alcohol consumption look like normal behaviours. This is usually achieved by highlighting desirable features of the act of consumption. Non-conscious efforts in this regard are usually in the form of imitation of the behaviour of others. Often, increasing sales is the main driver for alcohol marketing via the media. However,

other benefits such as brand promotion and awareness (which may lead to increased brand loyalty and sales, may also represent the reason for media presentation of alcohol contents [230].

1.4.2.1 Television, movies and alcohol depiction

Though direct advertisement of alcohol on television is not allowed in many parts of the world, particularly in countries such as Saudi Arabia, portrayal of images relating to alcohol on television and movies is still common across the globe. In the UK, for instance, Lyons et al [209] reported the depiction of alcohol-related images in about 40% of television broadcasts. This has been shown to increase slightly over time [210]. Another study indicated that alcohol portrayal in movies was much more prevalent, with about 86% of broadcast time showing outright alcohol use or the appearance of alcohol-related branding images [231]. More worrisome is the fact that reports indicate the link between alcohol portrayal in movies and alcohol consumption among the populace, particularly young people in several locations across the world, including New England (0.12; 95% CI: 0.10-0.14; $p < .001$) [232], Germany [232,233] and the United States of America [234]. Moreover, Hanewinkel et al [235] reported that alcohol imagery in movies is a risk factor for the initiation of alcohol consumption. The effect sizes of alcohol imagery exposure on alcohol consumption as reported by Hanewinkel et al.[232] is small (less than 0.2), meaning that the findings have limited practical applications. The effect size is measured based on whether people drink more alcohol after exposure to alcohol imagery. Age differences influence the effect sizes, with younger viewers more likely to drink alcohol upon exposure compared to adults. For example, the adjusted incident ratio rates for alcohol use was observed to be

1.05 (95% CI, 1.02-1.08; *P* = .003) for every extra 1000 occurrences of alcohol exposure in the films [235].

1.4.2.2 Magazine and alcohol consumption

According to Atkinson et al [222], alcohol depiction is magazines is also common and gender specific in nature in the UK. The study highlighted that some alcoholic brands were presented to be symbolic and portrayed in ways that make them appeal to people of different gender differently, for instance, the study indicated that two sides of drinking were presented in most magazines targeted at women. While the glamorous side of alcohol consumption was presented in one hand, its harmful effect on feminine attributes such as beauty, appearance and their role as mothers was also shown. For those targeted at men, alcohol drinking at social gatherings and pubs was presented as a sign of masculinity while ladies who drink were represented as vulnerable and emotional. These reports were also corroborated by Smith and Foxcroft [236] who indicated significant association between exposure to alcohol advertising in magazines as well as other media channels and the development of drinking habits in young people.

1.4.2.3 Media and prevention of alcohol consumption

Though the contribution of media exposure to alcohol contents to the development of drinking habits have been extensively reported, the media has also been identified a veritable tool in communicating messages geared towards the control of alcohol consumption and abuse [237]. In addition, alcohols control strategies targeted at the population in many countries are often implemented via the use of the media. This may be in terms of promotion of awareness of the consequences of

drinking or education of the public on key issues relating to alcohol consumption and its attendant consequences [222]. These approaches are based on the evidence that mass media have the ability to directly or indirectly influence behavioural changes if they are properly utilized [238].

In support of this view, Jepson et al [239] indicated that campaigns in media can lead to reduction in drink driving. However, Yadav & Kobayashi [240] indicated uncertainties about the level of significance of this change and the ability to translate into reduction in consequences of drink driving such as accidents and injuries have been also reported. This notwithstanding, analysis of the impact of media intervention on the reduction of substance use among young adults indicated that media messages targeted at alcohol consumption elicited desirable changes in consumption pattern as well as increasing knowledge and changing attitudes of participants [241].

1.4.3 Media and consumption of high fat, salt and sugar (HFSS) foods

The impact of media advertisement and portrayal on food choices of adults and particularly children have been reported [242]. Unlike tobacco and alcohol which cannot be advertised on every channel (particularly those targeted at children), food items can be advertised on both traditional channels such as television and movies as well as new media channels such as, websites and social media sites [242]. Still, it is important to note that the watershed ban is coming into force and the government has confirmed its intentions to enact a total ban on paid-for advertising online for some products that are High in Fat, Sugar or Salt (HFSS) by the end of 2022 [243,244].

The government has precisely selected the products that fall within the scope of the ban and has focused more on those that are likely to appeal to children [243,244]. The online ban exempts brand advertising, ads in digital-only audio media, media supporting point of sale content, SMEs advertising, marketing in brand's own media, and B2B ads [244]. The ban is expected to come into force as of 2023 as the government seeks to deliver on its promise to deal with the growing obesity crisis in the UK. However, the ban only covers adverts rather than television content, product placement, or branding at sporting events. Studies indicate that children are particularly targeted by the media promotion of unhealthy food and beverages, the majority of which contain unhealthy proportions of fat, sugar and salt [245]. According to Livingstone et al [245], this problem is exacerbated by misinformation provided by many food manufacturers. For instance the promotion of unhealthy meals takes unfair advantage of the vulnerability of children to marketing, complicating the raising of children [246]. These factors have been implicated as significantly contributing to the wrong food choices by children and young adults in particular [242].

More recently, marketing of fast food through non-traditional media channels including sponsored webpages, third-party sites, school promotions and social media are becoming increasingly popular [247]. According to Constantinides & Fountain [247], these channels are more difficult to regulate due to the ability of users to add contents freely, compared to traditional sources, such as television and print media. Moreover, strategies such as offering toys to children and advertising embedded in games makes it even more difficult for children or young adults to

resist the hidden messages [248]. Social media represents another media that is difficult to regulate as contents can easily be generated and shared by users. Studies investigating the impact of different media channels indicate that internet and social media channels are more strongly linked to the consumption of junk food among children compared broadcast media channels [242]. The study further indicated that while children exposed to online contents are generally prone to engaging in the consumption of junk foods, the influence of online media on this habit is more common in children in urban areas [242]. However, Buijzen et al [248] asserted that the interplay between advertisement and food choices among children and older people is complex. The study indicated that key actors in this complex interplay are media, parents (for children) and healthy eating outcomes of the people involved.

1.4.3.1 Media, obesity and HFSS food consumption in children

Most research linking media exposure to HFSS food and actual change in behaviour focuses on children. For instance, Ferguson et al [249] investigated the impact of media on unhealthy food consumption as well as the health consequences in children. Among other impacts, Ferguson et al [249] indicated that advertising of unhealthy foods can be linked to the prevalence of obesity among children as a result of unhealthy food choices. According to the American Psychological Association, directing advertisements which could lead them to make unhealthy food choices is unfair [250]. Pretlow [251] further indicated that the current high prevalence of overweight and obesity among children can be directly linked to unhealthy food choices, influenced by the media and other factors. This view is also

supported by several other reports including Coon & Tucker [252] which associated television viewing with food consumption.

In addition, Kelly et al [242] further alluded that majority of these advertisements of unhealthy food may also have direct consequences on children's eating pattern and behaviours. Linking this to the development of obesity, Halford et al [253] and Boyland et al [254] indicated that obese children are more likely to watch television habitually and are more likely to have higher preference for food advertised on the television. In this same regard, de Droog, Valkenburg, & Buijzen [255] opined that the use of cartoon characters may significantly increase the desire of children to consumed food items advertised using these characters. Eagle et al [256] stated that it is unfortunate that the policy approaches towards addressing this problem is rather simplistic and ineffective. The authors therefore recommended for renewed strategies involving the establishment of policies and regulations which either limit, regulate and/or completely ban the advertisement of HFSS food to children. This call was also supported by the reports of Kent et al [257] which indicated that increased regulation will curtail food marketing to children via television and Dhar & Baylis [258] which reported the impact of the ban on fast-food advertisement to children in Quebec region of Canada.

1.4.3.2 Television and unhealthy food in the UK

While many countries have not taken serious steps to address the impact of television advertisement and programming on food choices, particularly with respect to children, the Office of Communication (Ofcom) in the UK have

established a regulatory framework with respect to this issue [259–261]. The regulation aims specifically to reduce the exposure of children and young adults (16 years old or less) to the advertisement of unhealthy foods on television [261]. While an outright ban of the advertisement of these types of food on channels dedicated to children were put in place, its restriction was also imposed on programmes aimed at children aged 4 to 15 on all channels in the UK [262]. In addition, voluntary efforts such as the Children's Food and Beverage Advertising Initiative (CFBAI) are also available to help regulate standards for food advertising to children [259,263].

Among many other provisions, Ofcom regulations [262] indicate that:

1. Television programmes or advertisements involving the presentation or endorsement of products or services specifically targeted at children by a character or personality which features prominently on children's television programme must not be shown before 9pm
2. No advertisement material must directly as or advise children to buy or ask their parents to make enquiry about food products
3. Nutritional or health claim of products advertised must be supported by sound scientific evidence and must not give any misleading nutrition or health information
4. No advert on television much encourage excessive food consumption
5. Adverts must not discourage good dietary practices and where comparison of food is made, such comparison must not discourage the selection of

options that which are recommended as essential part of diets (such as fruits and vegetables).

1.5 Social Learning Theory and exposure to tobacco, alcohol and HFSS media contents

Social learning theory is a theory of human behaviour which suggests that people learn new skills by observing and imitating other people [264]. The theory particularly stipulated that learning, as a cognitive process, can be facilitated by instruction or observation and that this can occur in the presence or absence of reinforcement or motor reproduction [265]. The theory further indicated that the observation that led to behavioural adaptation is not only limited to the observation of the behaviour in itself, but also the observation of rewards or punishment that is associated with the behaviour. The implication of this is that when an individual sees a particular behaviour of another individual being repeatedly rewarded, this may motivate them to adopt such a behaviour. The opposite is true if the behaviour is associated with punishment [264]. According to Deaton [266], the theory summarizes learning as involving observation, thought and behavioural imitation. It generalizes that people pay attention to others, and later recall their observations. Through motivation and ability, humans then imitate said observations.

Social Learning Theory can be used to explain the mechanism through which the exposure to alcohol, tobacco and HFSS media contents can influence their consumption [265,267]. For instance, the consumption of these items is often presented in movies as glamorous and young adults who are constantly exposed to these

contents, in line with Social Learning Theory, will observe this and may be motivated over time to imitate what they observe in movies. Constant observation of famous movie characters or those who are considered as heroes by children or young adults may also significantly motivate these group of individuals to start smoking, engage in alcohol and HFSS consumption [265]. Moreover, the essence of advertisements is often to encourage patronage. When people are exposed sufficiently to advertisement materials, they are more likely to remember the advert whenever they are about making purchase decisions, and this impression may significantly influence their buying behaviour. It is also possible that when the people are constantly exposed to media contents showing the consumption of tobacco, alcohol and HFSS, they may lose the consciousness of the health implications associated with the consumption of these materials. The understanding of the impact of media exposure to alcohol, tobacco or HFSS, and particularly how it can motivate human behaviour may be partly responsible for the restrictions placed on the advertisement of these materials to children.

In line with this research, various studies tie potential exposure to a possible change in behaviour especially among adolescents. In one longitudinal study[268], the authors test the smoking status and the attitude towards smoking among adolescents and whether these can predict support for tobacco control policies. The authors used hierarchical multiple regression analyses to test adolescent smoking status and the attitude towards smoking as predictors of eliminating smoking on television and in movies, among other factors [268]. The study cites substantial evidence linking

exposure to smoking images in movies and the onset of adolescent smoking [268]. Similar thoughts were noted in a study investigating the effects of prenatal alcohol exposure on cognitive and behavioural development [269]. The authors performed meta-analyses on data collected from 2,236 participants and used the outcome to analyse the effects of prenatal alcohol exposure on IQ, cognitive function, sustained attention, and problems with behaviour [269]. The similarity in effect sizes derived from the study suggest that potential exposure to alcohol affects basic components of cognition [268]. In another study, a sample of 6,998 adolescents was used to examine the role of parental engagement in the transmission of smoking behaviour across generations [267]. In the study, parental engagement was tied to the inter-generational transmission of smoking behaviour [267]. The intra-class correlation for parental engagement were .45 for mothers and .49 for fathers, suggesting that parental smoking had a moderately large positive effect on adolescent smoking.

1.6 Regulation of media exposure

Video on demand services are regulated in the countries they are registered. For instance, services in the UK are regulated by the Office of Communications (Ofcom) [262,270,271]. Section 1.10 of the Ofcom Broadcasting Regulation states that *"The use of illegal drugs, the abuse of drugs, smoking, solvent abuse and the misuse of alcohol must not be featured in programmes made primarily for children unless there is strong editorial justification; must generally be avoided and in any case must not be condoned, encouraged or glamorised in other programmes broadcast before the watershed (in the case of television), when children are particularly likely to be listening (in the case of radio), or when content is likely to be accessed*

by children (in the case of BBC ODPS) unless there is editorial justification; must not be condoned, encouraged or glamorised in other programmes likely to be widely seen, heard or accessed by under-eighteens unless there is editorial justification".

Section 9.6b of the Ofcom Broadcasting Code states that *"Product placement is prohibited in children's programme"* and went further in Section 9.13(a & b) to state that *"The product placement of the following is prohibited: (a) alcoholic drinks; (b) foods or drinks high in fat, salt or sugar ("HFSS")"*

1.7 National and international legislative context

Over the years, different legislation has been developed globally touching on the marketing of tobacco, alcohol, and HFSS foods. Concerning tobacco, the most important legislative change was the WHO Framework Convention on Tobacco Control adopted by the World Health Assembly in 2003 [272–275]. At the time the treaty came into force, it represented a major milestone in promoting public health. Key WHO CTC provisions include policies on price and tax, a ban on tobacco advertising, regulation on packaging and labelling, promotion and sponsorship, reduction of interference in public health policy, and protection from exposure to second-hand smoke among many others [274,275]. In the UK context, the tobacco control legislation relates to minimising non-communicable diseases and early death by controlling the sale and use of tobacco and encouraging healthier behaviour [276,277]. The legislative environment in the UK is riddled with a mixture of price, promotion, education and health warnings, control of ingredients, plain

packaging, and sales [276,277]. Such an approach relies on a pragmatic response to uncertainty, in that a combination of all these interventions is expected to generate an effect that is stronger than the sum of individual efforts.

Alcohol's international legislative context is guided by WHO's global strategy to reduce the harmful use of alcohol. The endorsed strategy provides guidance to Member States and to the WHO Secretariat on suitable means to minimize the harmful use of alcohol. The guidelines set priority areas for global action and recommend a segment of policy actions and options that could be implemented. In the UK, alcohol advertising rules are amongst the strictest in the world. The regulations apply to ads across all media and place a lot of emphasis on safeguarding young people [278]. Alcohol ads should not be directed at individuals under 18 years or should not contain information likely to appeal to them by demonstrating youth culture. The rules also place strict controls around the placement of alcohol ads, especially those appearing in and around programmes focused on audiences below 18 years and those likely to appeal to this specific age group [278]. More general rules protecting consumers across all the ages are also available in the UK.

Concerning HFSS foods, there have been increasing calls for the European Union to adopt legislation protecting children from the harmful effects of the widespread marketing of food with poor nutrition [279,280]. International organizations, such as Foodwatch, European Public Health Alliance, and Eurochild have progressively shown concern over junk food marketing. These organizations have recently released a blueprint Food Marketing Directive that details how the EU could use its

powers to effectively control cross-border marketing [279,280]. The key provisions in the directive include a ban on advertising nutritionally poor food between 6am and 11pm on broadcast media, terminating the marketing of food that is nutritionally poor on digital media, preventing sponsorship of events, such as sporting events or festivals with cross boarder events, ending the use of marketing techniques such as food packaging that excites children, as well as characterizing a child as any individual below 18 years [280]. The coalition of these organizations advises that regulators could use the WHO Europe's nutrient profile model to identify food that is nutritionally poor. While these suggestions to legislate seem plausible, the EU has to date failed to control cross-border marketing of HFSS foods, with only a few notable initiatives in the UK and Spain [279].

In the UK, the legislative context has featured potentially effective tools to minimise the purchase and consumption of HFSS products. The aim of HFSS policies in the UK over the years has been to improve diet, reduce obesity and diet-related ailments, and tackle inequalities in health [281,282]. Most policies in the UK and across many other countries have been limited in scope, with a lot of emphasis being placed on broadcast advertising and dependency on voluntary agreements with food and advertising industries. Such voluntary agreements have been limited in their effectiveness [281–283]. For instance, the UK enforced statutory regulations limiting the exposure of children to HFSS products through television. With this legislative framework in place, Ofcom, the communications regulator in the UK, approximated that children were exposed to fewer HFSS advertisements [281–283]. Nonetheless, these regulations only applied to programmes singling out children

and evidence indicates that there was displacement of advertising to television programmes focused on a mixed audience. Besides, independent research also showed that the legislative framework had no major impact on children's general exposure to HFSS advertising [281,283]. Nonetheless, these policies focus on improving diet by minimising energy and nutrients purchased from HFSS foods and drinks.

1.8 Statement of the problem

Though the review conducted in this study has highlighted the potential role of exposure to tobacco, alcohol and HFSS in motivating the consumption of these items, there are still some gaps in knowledge, part of which this research aims to address. In the first instance, while this study has highlighted the findings of existing studies on the exposure to alcohol, tobacco and HFSS in films, it is evident that there are no contemporary data on this subject. The need for new studies investigating exposure to alcohol, tobacco and HFSS content in the media is also anchored on the fact that technological advances, such as high-speed internet which facilitates online streaming as well as the development of smart phones, have tremendously increased access to films (and by extension advertisements or content placed in films). Therefore, it is important to investigate what the impact of this may be in terms of the amount of content in films on these video-on-demand platforms.

Secondly, this literature review has already highlighted that there is a large amount of alcohol content on TV. However, it is known that certain genres on TV may feature significantly higher alcohol contents compared to others. Sports TV

programmes are typical examples in this regard. For example, reports from Murray et al [284] show significant contents of alcohol in televised Euro 2016 football matches while Barker et al [285] reported as well high alcohol content televised in the 2018 F1 Championship. Unfortunately, there is a general lack of contemporary evidence which explores advertising in sporting events broadcast on TV as well as the impact of these on people belonging to different age categories. This is also true for media content for HFSS and tobacco advertising on TV sports programmes. These are the gaps that this present study aims to address.

1.9 Aim and Objectives of the Study

This study aims to determine the instances of tobacco, alcohol, and HFSS imagery in films and identify media exposure in sports sponsorship broadcast on television. VoD films were selected since these services are popular among young people, with close to 20% of young adults and 46% of teenagers in the UK having used some type of VoD service, such as Netflix [286]. These figures suggest a more general change in viewing habits in the UK. Similarly, the 2018 and 2019 FIFA World Cups were selected since these events appeal to people of all ages, yet they are sponsored or partnered by alcohol and HFSS brands. In the UK, the events had high viewership figures – an estimated 44.5 million people tuned in to BBC's television coverage of the men's game [287], and an estimated 47% of the UK population believed to have watched the coverage of the 2019 women's game [288]. The two - VoD and the FIFA World Cups are used by advertisers to sell their products on television. Specific objectives of the study include:

1. Analysis and evaluation of tobacco, alcohol and HFSS contents of the broadcast selected matched during the FIFA 2018 World Cup by the British Broadcast Corporation (BBC) and the Independent Television Network (ITV).
2. Investigation of tobacco, alcohol and HFSS content in Netflix and Amazon Prime Video original films released and watched in 2017.
3. Analysis and evaluation of tobacco, alcohol and HFSS contents of the broadcast selected matched during the FIFA 2019 of Women's World Cup by the BBC and ITV.

Based on the above aim and objectives, the study hypothesised that instances of alcohol, tobacco, and HFSS imagery will be prevalent in original Netflix and Amazon Prime Video films, and the 2018 and 2019 FIFA World Cup.

1.10 Key Terms

This section provides clarification on how key terms– promotion, marketing, exposure, advertising, and viewers – are understood under the context of the study. A description, along with a clarification on what is legal, observed, and what is covered by evidence is as shown below.

1. Promotion - The publicizing of products to raise awareness and increase sales [289]. Promotion was observed by noting instances of advertising, sales promotion, publicity, and individual selling of alcohol, tobacco, and HFSS foods in the VoD films and FIFA World Cup games.

2. Marketing - Promote the buying or the selling of alcohol and related products. In this thesis, marketing involves alcohol, tobacco, and HFSS brands reaching out to their target audience through VoD films and the FIFA World Cup games. Marketing of these products was observed in both VoD and FIFA World Cup games.
3. Exposure - The rate at which audience members encounter certain messages or groups of messages on media. Exposure requires the physical presence of a message, the message being in an individual's perceptual capabilities, along with certain psychological elements [290]. Exposure is considered to have occurred when individuals experience one of the four exposure states, including attentional, transported, automatic, and self-reflexive. Exposure was observed in the men and women's FIFA World Cup games.
4. Advertising - Within the context of this thesis, advertising refers to communication with target users of the products through openly sponsored and non-personal channels. Advertising is viewed from a legal perspective with laws existent managing the communication of information. Advertising was observed in the men and women's FIFA World Cup games.
5. Viewers – The term refers to the audience reached by television, or rather a segment of the general public interested in information or entertainment.

6. Distribution of branding appearances – Refers to how the HFSS brands in this study are dispersed, indicating brands that are common and those that are rare in the reviewed matches.“

CHAPTER TWO

METHODS

2.0 Introduction

The coding, sampling, and recording methods used in previous research were reviewed and considered for their relevance in directing the current research. Methods used for the study involving matches selected for the FIFA World Cup Finals were described, with focus on details of match selection, coding strategy employed, method of data collection and the method for data analysis. The same category of information was provided for the FIFA Women's World Cup. For the study involving films, film selection, coding of alcohol, tobacco and HFSS content as well methods for data collection and analysis were also described.

2.1 Methods for Films

2.1.1 Sampling of films

Before sampling the films, the researcher sought guidance from previous studies in the same domain and noted their use of the most popular films [291]. For this reason, the study selected the most highly rated films on Netflix and Amazon Prime Video watched by audiences across the UK in 2017 based on the IMDb rating data as of 2017.

Using the IMDb rating data, films were identified for analysis. IMDb allows users to register and cast a vote on every title released in the database. The vote often ranges from 1 to 10. The votes submitted by individuals are then added and averaged as a single IMDb rating that is visible on the title's main page. The study

selected all 11 Amazon Prime Video films released in 2017 and sought to select an equal number from Netflix. IMDb ratings provided an accessible means to select the top 11 rated movies from Netflix. Table 1 presents a summary of the selected films.

Using IMDb rating data presented certain strengths to the study. One key benefit is that movies and series in the database are reviewed by registered IMDb users before the rankings are visible to the audience. These ratings offer a simplified way to see what other users globally think about the film titles listed on the website. The ratings are also accurate since they are computed using a reliable and unbiased formula, which involves taking all the individual ratings cast by IMDb registered users and using them to compute a single rating [292].

2.1.3 Coding of films

Before viewing each film identified, a detailed coding system was developed to guarantee that the most suitable information would be identified and collected. A coding system ensured that the same information would be sought from every film viewed and coded individually. The coding guide used was developed based on the aims and objectives of the thesis, along with previous research exploring tobacco and alcohol content in films [286,293–295]. The coding system used in the study by Barker et al.[286] and Lyons et al.[202] was selected, adapted, and adjusted in the following ways. Instances of tobacco, alcohol, and HFSS products were coded for each selected film semi quantitatively at 5 minutes intervals. The coding began at

the start of the film and continued until the end of the credits. Various instances of the same category appearing within 5 minutes interval were regarded as a single event. Instances that ran into successive 5-minute periods were coded as unrelated events. Instances in different categories occurring in similar intervals were reported as different events. This coding system has been extensively used in many previous studies to quantify alcohol, and tobacco contents in TV programmes and films [296]. In summary, the coding system used in this study was divided into the following categories:

- Actual use/consumption: the actual use/consumption of alcohol, tobacco or high fat, sugar or salt food on screen by any of the characters on the screen.
- Inferred use/consumption: reference to the use/consumption of alcohol, tobacco or HFSS without the actual consumption on the screen, and
- Other Content: which accounts for the appearance or presence of materials related to alcohol, tobacco or HFSS on the screen
- Branding: which accounts for the actual appearance of brands for alcohol, tobacco or HFSS on screen

2.1.3.1 Tobacco coding

Tobacco use, imagery, or tobacco appearance in the form of outright tobacco use, display of tobacco paraphernalia, inferred tobacco use, or brand appearance were coded in this study. Actions such as consumption of any tobacco product such as cigarette, cigar, pipe or other products were coded as tobacco use. Similarly, the display or screen presence of any apparatus or material (such as lighter, matches,

ashtray, cigarette packet etc) depicting tobacco use or smoking were interpreted as tobacco paraphernalia. Verbal, non-verbal, or written inferences to tobacco smoking was interpreted as inferred tobacco use while tobacco brand appearances were defined as the presence of tobacco branding on screen or in the picture background. Tobacco product logos, e-cigarettes, advertisement or other forms of promotion was coded in this category as others.

2.1.3.2 Alcohol coding

Coding categories include actual alcohol use, which will be defined as on-screen consumption of alcohol products. The coding system also documented the type of alcohol product (beer, wine, champagne, spirit, etc) consumed. The study also coded implied alcohol use, which was interpreted as visible appearance but not outright consumption of alcoholic products. Moreover, actions such as verbal reference to alcohol (either in conversation or ordering a drink), drunken behaviour and other appearances depicting alcohol consumption were coded as implied alcohol use. Other actions such as the display of materials related to alcohol use (such as beer pumps, bottles, cans, etc) were coded as alcohol reference. Brand appearance was used to describe the presence of clear branding information on the screen or in the background. This also considered the display of materials such sponsor's logo, advertisement, or other branded materials.

2.1.3.3 HFSS coding

In this study, HFSS products were described as food scoring four or more on the Department of Health's Nutrient Profiling Model [297] and drink scoring one or more that are high in saturated fat, salt or sugar. The nutrient profiling model was

developed in 2004-2005 by the Food Standards Agency (FSA). It is used as a tool to help Ofcom differentiate foods and enhance the balance of television advertising directed to children [297]. The scoring is allocated based on 100g of food or drink, regardless of the serving size and whether a product needs to be reconstituted before it is eaten. The points were awarded for 'A' nutrients, featuring energy, total sugar, saturated fat, and sodium, and the 'C' nutrients, featuring fruit, fibre, vegetables and nut content, and protein [297]. The outcome for 'C' nutrients was then subtracted from the score for 'A' nutrients to give the final nutrient profile score. Decisions on classifying certain food items as HFSS were made by checking the content against the Ofcom 'Big 6' classifications of food. The study recorded the HFSS brands and checked them against the Nutrient Profiling Tool to ascertain that the brand was actually an HFSS product [298].

The coding took account of actual HFSS use, which was defined as on-screen consumption of HFSS goods. The coding process documented the type of HFSS product which was a big range of different types of products consumed (soft drinks, crisps and savoury snacks, fast food, and sweets).

The study coded implied HFSS use, which was interpreted as visible appearance but not outright consumption of HFSS products. Furthermore, actions such as verbal reference to HFSS (either in conversation or in ordering), other appearances depicting HFSS consumption were coded as implied HFSS use. Other actions such as the display of materials related to HFSS use (HFSS food packet, advertising,

actual food shown, brand associated with HFSS food but not shown in an advert, and verbal reference but not implied) were coded as alcohol reference. Brand appearance codes describes the presence of clear branding information on the screen or in the background. This also includes the display of materials such sponsor's logo, advertisement, or other branded materials.

2.1.4 Method of data collection for films

According to previous reports [291], background information of all films analysed in this study was collected. This information includes the film title, year of release, age rating, genre, target audience and historical era. The selected films covered a diverse audience (as indicated by IMDb classification) since they were classified under four age categories – 15, 18, 12A, and PG, and four genres – drama, comedy, action and adventure. The age ratings mean that the films contained strong material such as swearing, strong horror and strong violence (15); some were designed specifically for adults (18); some contained material not meant for children under 12 years (12A), while others contained content that children could find confusing or upsetting and needed the guidance of parents, teachers, and guardians (PG). This study also documented the total run time and the name of the production company. Video on Demand (VOD) format of all selected films were collected in this study. In line with previous studies and to enable more accurate data collections, a 5-minute coding interval was used in this study [291]. All episodes of tobacco, alcohol or HFSS consumption within the 5-minute period were recorded as one event irrespective of the number of appearances within that interval. However, where one episode appears over a transition between one 5-minute periods to another 5-minute

period, it was counted as two separate episodes. However, multiple branding information appearing within a 5-minute interval were counted separately. The total number of brands as well as brand identities were also captured and recorded. To ensure reliability and accuracy of data collection, one-fifth of the coding was carried out by two separate authors.

2.1.5 Method of data analysis for films

Data collected were initially recorded using Microsoft Excel prior to analysis using SPSS or Graph Pad Prism statistical software. Total film hour was calculated by adding the length of all the films together. Descriptive statistics such as mean and standard deviation were computed. Codes (such as, alcohol use, inferred alcohol use, and alcohol brand appearance) were expressed as number of occurrences per hour. The mean rate of use was computed for films to account for differences in film length. This was calculated by dividing the sum of episodes in each by the length of the film in hours followed by division by the total number of films coded. Cumulative frequencies were used during statistical analysis. The cumulative frequencies were used to determine the number of observations above or below a certain value in the collected data set. The study calculated cumulative frequencies for visuals occurring in five-minute intervals within the selected Netflix and Amazon Prime Video films. Data obtained across all categories (tobacco, alcohol and HFSS) from movies selected from Netflix and Amazon Prime Video was also compared by chi-square t-test between platforms, a statistical test that can be useful in testing differences between groups. The test allows for the determination of whether a statistically significant difference exists between categorical variables.

The resulting values were considered to be not significantly different at $p<0.05$, meaning that differences in the categorical variables would be expected to happen by chance more than one out of twenty times.

2.2 Methods for Sporting Events (FIFA 2018 Men's World Cup and 2019 Women's World Cup)

2.2.1 Selection of matches and broadcasting stations

When considering exposure in sporting events, the 2018 and 2019 FIFA World Cups were considered due to their high viewership and interest to the UK. The World Cup stands out as a popular event worldwide and in the UK. Advertisers of such products target matches in the World Cup based on the notion that they can reach a wide audience. Despite this understanding, no study has attempted measuring alcohol and HFSS imagery in men and women World Cup matches. The study involved matches featuring England, Saudi Arabia, and Russia, as well as the final match in the 2018 Fédération Internationale de Football Association (FIFA) Men's World Cup finals. The competition involved 32 teams who played 64 matches across 12 venues in 11 cities. Matches involving England and the final match were selected due to potential high viewership and particular relevance to the UK. Matches involving Saudi Arabia were selected as a contrast due to stringent alcohol promotion regulations in that country. Matches involving Russia were selected as the host country of the FIFA world Cup 2018 and also has a national ban on sales of all forms of alcoholic beverages from 11pm to 8am since 2003 [299]. Based on these criteria, this study selected a sample of 13 matches including all UK broadcast footage of the group A (Uruguay, Russia, Saudi Arabia, Egypt) and group

G (Belgium, England, Tunisia, Panama) games (played between June 14th and Jun 28th; featuring the three named countries) and the final match between France and Croatia (Figure 8).

The 2019 FIFA Women's World Cup was played between June 7th and July 7th, 2019, in France. The competition featured a total of 51 matches in 36 group stage games and 15 knockout matches. In this study, all matches from Group D, which featured England, and the final match between the United States and the Netherlands were selected for coding as they were likely to draw high UK audiences. Also, all matches played in Group A (except three matches which were not available online for unknown reasons), which featured France, were also selected for coding in this study. France was selected as a host country of the FIFA World Cup 2019 and also because of alcohol advertising ban on television or in cinemas [300]. A total of 10 matches were coded in this study.

The small number of games selected for the 2018 and 2019 FIFA World Cup presents a potential limitation to the study. The exposure arising from the two competitions is likely to be much higher than reported in the current study since only a sample of matches from the two sporting competitions were used. The estimates referred to in this study, therefore refer to potential viewer exposure to unhealthy brand marketing references rather than actual exposure or any effect on the viewer. Imagery identified in the matches represents potential viewer exposure to unhealthy food choices, rather than the actual exposure or any effect on the

viewer. There is also a high chance that factors, such as location and the size of the imagery, along with previous familiarity with the brand are likely to moderate the effect of exposure to imagery. It is also possible that the results of the study would be different if another set of games was selected. Differences could arise depending on the advertising references captured in the new set of games. The outcome presented in this study is only meant to be descriptive in illustrating the scale of exposure, rather than providing an exhaustive account. These limitations, however, affect the generalizability of the study, and the outcome can only be applied to very specific situations.

2.2.2 Coding of sporting events

All billboard advertisements which occurred during the two halves as well as during the period between the first and the second halves of selected matches were coded in this study. The coding mechanism considered the appearance of logos for the selected brands “McDonald’s”, “Coca-Cola”, “Powerade” and “Budweiser” as indications of advertisement for these brands. The coding instrument separately listed each appearance of ‘Coca Cola’, McDonalds’, ‘Powerade’, and ‘Budweiser’ on digital advertising billboards along the perimeter of the pitch. The coding included any time of active play in the game, from kick-off to final whistle in the first and second halves of standard and extra time, and from the point the ball was placed for the first penalty to the scoring of the last penalty in matches that were settled by penalty shoot-out, except for the women’s game where none of the selected matches involved penalty shootout or extra time.

2.2.3 Method of data collection for FIFA World Cup

For each appearance, the start and ending time (in minutes and seconds i.e., 6:30-6:54) and match period (first half, second half, extra time and penalties) were recorded. Visual occurrences of each brand that appeared in clear, uninterrupted view on the screen received a single count in each instance. The duration of each continuous visual appearance was timed to the nearest second. Information was recorded in separate Excel files for each match along with general information about the match (start time, time ended, teams playing, date, broadcaster, stage in championship, country of broadcast). To ensure the accuracy and reliability of coding, the TV coverage for three of the thirteen games was coded independently by two coders (KA and RM/AB) using the play, pause, review method previously reported [301,302] and any differences resolved by discussion. Viewing figures for the UK were supplied by Digital-I, showing the number of views of each game and the estimated age range [303]. The viewing figures captured the matches recorded on BBC and ITV. The viewing figures did not provide an estimation of online viewers since Digital I do not collect online viewing figures. Therefore, online viewing figures were not recorded, and online viewership has not been included. All information and coding of matches were recorded in a Microsoft Excel file.

2.2.4 Method of data analysis for Men's and Women's FIFA World Cup

To estimate UK population exposure to branding content, this study analysed the distribution of branding appearances and used that distribution to compute cumulative gross and per capita impressions, using previously reported methods

[284,304]. Gross impressions were determined by multiplying the estimate of the UK population who had watched the men's and women's FIFA World Cup matches by the number of branding occurrences in each match. Per capita gross impressions of were obtained by dividing the total number of gross HFSS branding appearances across all the matches in the sample by the total population in the UK. The distribution of means was calculated using the frequency commands in SPSS software. To generate the cumulative distributions of branding appearances by match and type of visual occurrence (*McDonalds, Powerade, Budweiser and Coca Cola)* the researcher disaggregated the data on total duration of each visual occurrence to second-by-second observations by match period. For every visual occurrence, the study calculated the cumulative frequencies for five-minute intervals for every period of the selected matches. Appearances overlapping between intervals were coded in the two intervals. Viewership was calculated from proportion viewership figures from UK mid- year population estimates in 2017 [305]. Viewership was then combined with the number of alcohol/HFSS appearances per match to provide gross impressions. Dividing gross impressions by population estimates provided per capita impressions for children (4 to 17 years old) and adults (18 years and above) in the UK.

CHAPTER THREE

CONTENT ANALYSIS OF NETFLIX AND AMAZON PRIME VIDEO ORIGINAL FILMS IN THE UK FOR ALCOHOL, TOBACCO AND HFSS FOOD IMAGERY

3.1 Introduction

More recently, there has been interest in research focusing on the investigation of unhealthy commodity imagery in mass media programming, with special focus on broadcast and terrestrial television targeted at children and young adults due to the fact that these groups are vulnerable and can easily be enticed to engage in the consumption of these commodities [230,306,307]. The interest could be due to the high number of people (over 78,000) in the UK who die from smoking, with an equal number living with paralysing smoking-related illnesses [308]. Results from these studies indicated an association between smoking in films and smoking in youth and adults [309,310]. Similar results have been reported for HFSS and alcohol consumption [311,312]. It was reported that the restriction of exposure of children and young people to tobacco, alcohol and HFSS media content will significantly prevent the consumption of these items and by extension generate public health benefits. Furthermore, these studies identified the need for more studies which focused on the exploration of the link between the exposure to smoking and smoking uptake in vulnerable people [230,241,306,309,313–318]. However, the majority of the most recent studies focused on terrestrial television and broadcast media without considering the changing viewing habits which has made online and video-on-demand (VOD) services (such as Netflix and Amazon Prime Video) very

popular compared to terrestrial television services[266]. Available data indicate that Netflix has about 207.64 million subscribers globally, with about 11.8 million of these subscribers in the UK [319–321]. Similarly, Amazon Prime Video has about 8 million subscribers in the UK [322]. These services are particularly popular among young adults aged 16 – 24 years (20%) and teenagers (46%) [322] and so represent sources that could motivate behavioural changes in these groups of viewers.

Online VOD services are regulated in countries where they are registered. In the UK, VOD services (such as Amazon Prime Video) are regulated by the Office of Communications (Ofcom) [270,323]. A description of the specific regulations that guide video on demand services are further described in section 1.6 of this paper. The regulations described in Section 1.6 (Ofcom broadcasting code) exclude HFSS content in programmes not categorised as Children's programming but can be accessed by children. Rather than Ofcom, Netflix is regulated by the European Regulators Group for Audio-visual Media Regulators [324]. Unfortunately, these regulations exclude the advertisement of tobacco, alcohol or HFSS content.

Barker et al [286] reported significantly higher alcohol and tobacco imagery in original programmes from VOD services (Amazon Prime Video and Netflix) compared to terrestrial television programmes in the UK. However, Ofcom regulations affecting Amazon Prime Video services did not lead to less damaging content in the programmes. Age classification of movies was implemented to provide guidance about the suitability of contents to different categories of viewers. The British

Board of Film Classification (BBFC) conducts this classification in the UK using guidelines which were developed following an extensive public consultation, research, and the experience of the BBFC [325]. BFFC rates films that are suitable for all as “U”, those requiring parental guidance as “PG”, cinema release suitable for 12 years and over as “12A”, video release suitable for 12 years and over as “12”; films suitable for 15 years and over as “15”; films suitable only for adults as “18”; while adult works for licensed premises only are rated as “R18”. However, these classifications do not consider alcohol, tobacco and HFSS contents. Moreover, studies investigating alcohol, tobacco and HFSS contents in original movies shown by VOD services are generally lacking. Therefore, the analysis of alcohol, tobacco and HFSS content of movies shown on Amazon Prime Video and Netflix, is the focus of this study.

3.2 Summary of Methods

A detailed description of methods adopted in this study is presented in Section 2.2. Briefly, there were only 11 original movies released by Amazon Prime Video in 2017 and the 11 highest rated Netflix movies (based on the 2017 rating of original Netflix movies obtained from the Internet Movie Database (IMDb) were selected for analysis in this study. The BBFC [325] classification and genre of selected movies were recorded. The rationale for selecting original movies is because such productions are made from clearly original ideas rather than adaptations, remakes, and sequels. Selecting originals guaranteed that no related films were included in the study. Further, whilst studies have previously been undertaken looking at

alcohol and tobacco imagery in box office movies [204,295,326], no study has examined original movies screened on online platforms. The reason for selecting the most highly rated films on IMDb was to complement the 11 original movies produced by Amazon Prime Video in 2017. With IMDb, it was possible to identify the most highly rated films in 2017 for Netflix, guaranteeing an equal number of films for analysis for each VoD service. The sample size used in the study was small and is justified by resource constraints in determining the most highly rated films. The small sample size is nonetheless not a disadvantage since most related studies have followed a similar approach. Sample sizes in these studies tend to be equally smaller, maybe due to similar constraints faced by the researchers. A small sample size featuring original movies was important in helping achieve a desired level of accuracy.

The five-minute interval coding, previous described by Lyons et al [209], was adopted for the estimation of alcohol, tobacco and HFSS content of selected films. Data collected were categorised as actual consumption when there is actual consumption of alcohol, tobacco and/or HFSS food on the screen; inferred consumption when reference to the consumption of alcohol, tobacco and/or HFSS food was observed without actual consumption; and other content when paraphernalia and other reference to materials related to alcohol, tobacco and/or HFSS were shown on the screen. For analysis, multiple appearances of the same category within the five minutes interval were recorded as one data event except if the appearance overlapped between two intervals. To ensure reliability and accuracy of data

collection, one-fifth of the coding was carried out by another researcher (AB). Coding data were initially recorded in Microsoft Excel prior to analysis using IBM SPSS statistical package (version 24). The analysis carried out in the study entailed descriptive statistics and a comparison of the mean use of alcohol, tobacco and/or HFSS in the movies. Descriptive statistics were used to describe the basic features of the data and formed the basis of the study. The comparison of means helped determine if Netflix and Amazon groups had similar means. The analysis also calculated the estimates of imagery content in the Netflix and Amazon Prime Video films.

3.3 Results

3.3.1 Characteristics of movies analysed

Details of included movies, including IMDb classification and BBFC rating are presented in Table 1 and Figure 4. 'Drama' was the most commonly coded genre of movies (50%, 11 out of 22 movies) followed by 'Comedy' (36%, eight out 22 movies. Two 'Action' movies and one 'Adventure' movie. With respect to age rating, 64% (14 out of 22) of movies coded were rated '15'. Two movies each were coded in the rating categories 'PG' and '12A' while only one movie rated '18' was coded in this study. The remaining three movies were rated 'I'. The 22 movies provided a total of 2357 minutes of run time, which the researcher coded in 479 five-minute intervals (235 from Netflix and 244 from Amazon Prime Video content).

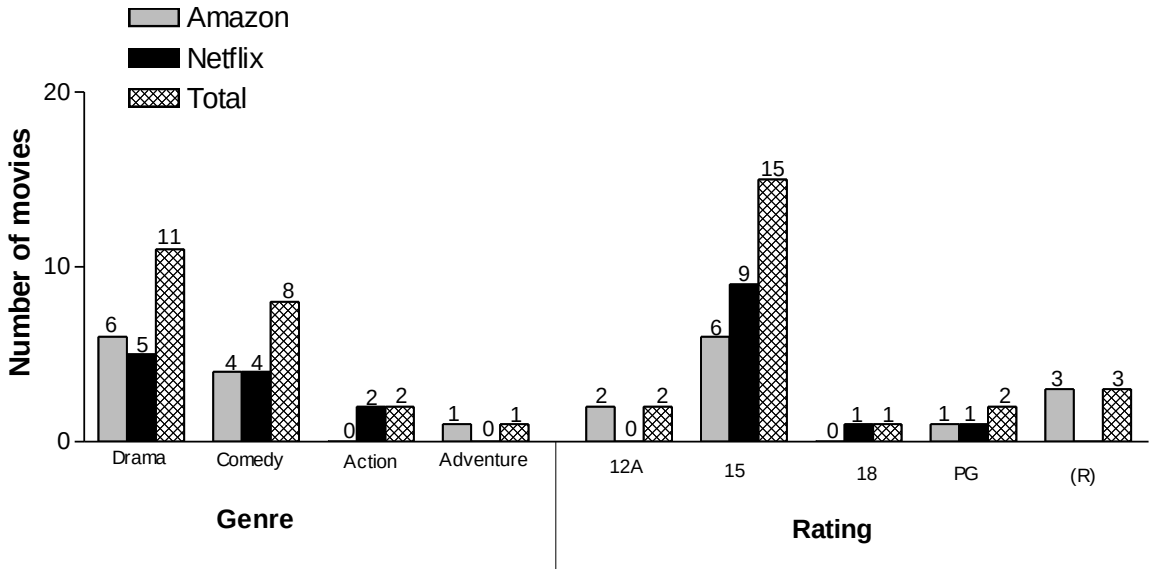


Figure 5: Analysis of selected movies by genre and BBFC rating.

Table 1: Summary of IMDb classification and BBFC rating of selected movies

Source	**Movie title**	**ǂIMDb classification**	**ΔBBFC rating**
Amazon Prime Video	The Salesman	Drama	12A
	The Lost City Z	Adventure	15
	The Wall	Drama	15
	The Big Sick	Comedy	15
	Landline	Comedy	(R)
	The Only Living Boy in New York	Drama	(R)
	Crown Heights	Drama	(R)
	Brad's Status	Comedy	15
	Wonderstruck	Drama	PG
	Last Flag Flying	Comedy	15
	Wonder wheel	Drama	12A

Netflix	Okja	Action	15
	Imperial Dreams	Drama	15
	I Don't Feel at Home in This World Anymore	Comedy	15
	Tramps	Comedy	15
	First They Killed My Father	Drama	15
	Gerald's Game	Drama	18
	Bright	Action	15
	Our Soul at Night	Drama	PG
	To The Bone	Drama	15
	The Incredible Jessica James	Comedy	15
	The Meyerowitz Stories	Comedy	15

ǂ= According to the Internet Movie Database (IMDB, *https://www.imdb.com*)

Δ = According to the British Board of Film Classification (BBFC, *http://www.bbfc.co.uk/*)

In total, alcohol content was seen in 200 (41.7%) of the 479 intervals of movies coded, and included 80 intervals of actual alcohol consumption, 113 intervals of inferred use and 174 intervals of alcohol paraphernalia/other reference content. Tobacco appeared in 129 (26.9 %) intervals, with actual tobacco use, inferred tobacco consumption and tobacco paraphernalia/other reference respectively occurring in 79 (16.4 %), 73 (15.2 %) and 83 (17.3 %) intervals. HFSS content appeared in 169 (35.2 %) intervals, with actual consumption of HFSS occurring in 41 (8.5%), inferred consumption in 73 (15.2%) and paraphernalia/other reference to HFSS consumption in 143 (29.8%) intervals (Figure 5).

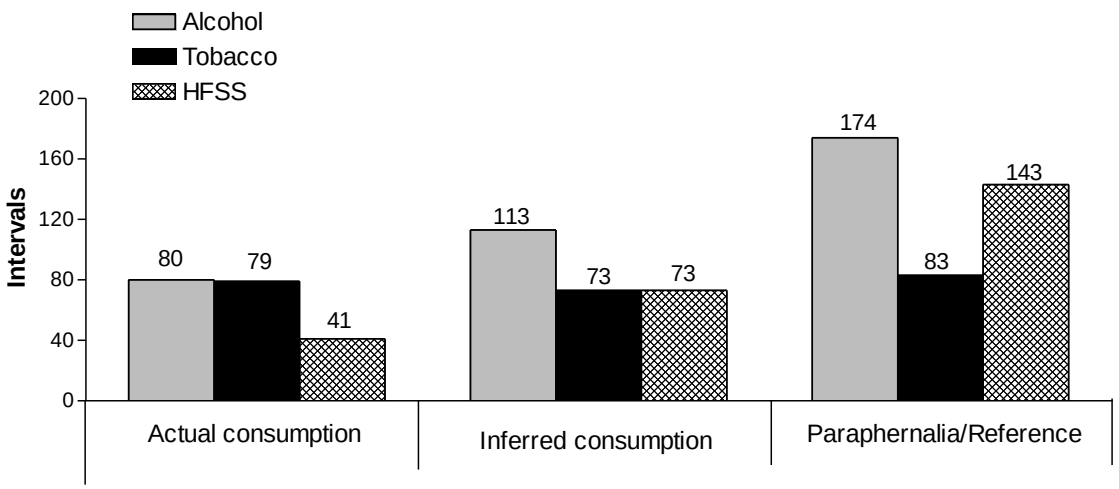


Figure 6: Summary of data on actual consumption, inferred consumption and reference to alcohol, tobacco and HFSS in all films selected for analysis

3.3.2 Alcohol in movies

For actual consumption, alcohol imagery related to beer (37 intervals, 7.7% of the total alcohol imagery), followed by wine/champagne (21 intervals, 4.3% of the total alcohol imagery), with only one interval of spirit consumption. Multiple types of alcohol product were consumed in seven (1.4 %) intervals (Table 2). There were 94 intervals (19.6%) of inferred alcohol, of which 26 intervals (5.4%) were verbal inferred alcohol, and this is twice the occurrence observed for alcoholic behaviour (13 intervals, 2.7%) while only one other type of inferred alcohol use was observed in the study (Table 2). The appearance of bottles was the most common alcohol reference observed (108 intervals). Moreover, other forms of reference to alcohol consumption occurred in 81 intervals such as appearances of glasses of alcohol on tables while verbal reference to alcohol consumption was observed in 41 intervals (Table 2, Figure 6).

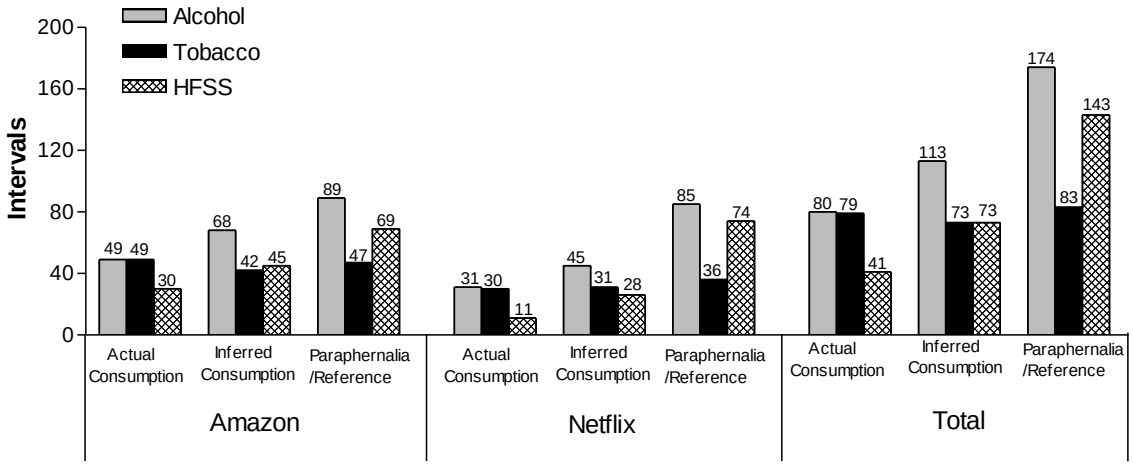


Figure 7: Summary of data on actual consumption, inferred consumption and reference to alcohol, tobacco and HFSS in movies selected from Netflix and Amazon Prime Video

Table 2: Details of data on imagery of alcohol, tobacco and HFSS from all selected movies

Coding category	**Product category**	**Brand/behaviours/materials**	**Interval**			**Percentage (%)**
			Amazon	**Netflix**	**Total**	
Actual use	Alcohol	Beer	15	22	37	7.7
		Wine/Champagne	14	7	21	4.3
		Spirits	1	0	1	0.2
		Various types	7	0	7	1.5
		Unknown	16	6	22	4.5
		Total	**53**	**35**	**88**	**18.3**
	Tobacco	Cigarette	42	29	71	14.8
		Cigar	8	2	10	2.1
		Smoking pipes	1	2	3	0.6
		Total	**51**	**33**	**84**	**17.5**
	HFSS	Soft drink	12	3	15	3.1
		Confectionaries	5	4	9	1.8
		Pre-sugared breakfast cereal	2	0	2	0.4

		Crisps and savoury snacks	4	0	4	0.8
		Fast food	5	3	8	1.6
		Pre-prepared convenience food	4	3	7	1.5
		Total	**32**	**13**	**45**	**9.4**
Inferred use	Alcohol	Inferred drinking	56	38	94	19.6
		Verbal	16	10	26	5.4
		Alcoholic behaviour	7	6	13	2.7
		Others	1	0	1	0.2
		Total	**80**	**54**	**134**	**27.9**
	Tobacco	Verbal	3	2	5	1
		Non-verbal	40	29	69	14.4
		Total	**43**	**31**	**74**	**15.4**
	HFSS	Verbal	8	9	17	3.5
		Non-verbal	40	27	67	13.9
		Others	1	0	1	0.2
		Total	**49**	**36**	**85**	**17.7**
Paraphernalia /Reference	Alcohol	Bottles	54	54	108	22.5
		Verbal reference	27	14	41	8.5
		Others	53	28	81	16.9
		Total	**134**	**96**	**230**	**48**
	Tobacco	Ashtray	29	20	49	10.2
		Cigarette display	20	13	33	6.8
		Lighter	10	12	22	4.5
		Matches	6	1	7	1.5
		Smoking/non-smoking sign	10	3	13	2.7
		Others	9	0	9	1.8
		Total	**75**	**49**	**124**	**25.8**
	HFSS	Display of food packet	31	32	63	13.1
		Advertising	11	8	19	3.9
		Actual food shown	26	24	50	10.4
		Other HFSS associated brands	1	0	1	0.2

		Verbal, not implied	20	19	39	8.1
		Others	7	3	10	1.5
		Total	**96**	**86**	**182**	**37.9**

3.3.4 Tobacco in movies

In total, tobacco content was seen in 129 intervals (26.9% of total intervals). Cigarettes were the most frequently consumed tobacco product (71 intervals, 14.8 %) with use of cigars and pipes occurring in 10 (2.1%) and three (0.6%) intervals respectively (Table 2). Implied tobacco use occurred in 74 intervals, comprising of 69 (14.4%) non-verbal and five (1.0%) verbal intervals of implied tobacco use. Tobacco paraphernalia/other reference was recorded in 92 intervals, comprising the display of ashtrays (49 intervals), cigarettes (33 intervals), lighters (22 intervals), matches (seven intervals), and of smoking or 'no smoking' signage (four intervals). Other forms of reference to tobacco smoking were observed in nine (1.8%) intervals.

3.3.5 High fat, salt, and sugar (HFSS) foods in movies

In total, HFSS content was seen in 169 intervals (35.3% of total intervals). Soft drinks (15 intervals, 3.1%) were the most prevalent type of HFSS consumed, followed by confectionaries (nine intervals, 1.8%). Fast food (eight intervals, 1.6%), pre-sugared breakfast cereal (two intervals, 0.4%), crisps and savoury snacks (four intervals, 0.8%) and pre-prepared convenience food (seven interval, 1.4%) were also observed. Pre-prepared food and drink were considered as HFSS

based on their nutritional score. These foods were identified as HFSS by comparing their energy, saturated fat, sodium, and total sugar against fruit, vegetables and nut content, fibre and protein. Points were allocated to pre-prepared convenience foods based on 100g of a product. Points were awarded for 'A' nutrients (energy, saturated fat, total sugar and sodium) and for 'C' nutrients (fruit, vegetables and nut content, fibre and protein). The 'C' score was subtracted from the 'A' score to give the final nutrient profile score. Pre-prepared convenience foods scoring 4 or more points, as well as drinks scoring 1 or more points were classified as HFSS. Non-verbal and verbal inferred HFSS consumption was observed in 67 intervals (13.9%) and 17 intervals respectively. Display of food packets (63 intervals, 13.1%) and actual food (50 intervals, 10.4%) were the most common HFSS paraphernalia/reference observed (Table 2). Other HFSS, verbal reference without intention of consuming (39 intervals), HFSS advertising (19 intervals, 3.9%), other HFSS associated brand (10 intervals) and other forms of HFSS reference (one interval) were also observed (Table 2).

3.3.6 Comparison of alcohol, tobacco and HFSS imagery in Amazon Prime Video and Netflix movies

The total number of intervals showing alcohol, tobacco and HFSS imagery in Netflix movies was 279 compared with 324 intervals observed for Amazon Prime Videos. There was no significant difference in alcohol, tobacco and HFSS imagery observed in movies selected from Amazon Prime Video compared to Netflix, based on the outcome of the chi-square and t-test. A comparison of the proportion of

intervals showing alcohol, tobacco and HFSS in movies selected from Amazon Prime Video and Netflix is presented in Table 3. The total proportion of alcohol and HFSS intervals were the same on each service, with a slightly higher proportion of tobacco content intervals on Amazon Prime Video (Table 3).

Table 3: Proportion of intervals containing content on each service

Product	**Data Category**	**Netflix**	**Amazon Prime Video**	**P**
Alcohol	Any Content	42	42	(p>0.05)
	Use	13	20	(p>0.05)
	Inferred Use	18	28	(p>0.05)
	Paraphernalia	36	36	(p>0.05)
	Branding	9	3	(p>0.05)
Tobacco	Any Content	24	30	(p>0.05)
	Use	13	20	(p>0.05)
	Inferred Use	14	18	(p>0.05)
	Paraphernalia	16	20	(p>0.05)
	Branding	1	0	(p>0.05)
HFSS	Any Content	35	35	(p>0.05)
	Use	5	12	(p>0.05)
	Inferred Use	12	18	(p>0.05)
	Paraphernalia	31	28	(p>0.05)
	Branding	10	14	(p>0.05)
TOTALS		279	324	

3.4 Discussion

3.4.1 Summary of findings

This component of the study analysed VoD films, and the findings support the aim of the PhD by suggesting potential exposure to alcohol, tobacco and HFSS imagery. The study establishes that movies originally made for and distributed by Amazon Prime Video and Netflix contain a considerable amount of the studied imagery. The study has also revealed that the frequency of display and the proportion of

programming time containing these imageries were not significantly different in original movies selected from Amazon Prime Video compared to films selected from Netflix. This implies that these services equally represent a source of exposure to alcohol, tobacco and HFSS content to viewers, despite the differences in regulations applying to these two providers and the generally stricter controls applying to Amazon Prime Video [270,323]. The stricter regulation imposed by Ofcom may not necessarily, therefore, translate to a proportional reduction in alcohol, tobacco, and HFSS imagery in programmes.

3.4.2 Relationship with previous studies

Findings of the present study confirm previous reports indicating potential harmful exposure to alcohol and tobacco imagery in programmes provided by VOD services [286], with Amazon Prime Video films having higher number of imageries compared with Netflix films. In a study which analysed alcohol and tobacco content of a sample of 50 episodes of five highest rated Netflix and Amazon Prime Video movies in 2019, Barker et al [286] previously reported that contents relating to tobacco and alcohol imagery occurred in more than 70% of all episodes sampled. When compared to terrestrial movies, the figures from the current study are more or less equal. For instance, Barker et al. [210] noted tobacco content in 33% of all programmes. Real use of tobacco occurred in 12% of the broadcasts, while implied tobacco use and branding were rare [210]. Most of the tobacco content was aired after the 9pm watershed. Alcohol content was observed in over 50% of all the programmes broadcast on UK terrestrial TV and over 50% of all adverts or trailers between programmes [327]. Most of the alcohol content noted in the study happened

before the 9pm watershed [327]. The study by Barker et al[286] is similar to the current study since it addressed tobacco and alcohol content in video-on-demand programmes. Unlike Barker et al., the current study focuses on original movies, and considers a wider range of imagery, including tobacco, alcohol, and HFSS. Moreover, this study has a much wider scope, especially on HFSS imagery unlike the study by Barker et al., which addresses only tobacco and alcohol contents.

In this study, the researcher selected Netflix films for analysis using IMDB ratings as opposed to the selection of top films per year by viewership as has been done in previous studies [204,286,311]. This was partly because viewing data for VOD programmes were not available. Despite this disparity in the selection methods and paucity of data for VOD programmes, imagery of HFSS, tobacco and alcohol in previous studies [166,231,296,311] were similar to figures obtained in this present study. This therefore underscores the fact that the content of these products in programmes that are easily available to all groups of the society (including children) is becoming alarming and needs to be addressed urgently.

Several other studies have indicated that imagery of HFSS, alcohol and tobacco is not limited to movies that are available via VOD services, but in many other televised programmes. Sporting events represent one of such programmes which have been widely studied in this regard. For instance, Graham and Adam [302] reported significant alcohol marketing in televised English professional football while Murray et al [284] reported the same significantly high alcohol content in

televised Euro 2016 football matches. These cross-border issues are also applicable to movies streamed by Netflix and Amazon Prime Video. Looking at the issue in the UK, for instance, both Netflix and Amazon Prime Videos are not UK-based companies and only Amazon Prime Video falls under Ofcom regulations as of now. Netflix does not fall under Ofcom regulations since the subscription streaming service and production company is based in the Netherlands, a country beyond Ofcom's jurisdiction. Ofcom's influence is within the United Kingdom, where it holds British broadcasters to standards of impartiality and fairness. This implies that what may be considered as "regulatable content" in the countries where Netflix services are domiciled may be significantly different from what is applicable in the UK. Moreover, the scope and strength of regulations will be different from one country to another. However, this may change in the future as the UK government plans to subject Netflix to Ofcom regulation in the coming days with the VoD service keen to expand its presence under such control [271].

3.4.3 Strengths and Limitations of the study

This study is the first content analysis of HFSS imagery in original films made by and distributed by VoD services. Due to its originality, the study is likely to stand out as a key influence to future research interested in examining HFSS imagery portrayed in original films. A comparable study has been done by Escalon et al.[328], quantifying exposure of children and adolescents to television adverts for HFSS products. While Escalon et al.[328], study exposure on television, the current study achieves the same objective using data from VoD services. The authors also

quantify exposure to television advertisements for HFSS foods using collected audience data. Escalon et al. use an audience meter which tracks the amount of time each study participant spends in front of each television programme, instead of using self-reported measures. The current study did not collect audience data in the same way as Escalon et al.[328], since data on HFSS imagery was collected through observation. Barker et al.[298] conducted another related study quantifying HFSS content in different episodes of reality TV programmes broadcasted on TV. The study used viewing data and population estimates from the UK to estimate population exposure to HFSS content. The findings by Barker et al.[298] are similar to those of the current study since they both revealed a high number of HFSS imagery in the reviewed media. Another similar study was carried out by Boyland et al.[254] to evaluate the extent of food advertising to young people on UK television channels. Similar to the findings of this study, Boyland et al.[254] concluded that children in the UK are exposed to extensive TV advertising for unhealthy food items, despite the current regulations.

The study selected all the Amazon Prime Video films, but not all from Netflix released in the year 2017. The implications arising from the study are, therefore, likely to be more applicable to Amazon Prime Video films rather than Netflix. However, there is also the possibility that the selected movies may have not generated the greatest number of impressions. Rather than focusing on movies which are most highly rated only, the analysis of movies with lower ratings (but may have high viewership) may also provide valuable information.

Selection via IMDB ratings has been previously reported in studies involving VOD services [329], however, this method of sample selection has limitations in that the researcher was unable to know whether the highly rated films were widely viewed, and was unable to use audience viewing figures to measure exposure to alcohol, tobacco and HFSS content from these films. However, it is known that VOD programmes may be much easier to access compared to terrestrial television programmes [329,330] due to factors such as the ubiquitous nature and general availability of the internet [331]. Around 80% of children aged 5-15 watch some form of VOD content [332], therefore, it is likely that original films on VOD services are a potential source of alcohol, tobacco and HFSS content which is likely to contribute to youth uptake and consumption.

Another limitation is the scope of this study. The researcher has analysed only services provided by Amazon Prime Video and Netflix watched in the UK for a period of one year. Future studies could therefore address this limitation of the present study by sampling and analysing movies or other terrestrial programmes shown and those produced in other countries. Also, the researcher has limited the analysis to only one year in the present study. The analysis of tobacco, HFSS and alcohol contents over two or three years will provide information on the trend of this exposure and will provide useful information that could be used to gauge the effectiveness of current regulations.

While the study sample was useful in the study, it presented a key potential limitation. Even though the study selected films based on IMDb ratings, it is possible that some or all the selected movies did not generate the greatest number of impressions. Some VoD films not featuring on the top-rated list but with potentially high viewership were excluded from the study.

3.4.4 Implications for practice

The current study found no significant difference in the proportion of intervals containing alcohol, tobacco and HFSS imagery in original Netflix films and original Amazon Prime Video films, showing that the stricter Ofcom regulations applied to Amazon Prime Video do not necessarily result in less content being shown. The Ofcom rules are clear since they specifically provide guidelines on tobacco and alcohol content, something that the European audio-visual media services directive does not. The claim that Ofcom rules are clear is based on a comparison of films from two different services with differing regulations showing no major differences in the proportion of imagery shown in the films. This does not necessarily mean that Amazon Prime is not complying with the Ofcom regulations. Instead, it is a potential indicator of how Amazon Prime and other on-demand program services have the prerequisite features needed to manage compliance with basic regulations. The supposed clarity of the Ofcom rules and whether the showing of restricted content on Amazon Prime Video is a prevalent problem can only be determined by replicating the methodology in a different setting. Additional studies

with larger sample sizes are needed, as well as, covering different types of services and television programmes across different years to ascertain the strict nature of Ofcom rules. The Ofcom rules around HFSS are currently only restricted to adverts and this implies that findings on HFSS may be an outlier, even though the European audio-visual media services directive does not specifically provide guidelines on this category of foods.

The study findings indicate that original films on VOD services are likely to be a source of harmful exposure to tobacco, alcohol and HFSS imagery in young people. Promoting stricter regulations should be considered by governments and the regulatory parties as current regulations are failing to stop or reduce the high content of tobacco, alcohol, and HFSS in VOD services. Moreover, there is a need for consistent regulations to stop cross border issues such as portability, mostly evident through the national barriers in the digital environment. In view of the changing viewing habits of adolescents, there is a need for the regulation of tobacco, alcohol and HFSS imagery in original content from VOD services, whether this be updating the European audio-visual media services directive to ensure that European regulations specifically include alcohol, tobacco and HFSS content, or ensuring that the current UK regulations which cover Amazon Prime Video are applied across Europe. Regulating this content on VOD services would likely prevent youth exposure to this content.

3.4.5 Implications for future studies

It may be beneficial to conduct further studies with a larger sample, including films watched in multiple countries to check if there are differences in the imagery over an extended period. A longitudinal study on the exposure of alcohol, tobacco, and HFSS imagery could provide unique insights that might not be possible any other way. Studies carried out over extended periods of time could allow the researchers to examine changes over time. A study which selects movies based on BBFC's age rating will further help in the analysis of exposure of children to tobacco, alcohol and HFSS contents, particularly in movies rated by BBFC as appropriate for children. Finally, studies investigating the effectiveness of the regulation of VOD services in the countries where they are registered and the implication of this for other countries where these VOD services are accessed are also needed. Such studies would help address cross-border issues affecting the regulation of alcohol, tobacco, and HFSS imagery across different countries. As such, this would help determine actual exposure to such content across borders. This will provide a better understanding of the impact of the current split regulation of VOD services.

3.4.6 Conclusion

This chapter presented a content analysis of Netflix and Amazon Prime Video original films in the UK and examined depictions of alcohol, tobacco, and junk food. All 11 original movies released by Amazon Prime Video in 2017 and an equal number released by Netflix were selected for analysis. Generally, the study demonstrated that movies originally made for and distributed by Amazon Prime

Video and Netflix contain a considerable amount of alcohol, tobacco, and HFSS imagery. The study noted several illustrations of alcohol brands regularly occurring in Amazon Prime Video and Netflix services. The branding was noted despite Amazon Prime Video being regulated by Ofcom under Section 9.13 of the Broadcasting Code [262]. The Code prohibits product placement of alcoholic drinks. The study findings also showed a similar frequency of these imageries between the two providers. The similarity may imply that alcohol, tobacco, and HFSS imagery is common in original programming on VOD services governed by different authorities. The study findings indicate that original programming on Amazon Prime Video and Netflix is a potential source of exposure to alcohol, tobacco, and HFSS imagery. The findings may also suggest that the strict regulations enforced by Ofcom in the UK do not translate to lower levels of alcohol, tobacco, and junk food content. The seemingly severe regulations applied by Ofcom on Amazon Prime Video and those applied to Netflix in the Netherlands seem to be ineffective based on the findings of this study.

CHAPTER FOUR

POPULATION EXPOSURE TO ALCOHOL AND JUNK FOOD ADVERTISING DURING THE 2018 FIFA WORLD CUP

4.1. Introduction

The contribution of alcohol consumption to the global burden of sickness and injury (Disability-Adjusted Life Years, DALY) [333] and the impact of media exposure to alcohol marketing, awareness of alcohol marketing, engagement with and/or receptivity to alcohol marketing on the initiation of alcohol use, binge drinking, and diseases [108,150,161,229,334] have been highlighted in Chapter One of this thesis. Similarly, the consumption of unhealthy food as a major risk factor for non-communicable diseases [150] and the contribution of increased availability and marketing of highly processed HFSS foods to the current obesity pandemic in many developed countries [161] have been highlighted in this thesis. This thesis has also indicated the link between the exposure to HFSS food advertising (via sponsorship and other forms of promotion) and increased HFSS consumption among children and adults [306,335–341].

These observations were partly responsible for concerns leading to the regulation of alcohol product marketing, particularly through media channels that are capable of reaching many people at the same time, such as television, in many countries [334]. To address the problem arising from the consumption of HFSS, the WHO recommended regulating HFSS food advertising targeted at children as well as a legally binding rule which restricts HFSS marketing in certain media and at certain

times, with the Ofcom and the Advertising Standards Agency (ASA) having responsibility for enforcing regulations prohibiting alcohol and HFSS advertising in programmes aimed at audiences below the age of 16 in the UK [261,342]. Despite these regulations, it has been reported that media exposure to alcohol and HFSS content in programmes shown on television is still widespread [325]. Be that as it may, few studies have examined the nature and content of HFSS advertisements in sports. The nature and content of HFSS content would be an important consideration when designing legislative solutions.

This chapter presents the analysis of alcohol and HFSS advertisements during the FIFA 2018 World Cup. The 2018 Fédération Internationale de Football Association (FIFA) World Cup final was partnered by Coca Cola, and sponsored by McDonald's and Budweiser [267,343,344]. Coca Cola and McDonald's are HFSS producers, while Budweiser is an alcohol producer. Coca Cola also manufacturers and markets Powerade, a popular sports drink. Powerade is an isotonic sports drink meant to support effective hydration and carbohydrates. The drink is designed to replenish the energy and fluids that the body loses during exercise. Powerade contains high levels of sodium. This study quantified alcohol and HFSS content and estimated population exposure to this imagery in a sample of games from the 2018 FIFA World Cup.

4.2 Summary of Method

The 2018 FIFA World Cup took place between June 14th and July 15th, 2018. A total of 13 matches, including 12 group stage games, and one knockout game

(which was the Final match) were selected out of all the games played during the tournament. Matches played by England, (Group G), Saudi Arabia (Group A), and Russia (Group A) and the final match between France and Croatia (Figure 7, 8 and 9) were analysed in this study. Matches involving England and the final match were selected due to potential high viewership and relevance to the UK. Matches involving Saudi Arabia were selected as a contrast due to stringent alcohol promotion regulations in that country [345]. Specifically, Saudi Arabia prohibits the manufacture, sale, possession, and consumption of alcohol. [346] The country has strict alcohol regulations due to the strict interpretation of the Quran requiring Muslims not to be intoxicated in any way or form [347]. Matches involving Russia were selected as the host country of the FIFA world Cup 2018 and due to the alcohol advertising regulations (Article 14 and 21) in the country. Article 14 of the Law on Advertising specifies the prohibition to distribute alcohol products advertisements on TV channels accessible on a pay basis. Both Saudi Arabia and Russia were included as comparators, and it was expected that there would be differences in advertising and promotion of alcohol and HFSS products due to the existing stringent prohibition measures. It is also important to acknowledge that the feed used in the study was broadcast in the UK. There is a possibility that the feed in the respective nations may have been different. Differences in the feeds might mean differences in the advertising or promotion shown, since the streams target varying locations with dissimilar advertising regulations. Russia was the host nation for the men's World Cup, while Saudi Arabia was selected being the home nation of the researcher. Article 21 includes a prohibition on alcohol advertising on the Internet

[348]. The coding of alcohol and HFSS exposure in selected matches were carried out as described in Section 2.1.2. Briefly, the appearance of 'Coca Cola', McDonalds', 'Powerade', and 'Budweiser' on digital advertising billboards along the perimeter of the pitch was counted for all active playing times and the period between the first and second halves of all selected matches. Data on duration of brand appearance were also collected (Section 2.1.3). Data were recorded in an Excel file. The distribution of brand appearance as well as cumulative gross and per capita impressions were also computed (Section 2.1.4).



Figure 8. Powerade advert during the 2018 FIFA World Cup in the match between France and Croatia.



Figure 9. McDonald's ad during the 2018 FIFA World Cup France vs Croatia game.



Figure 10. Screenshot of a 2018 Budweiser World Cup Campaign during the France vs Croatia Match

4.3 Results

4.3.1 Match characteristics and viewership

Of the 13 matches studied, seven matches were broadcast in the UK by the BBC and six by ITV. The total duration of active play for the 13 matches was 75,731 seconds (equivalent to 1262 minutes and 11 seconds) (Table 4). Games were viewed by between 0.1% and 30% of the adult population (aged 16 years and above) and 0.02% to 17.3% of the child population (less than 16 years old) (Table 4).

Table 4: Characteristics of the thirteen matches recorded

Parameters/Matches	**Saudi vs Russia (Group A)**	**Egypt vs Uruguay (Group A)**	**Belgium vs Panama (Group G)**	**England vs Tunisia (Group G)**	**Russia vs Egypt (Group A)**	**Saudi vs Uruguay (Group A)**	**Belgium vs Tunisia (Group G)**	**England vs Panama (Group G)**	**Saudi vs Egypt (Group A)**	**Russia vs Uruguay (Group A)**	**England vs Belgium (Group G)**	**Tunisia vs Panama (Group G)**	**France vs Croatia (Final)**
Match date	14/6/2018	15/6/2018	18/6/2018	18/6/2018	19/6/2018	20/6/2018	23/6/2018	24/6/2018	25/6/2018	25/6/2018	28/6/2018	28/6/2018	15/7/2018
Kick off time	16:00	13:00	14:00	19:00	19:00	16:00	13:00	13:00	15:00	15:00	19:00	19:00	16:00
Channel	ITV	BBC	BBC	BBC	BBC	BBC	BBC	BBC	ITV	ITV	ITV	ITV	BBC/ITV
Active playing time (sec)	5801	5832	5769	5830	5652	5759	5832	5842	6129	5808	5588	5977	5904
% viewing (under 16 years)	3.9%	0.9%	3.2%	17.3%	6.4%	3.3%	3.75	15.7%	0.17%	1.2%	15.9%	0.02%	9.3%
% viewing (16 years and over)	7.0%	4.6%	7.3%	30%	12.6%	6.1%	7.2%	22.4%	0.31%	4.5%	23.9%	0.1%	15.2%

4.3.2 Analysis of brand appearance

The researcher identified 1806 occurrences of brand appearances in the sampled broadcasts, comprising 602 (33.3%) for McDonald's (figure 8), 464 (25.7%) for Coca-Cola (figure 10), 551 (30.4%) for Budweiser (Figure 9) and 189 (10.5%) for Powerade (Figure 7) (Table 5). There were 424 brand appearances in the games played by Russia, compared to 386 appearances noted in other Group A matches involving Uruguay, Saudi Arabia, and Egypt (Table 5). Among the brand appearances, 139 related to alcohol were in the games played by Russia (3 matches) compared to a combined 121 appearing in matches played by Uruguay, Saudi Arabia, and Egypt (9 matches). In the same manner, HFSS brand appearances in the games involving Russia were slightly more frequent (285 appearances) compared to a combined 265 appearances in the matches involving Uruguay, Saudi Arabia, and Egypt (Table 5). Brand appearances in all Group G teams were compared. The total number of brand appearances in the games played by England (3 matches) was 382, compared to 446 in the other Group G matches. Among the 382 brand appearances in the England matches, 109 entailed alcohol advertisements, while 273 were HFSS advertisements. The 446 brand appearances for the other Group G matches comprised 130 alcohol advertisements and 316 HFSS brand appearances (Table 5).

Table 5: Match by match analysis of adverts for McDonald's, Coca-Cola, Powerade, and Budweiser

Parameters	Saudi vs Russia (Group A)	Egypt vs Uruguay (Group A)	Belgium vs Panama (Group G)	England vs Tunisia (Group G)	Russia vs Egypt (Group A)	Saudi vs Uruguay (Group A)	Belgium vs Tunisia (Group G)	England vs Panama (Group G)	Saudi vs Egypt (Group A)	Russia vs Uruguay (Group A)	England vs Belgium (Group G)	Tunisia vs Panama (Group G)	France vs Croatia (Final)	Total
Number of McDonald's brand appearances	58	50	59	54	40	36	47	40	40	41	33	53	51	602
Number of Coca Cola brand appearances	44	29	35	41	31	39	34	27	31	30	29	46	49	464
Number of Budweiser brand appearances	62	39	46	41	37	35	35	30	47	40	38	49	52	551
Number of Powerade brand appearances	11	12	12	19	15	12	13	14	16	15	16	17	17	189
Total number of brand appearances	175	130	152	155	123	122	129	111	134	126	116	165	169	1806

Duration of McDonald's brand appearances	404	441	409	465	370	305	492	463	445	304	416	379	373	5266
Duration of Coca Cola brand appearances	367	335	364	367	298	290	299	371	316	270	323	286	389	4275
Duration of Budweiser brand appearances	428	389	401	461	345	414	407	403	483	319	416	390	369	5225
Duration of Powerade brand appearances	203	177	106	192	174	175	177	180	166	195	166	169	163	2243
Total duration of brand appearances	1402	1342	1280	1485	1187	1184	1375	1417	1410	1088	1321	1224	1294	17009
% of playing time where brand appearance occurs	24.1%	23.0%	22.2%	25.5%	21.0%	20.5%	23.6%	24.2%	23.0%	18.7%	23.6%	20.5%	21.9%	22.5%

The total duration of brand appearances across the 13 matches was 17,009 seconds (283 min 5 seconds or 22.5% of all playing time), of which the McDonald's brand appeared for 5266 seconds (87.76 minutes, 7.0% of playing time), Budweiser for 5225 seconds (87.08 minutes, 6.9% of playing time), Coca Cola for 4275 seconds (71.25 minutes, 5.6% of total playing time) and Powerade for 2243 seconds (37.38 minutes, 3.0% of total playing time, Table 5). The frequency of brand appearances varied significantly across the 13 games: being highest in the game between Russia and Saudi Arabia (total 175 appearances) (Figure 10), and lowest in the England - Panama game (total 111 appearances) (Table 5).



Figure 11. Coca Cola World Cup 2018 advertising during the Russia vs. Saudi Arabia match

The comparison of brand appearances in matches played in Groups A and G revealed that there were the same number of games coded from each group (Table 6). Though not statistically significant, the number of HFSS brand appearances were slightly higher during Group G matches (589) compared with brand appearance during Group A matches (550). However, more alcohol brand

appearances (260) were observed in Group A compared with Group G (239). The duration of brand appearances for Group G (8120 seconds) is higher compared with Group A (7613 seconds). Moreover, the duration for both HFFS (5642 seconds) and alcohol (2478 seconds) brand appearances in Group G was higher compared to durations observed for Group A (5235 seconds for HFSS and 2378 seconds for alcohol) (Table 6). Nearly half of all brand appearances during the 13 matches (840 appearances, 46.5%, lasting 85 minutes 48 seconds) occurred on billboards observed along the side-lines of the pitch; 232 appearances (12.8%; 18 minutes, 5seconds) were on billboards behind the goal lines (Table 7), and 734 appearances (40.6%; 179 minutes, 18 seconds) occurred simultaneously on side-line and goal-line billboards.

Table 6: Duration, appearances, and comparison between Group A and G

Description	**Group A**	**Group G**	**P Value (chi-square t-test)**
Games Coded	**6**	**6**	
HFSS appearances	550	589	0.435
Alcohol appearances	260	239	0.499
Total appearances for the group	**810**	**828**	**0.812**
Duration of active play	34,985 seconds (583 minutes 8 seconds)	34,838 seconds (581 minutes 3 seconds)	0.781
HFSS duration	5235 seconds (87 minutes, 25 seconds)	5642 seconds (94 minutes)	0.213
Alcohol duration	2378 (40 minutes, 3 seconds)	2478 seconds (41 minutes, 3 seconds)	0.539
Total Duration of brand	7613 seconds	8120 seconds	0.252

Table 7: Location, frequency, and duration (seconds) of brand appearance during the thirteen selected matches of the 2018 FIFA World Cup

Pitch side	**MacDonald's**	**Coca Cola**	**Powerade**	**Budweiser**	**Total**
Total number of sideline appearances	319	239	31	251	840

Total number of goal line appearances	69	59	14	90	232
Total number of simultaneous side lines and goal line appearances	214	166	144	210	734
Overall total number of appearances	602	464	189	551	1806
% of total	33.3%	25.7%	10.5%	30.5%	100%
Total duration of sideline appearances	1892 s	1319 s	194 s	1743 s	5148 s
Total duration of goal line appearances	371 s	281 s	55 s	403 s	1110 s
Total duration of simultaneous side lines and goal line appearances	3003 s	2675 s	1994 s	3079 s	10751 s
Overall total duration of appearances	5266 s	4275 s	2243	5225 s	17009 s
% of total	30.9%	25.1%	13.2%	30.7%	100%

4.3.3 Analysis of impressions

In total, the 13 games delivered an estimated 6.7 billion gross branded HFSS impressions and 3.7 billion gross branded alcohol impressions (references to alcohol portrayed in advertisements during the FIFA World Cup) to UK viewers (Table 8). Estimated total HFSS food impressions delivered to viewers varied significantly across the selected matches, with the highest number (1.8 billion) observed during the match between Tunisia and England, and the lowest (7.9 million) observed for the match between Panama and Tunisia. Per capita HFSS total impressions (adult and child) delivered by the sample matches are shown in Figure 11. The highest gross alcohol impression content was observed during the match between Tunisia and England (763.2 million) while the lowest (3.9 million) was observed during the match between Panama and Tunisia (Table 8). The analysis of per capita impressions (adult and child) for alcohol, indicating a similar pattern, is presented in Figure 12.

Gross impression delivered to children across the entire 13 matches was recorded separately (Table 9). Branded HFSS impression delivered to children ranged between 220,000 (observed for the match between Panama and Tunisia) and 208 million (observed for the match between Tunisia and England) while the sum of branded HFSS child impression across the entire 13 matches was 852 million. Alcohol impressions delivered to children ranged from 110,000 (Panama v Tunisia) to 89.6 million (Tunisia v England) while the sum for the entire 13 matches was

354 million. Per capita child impressions for HFSS and alcohol are represented in Figures 7 and 8 respectively.

Table 8: Gross and per capita total impressions of cumulative HFSS and alcohol appearances by population group and match

Match	HFSS		Alcohol	
	Gross Impression (95% CI) in billions	**Per capita Impression (95% CI) in billions**	**Gross Impression (95% CI) in billions**	**Per capita impression (95% CI) in billions**
Saudi v Egypt	41.04 (27.62– 54.46)	0.61(0.42 -0.82)	27.38(18.53 – 36.22)	0.41 (0.28 – 0.55)
Egypt v Uruguay	210.58 (192.43 – 228.75)	3.17 (2.90– 3.45)	104.02(95.15 – 112.88)	1.57 (1.43 – 1.70)
Russia v Saudi	446.26 (416.63-475.91)	6.72 (6.27-7.17)	271.41(253.59 – 289.22)	4.09 (3.82 – 4.35)
Tunisia v England	1767.32(1717.35-1817.30)	26.61 (25.86-27.37)	763.15 (741.82 – 784.47)	11.49 (11.17 – 11.81)
Uruguay v Saudi	171.27 (155.27– 187.29)	2.57 (2.34– 2.82)	131.61 (122.25 – 140.98)	1.98 (1.84 – 2.12)
Russia v Egypt	316.71 (295.90-337.53)	4.76 (4.46– 5.08)	286.07 (272.33 – 299.81)	4.31 (4.10 - 4.51)
Belgium v Panama	211.73 (191.80-231.67)	3.18 (2.89 – 3.49)	205.30 (191.97 – 218.64)	3.09 (2.89 – 3.29)
Uruguay v Russia	188.58 (172.28 – 204.88)	2.84 (2.59– 3.09)	106.30 (97.22 – 115.38)	1.60 (1.46 – 1.74)
England v Belgium	932.73 (902.34-963.14)	14.04 (13.59–14.51)	571.98 (553.56 – 590.41)	8.61 (8.33 – 8.89)
Belgium v Tunisia	276.06 (257.90– 294.23)	4.15 (3.88– 4.43)	169.29 (158.28 – 180.30)	2.55(2.38 – 2.71)
England v Panama	952.67 (920.49– 984.87)	14.34 (13.86-14.83)	426.80 (412.55 – 441.06)	6.42(6.21 – 6.64)
Panama v Tunisia	7.89(3.88 – 11.91)	0.11(0.06 -0.18)	3.91 (1.94 – 5.88)	0.06 (0.03 – 0.09)
Final Total (BBC + ITV)	1187.23 (1126.58 – 1247.88)	18.34 (17.39 – 19.29)	617.36 (585.82 – 648.90)	9.53(9.04 – 10.03)

Table 9: Gross and per capita child impressions of cumulative HFSS and alcohol appearances by population group and match

Match	HFSS		Alcohol	
	Gross Impression (95% CI) in billions	**Per capita Impression (95% CI) in billions**	**Gross Impression (95% CI) in billions**	**Per capita impression (95% CI) in billions**
Saudi v Egypt	4.49(2.56 – 6.43)	0.35(0.20 – 0.51)	2.99 (1.71 -4.27)	0.24(0.14 – 0.34)
Egypt v Uruguay	9.31(7.63 – 11.01)	0.73(0.61 – 0.87)	4.59 (3.77 -5.42)	0.36(0.30 – 0.43)
Russia v Saudi	51.56 (47.12– 56.02)	4.09 (3.74– 4.45)	31.30 (28.63 – 33.97)	2.48(2.27 – 2.69)
Tunisia v England	207.91 (199.91– 215.91)	16.50 (15.87 – 17.14)	89.60 (86.19 – 93.02)	7.10(6.83 – 7.37)
Uruguay v Saudi	31.43 (28.45– 34.43)	2.49 (2.26– 2.73)	14.65 (13.27 – 16.03)	1.16(1.05 – 1.27)
Russia v Egypt	57.65 (53.78– 61.53)	4.57 (4.27– 4.88)	30.01 (28.01– 32.00)	2.38(2.22 – 2.53)
Belgium v Panama	38.19(34.51 – 41.89)	3.03(2.74– 3.32)	18.72 (16.94 -20.51)	1.48(1.34 – 1.62)
Uruguay v Russia	10.37 (8.69 – 12.06)	0.82 (0.69 – 0.96)	5.84 (4.90 – 6.78)	0.46(0.39 – 0.54)

England v Belgium	124.54 (119.50 -129.59)	9.88(9.48 – 10.29)	76.23 (73.17 – 79.28)	6.04(5.80 – 6.28)
Belgium v Tunisia	29.51 (26.89 – 32.14)	2.34 (2.13 – 2.55)	18.06 (16.47 – 19.66)	1.43(1.30 – 1.56)
England v Panama	133.05 (127.63 – 138.48)	10.55 (10.13–10.99)	59.49 (57.09 – 61.89)	4.71(4.52 – 4.90)
Panama v Tunisia	0.22 (-0.07 – 0.53)	0.01(-0.01 – 0.04)	0.11 (-0.03 – 0.26)	0.01(0.00 – 0.02)
Final Total (BBC + ITV)	154.00 (144.15 – 163.85)	12.56 (11.75 – 13.38)	80.01 (74.95 – 85.20)	6.53(6.11 – 6.95)

Figure 12: Per capita impression of HFSS in selected matches during the FIFA 2018 World Cup

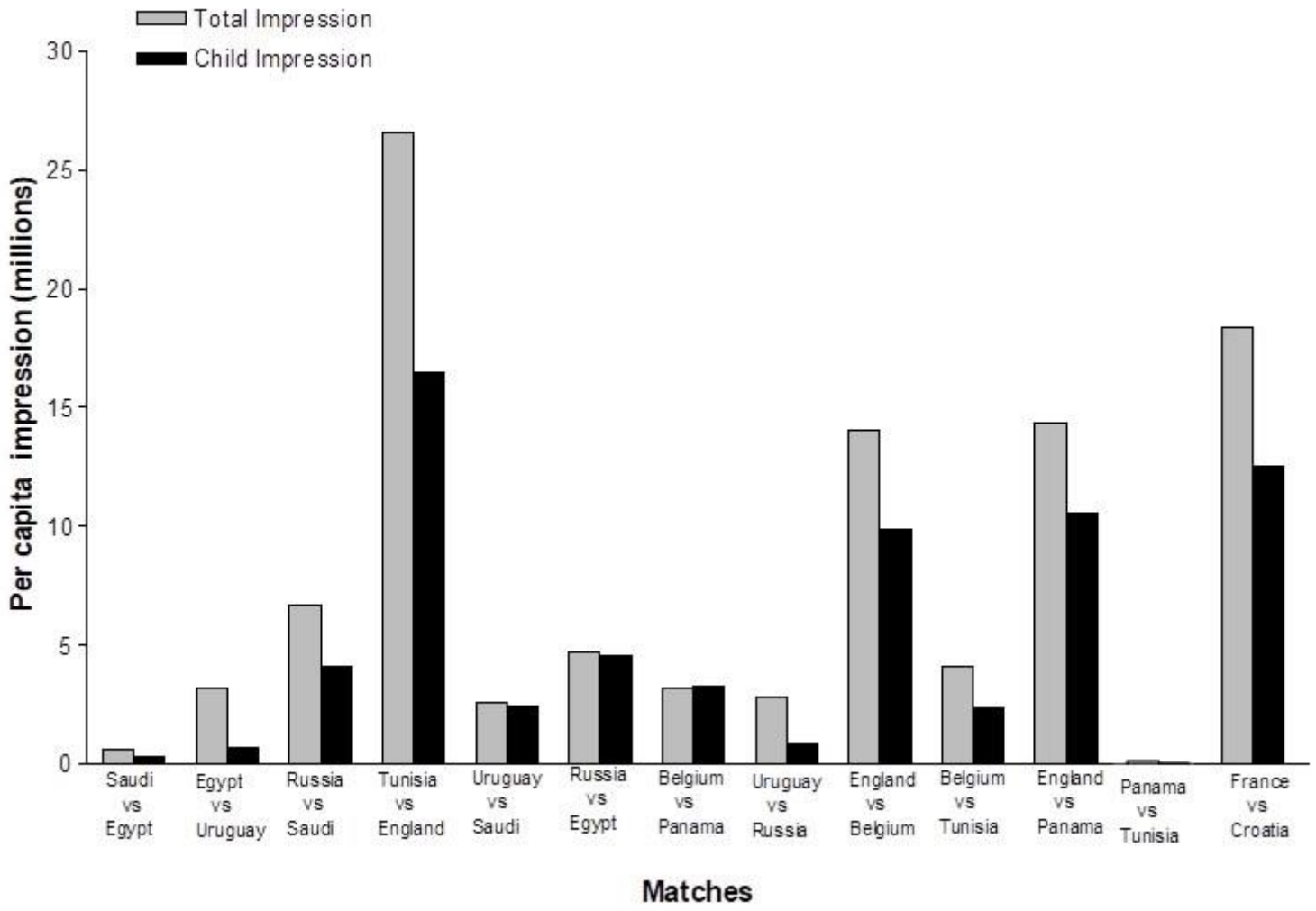
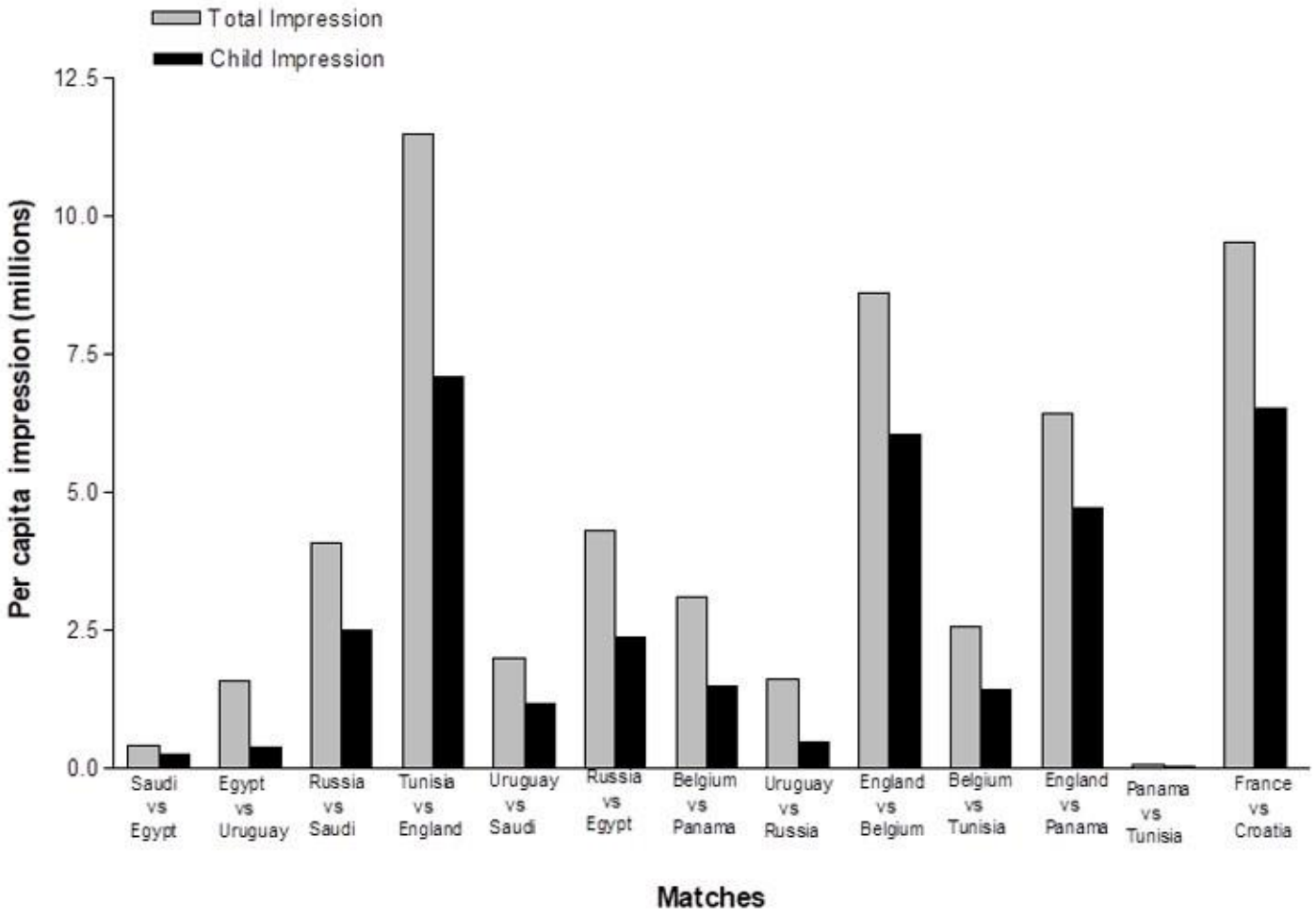


Figure 13: Per capita impression of alcohol in selected matches during the FIFA 2018 World Cup



4.4 Discussion

4.4.1 Summary of findings

This study identified 1806 brand appearances during the 13 matches selected for analysis. The McDonald's brand was the most advertised brand (33.3%) followed by Budweiser (30.4%), Coca-Cola (25.7%) and Powerade (10.5%). HFSS brand appearance accounted for about 70% of all brand appearances during the selected matches. Brand appearances were slightly higher in matches played by Russia in comparison to the rest of the countries in Group G, notwithstanding the prohibition of alcohol advertisements in Russia. However, some countries in Group G like Belgium and England have alcohol advertising regulations. Current rules in Belgium require that alcohol advertising must not be targeted at young people [349]. In England, the Advertising Codes of Practice (the CAP and BCAP codes) provides guidelines on what represents targeting a child audience. Generally, no medium with an audience proportion of more than 25% under 16 years is allowed to advertise HFSS products. For alcohol and electronic cigarettes, the audience proportion should not be more than 25% under 18 years. The guidelines do not allow the inclusion of under-age consumers in directly targeted audiences or mailing lists of these products [342]. However, these regulations have no bearing on billboard advertising at a football tournament held internationally given wide audience appeal [337].

The duration of brand appearance accounted for 22.5% of the total playing time for the 13 selected matches and the appearance of McDonald's, Budweiser, Coca Cola, and Powerade accounted for 7%, 6.9%, 5.6%, and 3% of playing time respectively. The majority of brand appearances (46.5%) occurred at pitch

side-lines alone while 40.6% of all brand appearances occurred simultaneously on the side-line and goal line. These brand appearances generated substantial audience exposure, delivering 3.7 billion alcohol and 6.7 billion HFSS total gross impressions. This study also revealed that an estimated 852 million HFSS and 354 million alcohol impressions were delivered to children in the UK. The alcohol impressions delivered to children can be considered as high since a related study by Murray et al.[284] studying Carlsberg alibi marketing in the UEFA euro 2016 football finals found a much lower figure of 163.3 million alcohol impressions delivered to children in the UK. However, the alcohol impressions targeted towards total viewers in the UK in the Murray et al.[284] study were much higher at 7.43 billion compared to the 3.7 billion reported in the current study. The study thus provides evidence that the 2018 FIFA World Cup was a source of significant exposure of children and young people to branded HFSS and alcohol advertising through sports sponsorship and is likely to be a contributor to alcohol and HFSS consumption by this population.

4.4.2 Relationship with existing literature

Available evidence indicates that advertising of alcohol and HFSS, particularly among children, can influence eating behaviour [350] and food choices [242,338], leading to an increased risk of obesity and related morbidities [351]. As observed in the present study, advertising during sporting events is a common practice and has been identified as the dominant medium for the promotion of alcohol and drinking among the general population [352,353]. Moreover, brands such as Budweiser and Coca Cola, which were analysed in this study have been major sponsors of several sporting events, such as stock car racing, the Olympics and

major football competitions [354]. Budweiser and Coca Cola spent $350 million and $265 million respectively for sports sponsorship in 2016, which are lucrative deals [354]. Another brand analysed in this study, McDonald's, is a top sponsor of the Olympics and contributed around $1 billion every four years before ending the sponsorship in 2018 [355]. Similarly, Powerade is also an official sponsor of many international sport events, including Rio 2016 Olympic Games, Australian Olympic Committee, football events, rugby union, and cricket [284,356]. Therefore, the partnering of Budweiser, Coca Cola, McDonald's and Powerade with FIFA 2018 as seen in this study is not surprising.

Though the advertising of alcohol and HFSS to adults is permitted in the UK, such advertisements are subject to regulations intended to protect children and young adults, particularly when the percentage of young viewers exceeds 30% of the target audience [357]. In the UK, the Advertising Code [261,262] bans advertisement scheduling and placement in programmes predominantly targeted at children and restriction of advertisements in programmes predominantly targeted at the general public [358]. Section 9.6b of the Ofcom Broadcasting Code states that *"Product placement is prohibited in children's programme"* and went further in Section 9.13(a&b) to state that *"The product placement of the following is prohibited: (a) alcoholic drinks; (b) foods or drinks high in fat, salt or sugar ("HFSS")".* With respect to alcohol, the code seeks to prevent the general appeal of these products to children and young adults [261,262,358]. However, while the Ofcom broadcasting code restricts content in programmes, the regulator has no remit over sponsorship at televised sporting events and the Advertising Standards Authority, the UK's regulator of

advertising, does not regulate advertisements at the venue of televised sporting events due to their definition of advertising. On this basis, a balanced regulation policy model would be needed to manage alcohol and HFSS imagery in such cases. Such an approach is similar to European Union's regulation of sports broadcasting, which protects the viewers by reducing aggressive marketing behaviour. The EU's Audiovisual Media Services (AVMS) Directive requires that important activities, such as major sporting events are identified in advance and that the organisers must respond to certain information needs, for instance on advertising, to ascertain their suitability for viewers [359]. Alcohol and HFSS advertising through sponsorship at televised sporting events is thus, to practical purposes, currently unregulated. This, therefore, necessitates the development of effective alcohol and HFSS regulations in televised sporting events.

While considering regulations for alcohol and HFSS imagery, there is a lot to be learned from tobacco advertising bans. Currently, there is a ban on the advertisement of tobacco products in cinemas before screening of movies. Most of the studies that have analysed smoking content in movies suggest a declining trend of this phenomenon due to the tobacco bans [185,197–201]. For instance, Lyons et al. [202] noticed a declining trend of smoking presentation in movies between 1989 and 2008 in the UK. Yet, a few studies still find significant exposure to tobacco content in the media, for instance smoking depictions by a lead actor [196]. When applied to the current study, it is possible to argue that the regulation of alcohol and HFSS imagery could be beneficial, though riddled with a few potential challenges. To be precise, effective regulation of alcohol and HFSS imagery could see a decrease in this content in the media, thereby reducing

exposure to unhealthy habits. However, the decrease may not be immediate considering that there is still significant exposure to tobacco content in the media despite the existence of tobacco advertising bans. This calls into question whether adverting bans could be effective in the short-term.

4.4.3 Strengths and limitations of the study

One of the key strengths of this study is the analysis of brand appearance across multiple games and across two groups of the world cup containing countries with different regulatory frameworks. This enabled the study to examine issues that may be associated with brand appearance in different countries, some with stringent advertising regulations and some without. Moreover, this study focused on more than one class of food materials that have been considered as unhealthy (alcohol and HFSS).

The cross-sectional nature of the study means that the researcher was unable to estimate the effect of the documented exposure on HFSS or alcohol content consumption in the study population. However, there is extensive evidence from elsewhere that exposure to such imagery through other media increases consumption of alcohol and HFSS [242,358]. For logistic reasons, the researcher was only able to code 13 out of the 48 matches in the entire FIFA World Cup competition. However, the study has no reason to think that the other groups and games would have been different, given the study finding of the similarity of alcohol appearances in games featuring countries with different controls on alcohol advertising in place.

The 13 games delivered an estimated 6.7 billion gross branded HFSS impressions and 3.7 billion gross branded alcohol impressions to UK viewers. The estimation of both gross and per capita impressions in this study assumes that viewers watched the entire broadcast of matches selected for coding and analysis, when in fact many may have watched only parts of the games. Moreover, the researcher only coded a small proportion of the matches featured in the 2018 World Cup (21% of matches), however this indicates that exposure arising from the full competition is likely to be substantially higher than reported here. Also, the study is unable to capture impressions to viewers who watched selected matches online, from within the stadia or viewers of other matches played throughout the tournament. Moreover, England played in some matches coded in this study and this may partly account for higher viewing figures for those matches, compared to matches involving other countries. The global viewership of the FIFA World Cup has been estimated at 3.4 billion, which is nearly half the global population [360]. This includes home TV audiences (estimated at 160 million), those who watched the game online and others who watched in public places such as bars, outdoor locations and pubs [361].

Selection bias could be an issue in the study if improper procedures are used to select the sample of FIFA World Cup matches. The researcher was solely responsible for selecting the matches to include in the study, and this could contribute to the selection of either favourable or unfavourable games. Even though this is a limitation and limits the applicability of the findings, the approach was useful in meeting the key objectives of the study. The viewing figures are only an average and there is no guarantee that all the people counted

as viewers actually watched the matches from the start to the end. This could present an additional limitation to the study. However, exposure estimates do not account for viewing online or outside of the home and so taking these into consideration would almost certainly result in our estimates being an under-estimation of actual exposure.

The study did not consider the content of the adverts since it is the brand being advertised that was of interest. Many advertisers have adopted alibi marketing methods that focus on the primary elements of the brand's identity, such as words, straplines, colour or the shape. The core elements of the brand are used in advertising instead of the brand's name or logo. The implication of this is that the content in the adverts may not promote consumption of HFSS foods, but serves as an alibi that can be associated with the trademarks of certain unhealthy food manufacturers. Examples of brands using alibi marketing to circumvent restrictions targeting the content of adverts have been noted in alcohol studies by Barker et al.[362] and Murray et al.[284].

Due to the confidentiality agreement with Digital I, it is not possible to quantify the number of viewers used to calculate impressions.

More focus was placed on the exposure to the imagery. Nonetheless, it is anticipated that there would be limited differences in the content of the adverts, for instances when comparing different imagery targeted at promoting HFSS foods.

4.4.4 Implication for practice

This study has thus demonstrated that the 2018 FIFA World Cup was a source of significant exposure of branded HFSS and alcohol advertising through sports sponsorship and is likely to be a contributor to alcohol and HFSS consumption by young people. Given the potential influence of brand appearances in FIFA World Cup events on food choices and alcohol consumption among children and young adults, it is important that the current regulations on alcohol and HFSS advertisement include televised sporting events. It is also important that branded sponsorship at televised sporting events is captured in the regulation. In addition, it is also important that global advertisement strategies ensure benefits to event sponsors without having negative impacts on the health and well-being of the population. Another major implication for practice relates to cross border regulation. The foundations of cross border regulations are necessary since standalone regulations in one country may not translate to other countries as demonstrated in the current study. Studies are needed to investigate how differences in regulations in different countries affect overall exposure of viewers to alcohol and HFSS contents.

4.4.5 Implication for future studies

This study coded only 13 matches played during the FIFA 2018 Men's World Cup. It is therefore important for future studies to code other matches played during the tournament as well as previous editions of the FIFA Men's World Cup in other countries to confirm the result of this study. Such studies will

enable better understanding of the problem so that recommendations for appropriate regulatory frameworks could be made. There is a lot of alcohol and HFSS content exposure in other sports, either at venues or during media coverage of matches and these should be considered as well in future studies. Studies may also consider examining esports, since there is a lack of research in this area. Esports is turning out to be one of the largest entertainment industries in the world, with an estimated audience of over 500 million globally [363]. Advertisers have equally targeted esports, with alcohol sponsorship placing millions of children and young people at risk of alcohol-related harm [364]. Another potential line of research may involve comparing the effect of brand name on a billboard against the full advert and whether these portrays would have a different effect on consumption. The extent to which the content of the advert plays a role in consumption deserves further investigation. As at the time of this research, no studies have been done comparing these two approaches to media exposure.

Moreover, the analysis of exposure of alcohol and HFSS exposures in other FIFA sporting events, such as the FIFA Women's world cup as well as other non-football sporting events is essential. This will generate data that can be used to develop strategies for effective and continuous monitoring of alcohol and HFSS advertising through sponsorship of sporting events.

The sample used consists of data from the 2018 FIFA world cup and represents the study population in the UK. The findings could broadly be applied to other types of sports with high viewership, such as the Super Bowl, World Series, the

national Basketball Association (NBA) The Masters, Rugby, and Wimbledon (though number of per-capita impressions would clearly need adjusting for populations outside of the UK). Considering the high viewership of the World Cup, these findings may not be generalisable to lower viewership sports.

4.4.6 Conclusion

The analysis shows that the 2018 FIFA world cup was a major source of exposure to young people in the UK and is likely to be a contributor to HFSS consumption and alcohol use. Despite EU regulations which prohibit media advertisement of HFSS and alcohol related contents to children, pitch-side promotional appearances during active play of the FIFA 2018 World Cup totalled over 2.5 hours for HFSS brands and approximately 1.5 hours for alcohol brands. Given the potential influence of this exposure on food choices and alcohol consumption among children and young adults, it is important that current regulations include televised sporting events in their remit or recognize branded sponsorship at televised sporting events as a form of advertising to prevent young people being exposed to this content. It is also imperative that global advertisement strategies which ensure benefits to sporting event sponsors without jeopardizing the health and well-being of the population are developed for the future.

CHAPTER FIVE

POPULATION EXPOSURE TO JUNK FOOD ADVERTISING DURING THE 2019 FIFA WOMEN'S WORLD CUP: IMPLICATIONS FOR PUBLIC HEALTH

5.1 Introduction

This thesis has highlighted in previous chapters that unhealthy lifestyle habits, such as unhealthy dietary intake, are a key risk factor for many human diseases, such as obesity [137,365]. It has also been highlighted that, to a large extent, the current global obesity epidemic stems from the increased availability and promotion of cheap, highly processed foods [365]. This is particularly true for foods which are high in fat, salt or sugar (HFSS or 'junk food') [366]. Exposure to HFSS food advertisements (which involves sponsorship and other types of promotion) has been shown to promote increased consumption of HFSS among children [306,337,338,340] and adults [337,338]. The relationship between obesity and increased consumption of HFSS food have been reported [137,365] and it is likely that obese children develop to become obese adults [367]. A report by the NHS shows that about 48% of obese children have one of their parents obese as well, and about 30% have overweight parent [132]. Overweight children, particularly at higher BMIs or if they have an obese parent, are more likely to become overweight adults [367]. Nearly half of overweight adults were overweight as children [367]. This study was undertaken to ascertain population exposure to junk food advertising in women's 2019 FIFA World Cup. This component of the study supports a previous study on men's FIFA World Cup and seeks to identify potential gender differences in population exposure among the games.

The 2019 Fédération Internationale de Football Association (FIFA) Women's World Cup, which appeal strongly to people of all ages, was partnered by Coca Cola [368] and sponsored by Powerade [344] both are HFSS brands. This chapter presents the analysis of HFSS advertisements during the FIFA 2019 Women's World Cup. Specifically, the chapter investigates the amount of potentially unregulated HFSS content shown at the sporting event and estimated population exposure to HFSS imagery in selected matches played during the tournament.

5.2 Summary of methods

The FIFA Women's World Cup 2019 took place in France between June 7th and July 7th, 2019, and featured a total of 51 matches, consisting of 36 group stage games and 15 knockout matches. All matches from Group D (which included England) and the world cup final were recorded and coded for HFSS content, as these matches were likely to draw some of the highest UK audiences. The study also included all Group A matches (except three group stage matches which could not be found at the time of this study). Group A was selected as it included France which was the host nation. The researcher measured all HFSS advertising during all broadcast footage of active play in selected matches from kick-off to the final whistle in the first and second halves of standard and extra time (none of the selected matches involved a penalty shootout or extra time).

The coding instrument used recorded each appearance of HFSS brands 'Coca Cola' and 'Powerade' on digital advertising billboards along the entire perimeter of the pitch. As previously reported [284,311], start and end time in

minutes and seconds (for example, 17:42 to 18:04) and match period (first and second half of normal and first and second half of stoppage time) for each brand appearance were recorded. Visual occurrences of each brand that appeared in clear, uninterrupted view on the screen received a single count in each instance. Information was recorded in separate Excel files for each match along with general information about the match (start time, end time, teams playing, date, broadcaster, stage in championship). To ensure the accuracy and reliability of coding, the TV coverage for three of the thirteen games was coded independently by two coders (KA and RM/AB) using the play, pause, review method previously reported [301,302]. Differences were resolved by discussion. UK viewing figures for the UK were supplied by Digital-I [303]. Viewership was calculated using UK mid- year population estimates in 2019 [369]. Given the reliance of advertising brands on such data, they are potentially accurate. However, this study did not collect additional information to ascertain the accuracy of the data. It is possible that the viewing figures could be subject to some reporting bias. The study was only able to access individual-level data to determine individual exposure to HFSS imagery.

To evaluate UK population exposure to branding content, the study analysed the distribution of appearances of brands and used the data to compute cumulative gross and per capita impressions as previously described [284]. To generate the cumulative distributions of branding appearances by match and type of visual occurrence (Powerade and Coca Cola), the study used the total amount of occurrences combined with population data to give the exposure estimates.

5.3 Results

5.3.1 Analysis of brand appearance

The total duration of active play for the 10 matches was 57,954 seconds (965 minutes and 54 seconds). The study identified 1104 occurrences of brand appearance in the sampled broadcasts, comprising, 685 (62.04%) for Coca-Cola (Figure 13) and 419 (37.95%) for Powerade (Figure 14) (Table 10). The total duration of brand appearances across the 10 matches was 7918 seconds (131 min 58 seconds) or 13.66% of all playing time), of which the Coca Cola brand appeared for 5100 seconds (8.80% of playing time) and Powerade for 2818 seconds (4.86% of total playing time, Table 10). The frequency of all brand appearances varied significantly across the 10 games, being highest in the final game between USA and Netherlands (132 appearances), and lowest in the France and South Korea game (92 appearances) (Table 10). Brand appearances during the 10 matches (466 appearances, 42.21%) occurred on billboards along the side-lines of the pitch; 111 appearances (10.05%) were on billboards behind the goal lines (Table 11), and 527 appearances (47.73%) occurred simultaneously on side-line and goal-line billboards.



Figure 14. FIFA Women's World Cup 2019 showing Coca-Cola advert during the England vs USA match



Figure 15. Screenshot of Powerade ad during a 2019 FIFA Women's World Cup between England vs USA.

Table 10: Results of Brands' appearances and durations

	France v South Korea	England v Japan	Japan v Argentina	Argentina v Scotland	Japan v Scotland	France v Norway	England v Argentina	France V Nigeria	England V Scotland	USA v Netherlands	Total
Coca Cola	57	71	75	60	58	73	58	83	77	73	685
PowerAde	35	39	40	40	38	46	37	42	43	59	419
Total	**92**	**110**	**115**	**100**	**96**	**119**	**95**	**125**	**120**	**132**	**1104**
Duration of Coca Cola	568	493	545	538	581	386	459	582	522	426	5100
Duration of PowerAde	290	324	228	261	315	214	248	271	373	294	2818
Total Duration	**858**	**817**	**773**	**799**	**896**	**600**	**707**	**853**	**895**	**720**	**7918**

Table 11: Results of the games by pitch side

Pitch Side	Coca Cola	PowerAde	Total
Total number of side-line appearance	266	200	466
Total number of goal line appearance	74	37	111
Both	345	182	527
Total	685	419	1104

Group D matches (England) contained more HFSS appearances (768) than Group A (France) (336).

5.3.2 Analysis of impressions

In total, the 10 games delivered an estimated 2.5 billion gross branded HFSS impressions (Table 12). Estimated HFSS food impressions delivered to viewers varied significantly across the selected matches, with the highest number (532.67 million) observed during the match between England and Scotland, and the lowest (74.26 million) in the match between Scotland and Argentina. Appearances of HFSS brands were higher in games in the England Group than in the France Group due to missing three matches of the France group. Gross impression delivered to children was reported separately over the entire 10 matches Table 13). The branded HFSS impression given to children ranged from 116, 000 (observed for the Japan-Scotland match) to 48 million (observed for the England -Scotland match), while the total of the branded HFSS child impression was 164 million over the entire 10 matches. The highest per capita of children impression exposure to HFSS content was observed during the match between Scotland and England (3.83 million total) and the lowest during the match between Scotland and Japan (0.09 thousand total) (Table 13).

Table 12: Gross and per capita total impressions of cumulative HFSS appearances by population group and match

Match	HFSS	
	Gross Impression (95% CI) in millions	**Per capita Impression (95% CI) in millions**
France v S Korea	185.46 (166.92-204.01)	2.77(2.50-3.05)
England v Scotland	532.67(497.45-567.89)	7.97 (7.45-8.50)

Argentina v Japan	109.89(93.80-125.98)	1.64(1.40-1.89)
France v Norway	128.39(110.72-146.07)	1.92(1.66-2.19)
Japan v Scotland	99.36(85.39-113.34)	1.48(1.28-1.70)
England v Argentina	413.74(386.11-441.38)	6.19(5.78-6.61)
Nigeria v France	108.55(91.87-125.23)	1.62(1.38-1.87)
Japan v England	466.50(434.90-498.12)	6.98(6.51-7.46)
Scotland v Argentina	74.26(61.91-86.62)	1.11(0.93-1.30)
Final: USA v Netherlands	475.36 (440.24-510.49)	7.11(6.59-7.64)
TOTAL	2594.18	38.79

Table 13: Gross and per capita child (<16) impressions of cumulative HFSS appearances by population group and match

Match	**HFSS**	
	Gross Impression (95% CI)	**Per capita Impression (95% CI)**
France v S Korea	13.64(11.43-15.86)	1.07 (0.90-1.25)
England v Scotland	48.64(43.92-53.37)	3.83 (3.46-4.20)
Argentina v Japan	5.02 (3.52-6.54)	0.39 (0.28-0.51)
France v Norway	3.86 (2.52-5.21)	0.30 (0.20-0.41)
Japan v Scotland	1.16 (0.50-1.83)	0.09 (0.04-0.14)
England v Argentina	24.73 (21.72-27.76)	1.94 (1.71-2.19)

Nigeria v France	3.55 (2.23-4.88)	0.27 (0.18-0.38)
Japan v England	23.58 (20.41-26.76)	1.85 (1.61-2.11)
Scotland v Argentina	1.24 (0.54-1.95)	0.09 (0.04-0.15)
Final: USA v Netherlands	38.71 (34.27-43.16)	3.04 (2.70-3.40)
TOTAL	164.13	12.87

5.4 Discussion

5.4.1 Summary of findings

The research shows that the FIFA Women's World Cup 2019 was a significant source of exposure to all age groups of individuals in the UK and is likely to lead to HFSS consumption. Pitch-side commercial appearances for HFSS brands totalled over 2.2 hours (2.5 billion total impressions) and (164 million impressions to children) during active play time of the FIFA 2019 Women's World Cup.

5.4.2 Relationship with existing literature

Marketing during sporting events is a common practice and has been identified as the dominant medium for the promotion of HFSS among the general population [370]. There is evidence to suggest that the promotion of HFSS may affect eating behaviour [350,370] and dietary choices [303], especially in children, increasing the risk of obesity and related diseases [351]. Coca Cola has been the main sponsor of numerous sporting events, such as football tournaments (such as Copa Coca-Cola and the UEFA Euro 2020), the Olympics

and stock car racing [354]. Coca Cola spent $265 million for sports sponsorship in 2016 [354]. Powerade is also an official sponsor of many international sports events, including football competitions (such as the FIFA World Cup), The Olympic Games in Rio 2016, Australian Olympic Committee, rugby union, and cricket [356].

The findings suggested a lack of alcohol content in the women's FIFA World Cup. This is similar to past research suggesting that alcohol advertising portrays women in a conspicuous sexual and demeaning manner, and as desirable objects instead of consumers of the product [371,372]. Alcohol commercials tend to objectify women for the goal of turning a profit. Most alcohol brands have also been hesitant to target women since females who drink have historically been stigmatised and presented as lacking femininity and negligent of their traditional roles and virtues [373,374]. With such stereotypes, most advertisers prefer to target men than women consumers of alcohol.

Similar to the findings reported in Chapter Four of this thesis, findings of this chapter have further showed the ineptitude of current legislations with respect to advertisement in sporting events. In agreement with a previous study by Taille et al [122], findings of this study have revealed that, even though the adverting of HFSS to adults is allowed in the UK, there is significant HFSS exposures to children and young adults, especially during programmes having a target audience in which the proportion of young viewers exceed 30%. This observed ineptitude may be attributable to gaps in the coverage of current regulations in the UK. For example, the ASA Advertising Code [342] forbids the

placement of advertising in programs primarily targeted at children and prohibits advertising in programs primarily targeted at the general public. However, the Advertising Standards Authority's advertising code does not apply to programme content. Moreover, the ASA in the UK does not regulate advertising at the venues of televised sporting events. Although the Ofcom broadcasting code regulates content in programs, the regulator has no control over sponsorship of televised sporting events [375]. Thus, HFSS advertising via sponsorship of televised sporting events is currently unregulated for practical purposes. This may partly explain the study findings that children are exposed to unregulated HFSS advertising at sporting events, and also suggest that this may continue for a foreseeable future, unless there is a significant change in regulation which adequately captures sponsorship of televised sporting events and advertisements at the venues of these events.

Several other studies have also arrived at similar conclusions. For instance, in a study which investigated the exposure of Australian children to food and beverages in sponsored sporting events, Kelly et al [317] reported that outdoor soccer alone generates 182,400 hours/weeks of exposure and represents the sporting event with the highest person-time exposure for children. It is therefore not surprising that FIFA Women World Cup (which is also an outdoor soccer event) generates as much exposure as reported in this study. In addition, Kelly et al [317] indicated that by juxtaposing the rate of sport sponsorship with HFSS exposure, Rugby and outdoor cricket are also two sporting events with significantly high potential of generating children exposure to HFSS advertising. While highlighting the need for revision of existing regulatory

frameworks with respect to HFSS advertising during sporting events, MacLean and Bonington [376] particularly prescribes a role for sport's governing bodies in joining the government in the enforcement of regulations.

Boyland et al [377] looked at the contribution of sports sponsorship to the exposure of children to HFSS from another perspective and particularly implicated the use of sport celebrities as endorsers of HFSS brands. The study, which exposed children to different HFSS advertisements including an advertisement involving the use of a long-standing celebrity endorser and then allowed children to consume advertised products ad libitum, reported that children consumed more of the produced advertised by the celebrity endorser compared to products advertised without the endorser. This clearly has a significant implication for football which particularly has a lot of well-known global celebrities. The study also further confirms the assertion that exposure to advert materials could promote overconsumption.

5.4.3 Strengths and limitations of the study

Though a few studies have analysed HFSS exposure to children in other sporting events [122,370], this study is the first study to conduct this analysis for the recently concluded 2019 FIFA Women's World Cup. Moreover, the specific focus on HFSS (rather than HFSS, alcohol and/or tobacco that is common in some previous studies) makes dealing with HFSS food marketing an important issue due to the potential impact on children. Moreover, the fact that FIFA Women's World Cup is not as popular as FIFA Men's World cup means that exposure within this event can easily be overlooked and may not generate

sufficient research interest. Useful data that could contribute to improvement in regulatory practices could therefore be overlooked and this study addressed that gap.

Although there is evidence to indicate that exposure to such imagery increases HFSS consumption, the study was unable to measure the effect of exposure to HFSS content on consumption as limited by the scope of the study. Some studies have also shown the effect of familiar media character branding on food choices and consumption. While this study does not take this angle, future studies should examine the impact of using familiar media characters when advertising HFSS foods [378]. Also, the analysis conducted in this study was based on UK television viewing figures, and therefore is unable to include people who watched selected matches online, from inside the stadium, viewers of other matches played during the tournament, and international viewers. Therefore, data presented in this study are likely to underestimate the true exposure. Furthermore, the estimation of impressions is based on the assumption that viewers watched the whole broadcast of matches chosen for coding and analysis.

Comparing the outcome of the analysis and the results presented in chapter 4 [379], it is evident that there are differences in advertisement between the women's and men's FIFA World Cups. The first difference is the lack of alcohol content in the women's FIFA World Cup. A possible assumption for this is that alcohol has been regarded as a male-dominated activity for many years [380]. Global statistics indicate that men consume more alcohol and have the highest number

of alcohol-related harms compared to women [380,381]. Another reason for the lack of alcohol in the women's FIFA World Cup could be because the game is still growing and its players are regularly portraying a positive image to other women. Sponsoring this game with alcohol brands would easily erode the positive values [382]. Most sponsorships target the men's game since the alcohol brands have objectives that align with those evident in men's football. On the contrary, the women's game is more focused on the family and having positive role models who encourage a much better view of life [383,384]. However, there is no guarantee that these standards will be maintained into the future since some sponsors such as Heineken are already targeting some women's games [385,386]. The second difference is that the women's competition exposed the audience to a higher percentage of HFSS content compared to the men's competition. The difference is surprising since past research evidence shows that women tend to have slightly greater consumption of healthier foods [387]. Women's competitions target a younger audience and lack alcohol advertisements [388]. That could explain why the women's competition had a lot of HFSS imagery targeting a much younger audience, who are likely to be convinced to consume junk foods [389]. Otherwise, the men's competition had more combined overall exposure to HFSS and alcohol content compared to the women's competition due to the fact that the men's competition attracts a higher audience [390]. Regulators must take note of the differences in advertising between the men and women's game, especially when developing guidelines governing the promotion of unhealthy products in televised sporting programmes.

The current study included group matches played by England, and this can partially account for higher viewing figures for those matches relative to matches involving other nations. The BBC indicated that 28.1 million people watched its coverage of the FIFA Women World Cup on television [391]. Therefore, the viewing figures calculated for TV broadcasts are likely to underestimate the actual number of impressions. Across all platforms, about 1.12 billion viewers tuned into the official television coverage of the FIFA Women's World Cup 2019, approximately around 20% of global population [392]. Therefore, the UK exposure estimates are probably a very small proportion of the actual overall global exposure.

5.4.4 Implications for practice and future studies

Given the exposure of children and young adults to HFSS imagery as demonstrated in this study, there is a need for the revision of current regulations to include televised sporting events as well as the acceptance of the fact that the sponsorship of televised sporting events is a significant source of exposure to HFSS contents. Therefore, there is a need to prevent young people from being exposed to HFSS content during sporting events prior to the 9pm watershed. It is important that advertising strategies, which ensure benefits to sporting event sponsors without risking the population's health and well-being, are developed in the future. Moreover, studies are needed to continually track HFSS advertisements through sponsorship at sporting events and to examine population exposure to potentially unregulated HFSS advertisement. Tracking HFSS advertisements will help regulators collect detailed and identifiable

analytics that would allow them to develop more suitable guidelines on promoting their products ethically.

In conclusion, this study has shown that the 2019 FIFA Women's World Cup was a major source of HFSS exposure via advertising made through sports sponsorship and is likely to promote the consumption of HFSS among young people. This implies that there is a need for current regulations to be revisited with a view to making amendment which will prohibit the type of exposures reported in this study. Moreover, effective international regulations which prohibit the advertisement of junk food during popular sporting events are needed.

Even though this study examined two types of sugary drinks, people may respond to adverts consisting of other HFSS foods in the same way. For instance, a study by Critchlow et al.[393] studied adolescents' reaction to fast food adverts and found at least half of the adolescents had positive reactions to the two adverts for most of the measures. Due to the similarity between the reaction to adverts and most HFSS products, the findings of this study support further regulation to control HFSS marketing and ensure that young people are protected. In light of the results of this study, it is appropriate to interpret them as directly supporting additional legislative measures on all HFSS foods posing a real health risk.

CHAPTER SIX

DISCUSSION AND CONCLUSION

The aim of this thesis was to quantify the amount of tobacco, alcohol, and HFSS food content in a sample of audio-visual media and estimate population exposure to this content. Research on the extent of media exposure is continually developing within the public health field, and audio-visual content has been identified as having guided exposure to certain messages. This means that media potentially contributes to the prevalence of lifestyle behaviours, such as tobacco smoking, alcohol consumption, and HFSS food consumption in adults and children, outcomes that are significant in public health. The study sought to address an existing gap in knowledge concerning the role of media exposure to tobacco, alcohol and HFSS and how such contact motivates the consumption of these items. The study also focused on media contents for tobacco, alcohol, and HFSS advertising on televised FIFA world cup matches. The study examined tobacco, alcohol, and HFSS content in VOD services, such as Amazon Prime Video and Netflix.

6.1 Summary of Study

Recent studies have reported unhealthy lifestyle behaviour such as tobacco smoking, alcohol consumption, unhealthy diet, and lack of physical activity as risk factors for many human diseases. To counter the risk of such unhealthy lifestyles, public health programs focused on increasing the awareness of the impact of such behaviour on the health and wellbeing of adults. Even though there are a number of previous studies that have highlighted exposure to alcohol, tobacco and HFSS in films, it was clear from the literature review that there

were no contemporary data on the subject. The current study was, therefore, inspired by the need for new data investigating exposure to alcohol, tobacco, and HFSS content in the media. The study was also anchored on the fact that recent advancements in technology have increased access to films. Such developments include high-speed internet which facilitates online streaming and the development of smart phones. Consequently, it was important to examine the impact of these advancements in terms of the amount of content in films on video-on-demand platforms, such as Netflix and Amazon Prime Video. The current study also showed interest in sports TV programmes bearing in mind that this genre of TV may feature significantly higher contents of alcohol compared to others. This angle of the study was inspired by the general lack of contemporary evidence exploring advertising in sporting events broadcast on TV and the exposure on people of different age groups.

6.2 Broad Implications

6.2.1 Exposure to Alcohol Content

Results of the study provided evidence that original films on VOD services, such as Netflix and Amazon Prime Video, are likely to be a source of harmful exposure to alcohol in the UK. The rate of recurrence of alcohol content was not significantly different in the movies selected from Amazon Prime Video compared to those chosen from Netflix. These findings imply that the selected VOD services uniformly act as a potential source of exposure to alcohol. These findings are consistent with past studies that have reported alcohol depiction in movies watched in the UK. For instance, Lyons et al. informed the depiction of alcohol-related images in close to 40% of television broadcasts [231]. Another

study similar to this also reported predominant portrayal of alcohol in the movies, with close to 86% of broadcast time displaying open use of alcohol or branding images related to alcohol [231]. Together, these findings are concerning since there is an outright link between the portrayal of alcohol in movies and consumption of these products among the population [232–234]. Alcohol imagery in movies remains a risk factor for the populace adopting an alcohol consumption culture. The study highlights the learn-by example approach that younger people follow through their development. The findings imply that regulators should understand the regular appearance of alcohol consumption in films normalizes alcoholism and can portray it as pleasant and worth doing. If the goal of regulators is to reduce teen drinking, restricting the display of alcohol in films (especially those featured in VOD services) may be an applicable move as evident in the success of the comprehensive ban on tobacco advertising in 1970 [394]. Ofcom's goal is to protect children from harm, and as the link between viewing and uptake exists, Ofcom should prevent children seeing this content [332,375]. The close to uncontrolled ability for brands to market through product placement in films allows them direct access to young teens who can establish a drinking pattern at an early age.

Alcohol was the most prevalent content in the analysed movies. This is a key concern in the public health domain since alcohol consumption stands as a causal factor for over 200 diseases and injury conditions [93,94]. Research by WHO links alcohol to the cause of over 200 ICD-10 disease codes [334]. While alcohol exposure may not necessarily imply consumption, there is a lot for the UK to learn from most eastern European countries that have the highest consumption

rate, perilous patterns of drinking, and consequently, high levels of deaths and disabilities related to alcohol [334]. These findings should concern stakeholders in the healthcare sector, especially the UK Health Security Agency (UKHSA) and the Department of Health and Social Care which exist to safeguard and improve the health and wellbeing of the nation and reduce health disparities [395]. Part of UKHSA's responsibility is to make the public healthier and reduce differences between the health of various groups by encouraging healthier lifestyles [395]. While exposure to alcohol content remains high in the analysed movies viewed in the UK, UKHSA's obligation could take time to achieve. The findings could also mean that controlling exposure to alcohol content may help lower the rate of chronic diseases associated with alcohol consumption in the UK, such as type 2 diabetes and chronic kidney disease.

As noted in the current study, advertising during sporting events is a common practice identified as the dominant medium for promoting alcohol and drinking among the general population. It is almost impossible to watch a live or televised sporting game in the UK and the rest of the world without being exposed to images of alcohol. The findings on the 2018 FIFA World Cup showed about 3.7 billion gross branded alcohol impressions to UK viewers. The study also revealed that an estimated 354 million alcohol impressions were delivered to children in the UK. Of particular concern to health experts is the exposure that children, young people, and adults had to many messages from alcohol sponsors during the 2018 FIFA World Cup. Such branded alcohol advertising through sports sponsorship is likely to be a contributor to alcohol consumption among these age groups. Overall, these findings are in accordance

with findings reporting that advertising of alcohol, particularly among children, can influence behaviour [350], leading to an increase in the risk of related morbidities [351]. The earlier children are exposed to alcohol advertising, the earlier they start drinking [396,397]. Children who otherwise might not have been thinking about alcohol start thinking to themselves ‘is this the product for me’ whenever they see alcohol advertisements [396,397]. If these young people are already drinking, exposure to alcoholic content increases their chances of drinking at hazardous levels [396]. Brands such as Budweiser and Coca Cola sponsor several sporting events with the intention of eventually making sales and recouping their advertising spent. Therefore, it is not surprising that the partnering of alcohol brands with sporting events leads to a start and increase in drinking behaviour among the young population.

The results show the prevalence of alcohol brands and their role in exposure to alcohol imagery. This study draws conclusions based on literature that such advertising primes young people to become drinkers. This was evident after analysing brand appearances in the 2018 FIFA World Cup. An earlier study by Duke University showed that adolescent exposure to alcohol can prime a child for alcohol uptake [397]. Referring to the findings by Duke University, it is possible to argue that alcohol advertisements noted in the current study can prime young people to start drinking alcohol.

The advertising of alcohol to adults in the UK is permitted, though the advertisements are subject to regulations meant to protect children and young adults. The Advertising Code in the UK prohibits the scheduling and placement

in programmes mostly targeting children. The Code also bans the placement of advertisements in programmes meant to be viewed by the general public [358]. Most sporting events fall under the general public category. Even though the Ofcom broadcasting code limits content in programmes, the regulator has no responsibility over sponsorship at televised sporting events. At the same time, UK's regulator of advertising, the Advertising Standards Authority, does not control advertisements at the venue of televised sporting events due to their narrow definition of advertising. Alcohol advertising during sponsored live sporting events is unregulated. Ambiguities in the regulations governing what can be shown on televised sporting events means that children of all ages are being exposed to alcohol-related promotions. At times the advertisement could be a catchy 30-second commercial, while in other cases brands deliver the message subtly through alcohol-branded logos or signage around a stadium. Considering this loophole, it is important for the UK government to consider developing effective alcohol regulations administrating televised sporting events. France is one country the UK can learn from after the implementation of the 'Loi Evin,' a policy that bans TV advertising of any drink with an alcohol content more than 1.2% [398]. These measures are evidence-based and are proven to work in France, considering that the country has achieved a 25% decline in the consumption of alcohol since the introductions of these restrictions. The policy is plausible since it has an impact on the sale of alcohol to minors. Part of the reason for the success of the policy is its establishment as part of the Code of Public Health, and this means the UK and other countries should also consider developing policies as a comprehensive package. The regulation has resulted in alcohol ads only illustrating the product and information. That means

that alcohol ads cannot maintain and feed harmful alcohol norms or rather increase the attractiveness of alcohol through advertising, an aspect linked to a decrease in the consumption of alcoholic beverages over time. However, the policy can only work by maintaining the founding principles to protect young people from being exposed to outdoor sources of advertising. Apart from 'Loi Evin' France has other initiatives for reducing alcohol consumption such as encouraging certain thresholds and supporting abstinence, and other countries could equally benefit from these.

Similar measures have also been shown to work in Norway [399,400] and Iceland [401,402]. Though alcohol consumption is a personal choice, the public health perspective must support such bans due to the significant negative health, social, and economic impacts resulting from high levels of alcohol consumption. Even though UK residents must take responsibility for their actions, the Government cannot depend on such an approach alone since it faces the consequences, costs, and impact of excessive alcohol consumption.

However, banning TV advertising of any drink with alcohol content may not work outrightly as evident in some countries. A case in example is Russia where a ban on advertising alcohol products on almost all media, including television and billboards has been in effect since 2013 [403]. The ban came in effect with the hope of solving the abnormally high rate of alcohol consumption in the country. The restrictions have had minimal effect to date since Russia continues to record some of the highest levels of alcohol consumption globally, even though the average rates have declined slightly [404]. The average Russian above the age of

15 drinks close to 11 litres of pure ethanol each year [404]. The failure of the ban is largely an outcome of the Russian society continually finding itself recording a greater spread of alcoholism and drunkenness with every step-up in anti-alcohol campaign [405]. Besides, Kremlin's reliance on revenue from liquor has negatively affected efforts to ban alcohol in the nation. The Russian government heavily depends on alcohol sales as a key source of tax revenue [406,407]. Such reliance on alcohol revenue makes efforts to ban TV advertising in Russia fruitless and cringeworthy.

An important matter to consider while reducing TV advertisements is cross-border advertising challenges. Exposure of viewers to alcohol content may differ from one televised sporting event to another depending on the intensity of regulations in the host country [408]. When a sporting event is televised, there are high chances that it will be aired in countries with different regulations. Advertisers are also adopting to new realities faster than the existing legal legislations, with the alcohol industry using prospects offered by digital platforms to sell their products in a large and unfettered market. Alcohol advertisers have the ability to use innovative techniques to target consumers and encourage drinking, including to children and adolescents [408].

Given the few studies on potential exposure to alcohol, tobacco, and HFSS imagery in VoD films and televised sporting events, there are considerable opportunities for research. The differences in the regulations across various countries and the impact they have on the exposure of viewers to harmful imagery is a matter that deserves more research consideration. The influence of

marketers and sports sponsors at major sporting events also requires serious research consideration if suitable governance mechanisms are to be proposed and implemented. Further studies should also consider quantifying the impact of exposure to unhealthy brand marketing through VoD and sports on the attitude and behaviour of children and adolescents. Concerning sporting events, this study has considered the men's and women's world cup games. There are still additional opportunities for further research to consider amateur and professional games, as well as junior sporting events that bring up even higher public health concerns.

The popularity of alcohol in the analysed movies and sporting events brings up questions on how to reduce the burden of harmful use of alcohol despite an increased rate of exposure. The UK and many other countries across the globe are responsible for formulating, implementing, monitoring, and evaluating public policies to reduce harmful exposure to alcohol content. A key strategy to using public policy would be to raise awareness of public health problems caused by harmful consumption of alcohol and supporting effective alcohol policies.

Implementing these initiatives is difficult considering that the main aim of alcohol marketing is to motivate alcohol consumption, whether knowingly or instinctively [229]. In this regard, films on Netflix, Amazon Prime Video, and other VOD services tend to make alcohol consumption look like normal engagements. The films achieve this purpose by highlighting the desirable features of alcohol consumption, encouraging many film viewers to imitate the

behaviour of others. This premise is supported by studies that posit increasing sales as the main motivation for alcohol marketing through media channels, such as movies [229]. Some advertisers of alcohol products seek to promote and increase awareness of their brands, which may lead to increased brand loyalty but also sales in the long run. Therefore, regulatory approaches must consider initiatives that protect the audience against negative influence while ensuring that advertisers still make their sales to the target audience.

6.2.2 Exposure to HFSS Foods

Upon analysing the films and sporting events, the current findings confirm the presence of HFSS content. There were many scenes of HFSS content in the Netflix and Amazon Prime videos. HFSS were also evident in the 2018 FIFA men's World Cup with popular advertising brands being Coca Cola, McDonald's, and Powerade, as well as in the 2019 women's FIFA World Cup with the main advertising brands being Coca Cola and Powerade.

In the VOD services, HFSS content appeared in over 35 per cent of the reviewed films. Among these instances, actual consumption of HFSS occurred in 8.5% of the instances, while 15.2% of the times featured inferred consumption. Most of these advertisements featured soft drinks, confectionaries, fast foods, pre-sugared breakfast cereal, crisps and savoury snacks and pre-prepared convenience food. The most common paraphernalia linked with HFSS imagery in the movies was the display of food packets (13.1%). The study compared the films across the two platforms and the outcome revealed that exposure to junk food imagery was similar between Netflix and Amazon Prime Video. This is

concerning considering that Ofcom subjects Amazon Prime Video to potentially stricter regulation by specifically considering tobacco, alcohol & HFSS content, whereas the regulations covering Netflix do not. This also shows that there is a chance that the measures put in place by regulators are not enough to prevent or minimize exposure to HFSS imagery. These results tie well with previous studies wherein the impact of media advertisement and portrayal of food choices among children and adults have been reported [242,311]. Studies have demonstrated that children are specifically targeted by the media promotion of food and beverages containing unhealthy proportions of fat, sugar, and salt [242,245]. Children, adolescents, and many adults are not equipped with the media literacy to differentiate marketing from other content, making the audience of the exposure vulnerable to persuasive marketing [409]. The exposure to junk food in films is a risk factor for obesity and restricting the marketing of these foods is a policy priority for the UK government and public health experts.

As mentioned earlier, HFSS imagery was also seen in the selected matches played during the 2018 men's FIFA World Cup. The brands identified in these games (McDonald's, Coca-Cola, and Powerade) sell products high in fat, sugar and or salt, despite being financially embedded in sport. Records of impressions delivered to children by these brands were alarming. This study argues that HFSS brands managed to generate a lot of audience exposure to children, young adults, and adults during the 2018 World Cup. There are various reasons why HFSS brands associate themselves with sport, some of them being to increase media exposure and make their brands more popular. However, these brands also choose to work with sporting events to associate a "health halo" to their

products [410,411]. These efforts tend to create a positive impression of their products despite their poor nutrients. By partnering with the 2018 World Cup and related sporting events, HFSS brands make their products seem healthier by promoting them to large numbers of people. [343,354,355,376] This advertising approach is a technique that has remained mostly unnoticed until recently, for instance through the Coca-Cola and the Premier League sponsorship deal [412]. Legislative institutions in the UK must adapt to accommodate food and drink brands spending big on sports sponsorship.

It is also worth discussing the interesting facts revealed by the analysis of the 2019 FIFA Women's World Cup. Branded HFSS impressions were delivered to both adults and children. Study findings demonstrate that the 2019 FIFA Women's World Cup was a major source of HFSS content exposure to all age groups of individuals in the UK. This is consistent with past research showing how marketing during sporting events promotes HFSS consumption among the general population [370]. This is a major concern considering that obesity is a key health challenge in the country. About two-thirds of adults are above a healthy weight and over a fifth of children in England are overweight or living with obesity by the time they start school at age 5 [351]. The findings mean that legislators in the UK must step up their interest in women's sports since poor regulation could portray them as attractive to HFSS advertisers.

VOD films and football sporting events, such as the World Cup, potentially contribute to the regular overconsumption of HFSS food which can lead to weight gain, and eventually obesity, which in turn has a major impact on health

and wellbeing and boosts the risk of obesity-related diseases. This is in accordance with past studies investigating media, obesity, and HFSS food consumption in children. For instance, Ferguson et al investigated the impact of media on unhealthy food consumption and the health consequences in children [249]. Tied to many other impacts, the findings showed that advertising of unhealthy foods can be associated with the prevalence of obesity among children because of unhealthy food choices. The American Psychological Association further suggested that direct advertisement that can lead to the target audience making unhealthy food choices is unfair [250]. In another study, Pretlow indicated that the current high prevalence of overweight and obesity among children can be attributed to the unhealthy food choices influenced by the media and other related parties [251]. This perspective is further supported by many other reports that associate television viewing with food consumption, including Coon and Tucker [252]. Companies such as Coca Cola and Powerade are major sponsors of numerous sporting events and invest largely in their sponsorship with the goal of ensuring their target audience buys their products. This is in total disregard of the potential impact of over-consuming HFSS food. The current Coronavirus pandemic has demonstrated the impact that obesity can have on the health outcomes affected individuals. Recent evidence suggests that people living with obesity who contract the coronavirus are more likely to be admitted to hospital and have an expanded risk of dying compared to non-obese patients [138]. On that account, dealing with the potential causes of obesity is an immediate concern for legislators.

The analysis of HFSS content in VOD films and sporting events also showed the ineffectiveness of current legislations with regard to advertisement. The study has verified that even though the advertising of HFSS to adults is allowed in the UK, there is a lot of HFSS exposure to children and young adults in programmes with a target audience where the proportion of young viewers exceed 30%. Such ineptitude could be because of gaps in the coverage of current regulations in the UK. While the ASA Advertising Code prohibits the timing and placement of advertising in programs predominantly targeted at children and those affecting the general public, the ASA advertising code does not apply to televised sporting events [413]. That means that HFSS advertising through sponsorship of televised sporting events is currently unregulated for practical purposes. To some extent, this explains the findings that children in the UK are exposed to unregulated HFSS advertising at sporting events and suggests that this trend is likely to continue unless there is a major change in regulation. Amendments to advertising regulation must sufficiently capture televised sporting events and advertisements at the venues of events.

One of the challenges in regulating HFFS food advertising in films seems to be misinformation by most food manufacturers. Such misinformation is a key area of concern in public health considering the negative effects associated with consumption of unhealthy proportions of fat, sugar, and salt. Precisely, the consumption of unhealthy diets has been identified as one of the primary risk factors for obesity and related non-communicable diseases such as cancer, diabetes and cardiovascular diseases [153]. Misinformation by food manufacturers could be responsible for the 1.9 billion adults that are overweight globally and

the 650 million of these who are obese [154]. This calls into question strategies and policies that can be used to promote healthy eating despite the prevailing potential of misinformation by food manufacturers. Government mandate could be used to develop policies that encourage a change in behaviour [117]. Such mandates may regulate the type of or the specific ingredients that food items supplied in the UK must possess. The national government can go a step further by issuing guidelines that prohibit the availability of specific HFFS food products in some public places, especially hospitals and schools. Plans to achieve this are already underway through restricting promotions of products high in fat, sugar and salt by location and by price (HFSS) policy. This legislation seeks to limit special reduced- price offers on foods containing high fat, sugar, and salt content in the UK. The goal of this program is to reduce sugar intake and the rates of obesity in the country. Upon enforcement, price promotions such as "buy one get one free" or "three for the price of two" will be restricted. This is consistent with what has been found in previous studies suggesting tax and pricing policies are a way of discouraging the consumption of certain food items [163]. These measures will be implemented as part of reinforcing the national dietary guidelines and reducing the consumption of HFFS food products. Such a program discourages residents from purchasing and consuming unhealthy food, thereby help in reducing the rates of obesity [414].

Scholars have investigated HFSS imagery in the media before, but this is the first content analysis featuring films made by and distributed by VOD services, as well as men and women's World Cup matches. Albeit, the methodology followed was similar to that established in past studies examining alcohol and

tobacco content in terrestrial television programmes and well as programmes delivered through VOD services [286,302,331]. A study similar to this, though not focusing on HFSS imagery found alcohol and tobacco contents in over 70% of all the sampled episodes of five highly rated Netflix and Amazon Prime Video movies in 2016 [286].

6.2.3 Exposure to Tobacco

The present study confirmed the findings on the presence of tobacco content in Netflix and Amazon Prime Video movies. Compared to alcohol and HFSS imagery, tobacco content was evident in 26.9% of the instances. The most frequently consumed tobacco product were cigarettes (14.8%). Popular references of tobacco in the reviewed movies include ashtrays (49 times), cigarettes (33 times), lighters (22 times), and matches (7 times). A comparison between the two VOD services showed a significantly higher amount of tobacco imagery in Amazon Prime Video films. The results demonstrate the potential adverse impact of media on tobacco smoking. Overall, these findings are in accordance with the findings reported by Morgenstern et al [314]. Morgenstern et al posited that media advertisement or portrayal of smoking can appreciably influence the development of smoking habits [314]. A similar pattern of results was obtained in a study by Marcon et al. [183], demonstrating a link between media exposure to smoking and the start of smoking in young adults. The probability of a young adult smoking is directly proportional to the level of exposure to smoking in the media [183]. These speculations easily confirm the seriousness of the impact of media exposure to smoking on the development of young people.

Based on an estimated viewership of Netflix (over 15 million subscribers) and Amazon Prime Video (over 10 million subscribers) in the UK, study findings suggest that millions of children and young people are exposed to tobacco imagery. Such exposure is a major public health concern, especially when it leads to young people starting to smoke. As mentioned earlier, previous studies have confirmed that individuals with higher levels of exposure to tobacco imagery through VOD services have increased odds of smoking compared to those with less exposure.[307,311,317] A combined analysis of past studies estimates that over one quarter of tobacco use arises as a result of exposure in movies. [207,210]

The heuristic model and the social learning theory best explains the study findings on potential of tobacco content in movies influencing smoking behaviour among young people. The heuristic model implies to techniques based on experience for different tasks, including research, problem solving, and learning [415,416]. In this context, the model postulates that the contents of media can trigger tobacco smoking, especially among adolescents [185]. Stated otherwise, the content in movies influence the identity of young people either directly or indirectly. This is further supported by Morgenstern et al who noted that young adults have a higher chance of adopting behavioural patterns which represent the self-image they desire [314]. Wherefore, films that feature celebrities or other popular entities with cigarettes portray an identity that considerably motivates smoking behaviour [182]. Social learning theory further supports the study's premise by hinting that people learn or acquire new patterns of behaviour by observing or imitating others [186]. When viewed in the context of

tobacco smoking, there is a high chance that children or young adults can start smoking by being subjected to tobacco content in films.

The study findings measured the quantity of pro-tobacco content in VOD services. These findings are consistent with other studies and reports that have shown that increased exposure to tobacco advertisements increases the viewers chance of progressing towards tobacco use [296,304,307,311,317]. With the consistency in these findings, it is impossible to expect that exposure to tobacco imagery would not lead to actual consumption. VOD service providers and legislative bodies in the UK should take note of these findings and develop guidelines governing the inclusion of tobacco imagery in films. Currently, content available through VOD platforms seems to be controlled solely by the company's rules, which are not made available to the public [417]. This study, therefore, posits that there is an immediate need to develop strong regulatory and enforcement measures associated with the depiction of tobacco content on VOD services in the interest of the health of children, young adults, and adults.

It is possible for the media to also serve as a tool for promoting anti-smoking behaviours. This proposition ties well with previous studies wherein anti-smoking campaigns on mass media have been shown to help encourage quitting behaviour [217]. Media campaign is one of the key tools used in the UK to promote cessation of tobacco use and prevent the initiation of smoking among young adults [220]. Opportunities exist for movie studios in the UK and the rest of the world to minimise tobacco incidents that appear in youth-rated movies. Reducing tobacco incidents that appear in these movies would prevent the

initiation of smoking use among young people. Other interventions that could help reduce exposure to tobacco content include confirming producers and distributors receive no payments for portraying tobacco use. Such a strategy can help end the on-screen depiction of real tobacco brands in films. Moreover, national and local health departments in the UK could also work with agencies that manage movie subsidies to guarantee that such financial assistance do not go to productions that depict the use of tobacco.

6.4 Limitations

The major limitation of this study is in the sample size, consisting of the 2018 men's and 2019 women's FIFA World Cup matches. During research, it is important to have an adequate sample size to draw legitimate conclusions. A larger sample increases the chances of reporting precise results. For logistic reasons, 13 out of 48 matches in the 2018 Men's FIFA World Cup and 10 out of 51 matches in the 2019 Women's FIFA World Cup were selected for analysis in the current study. There is a chance that coding all the 48 matches of the men's competition and 51 matches of the women's competition would have had an impact on the outcome of the study. The other approach would be to collect additional data from the 2010- and 2014-Men's FIFA World Cup and the 2011- and 2015-Women's FIFA World Cup to increase the sample size. With the small sample size, the study can only estimate exposure to alcohol, tobacco, and HFSS content but cannot identify major relationships in the data.

The probability sampling method of selecting VOD films and FIFA World Cup matches has limitations. Sampling errors may have occurred, and the sample

used in the study (a selection of films and matches) may not reflect the actual picture of exposure to alcohol, tobacco, and HFSS imagery.

This study is also limited to popular video on demand programmes and 2018 and 2019 FIFA World Cup matches watched in the UK. These VOD programmes and matches reached a wider audience, and it is possible that the findings of this study apply beyond the UK. The global video on demand market size was $53.96 billion in 2019 and is forecast to reach $159.62 billion by 2027 (representing a 14.8% CAGR during the projected period) [418]. At the same time, mobile technology, and next-generation broadband infrastructure driven by high-speed internet technologies such as 5G, Wi-Fi 5 and Wi-Fi 6 accelerate the viewership of the FIFA World Cup. For instance, a 2018 audit showed that more than half the world watched the record-breaking 2018 World Cup, including those who watched TV at home, on digital platforms or out of home [419]. These developments emancipate the consumers and encourage content providers to produce original content and improve the viewing experience for the viewers. Given the ease of access to VOD services and the FIFA World Cup for children and adolescents, the UK and other national regulators must account for the ever-changing viewing habits of adolescents to protect them from exposure to potentially harmful imagery encouraging alcohol, tobacco, and HFSS consumption. Future research should examine potential exposure to alcohol, tobacco, and HFSS imagery in a larger sample of programmes beyond the UK and in other sports as well. A few studies are already exploring exposure to harmful imagery in other sports, including Formula 1 [420,421], tennis and sailing [421], and cricket [422].

6.5 Future Actions

The current study found no major difference in the proportion of intervals containing alcohol, tobacco, and HFSS imagery in original Netflix and Amazon Prime Video films. These findings show that the stricter Ofcom regulations applied to Amazon Prime Video do not necessarily keep out alcohol, tobacco, and HFSS imagery. In the future, the UK must consider options of regulation beyond a ban. One solution would be to reduce alcohol, tobacco, and HFSS imagery advertising on televised sports events. The government could introduce regulations for these products that cover all unhealthy sponsorship in a unified way, instead of focusing on each product independently. Lessons could be drawn from the Governance of Sport Bill which was presented in the House of Lords in 2014 [423]. Even though the bill was unsuccessful, it defined marketing rules that could provide a strong mechanism to reduce the marketing of unhealthy products, if adapted [424]. Controlling the advertising of alcohol, tobacco, and HFSS imagery could work better than an outright ban, which could present a false reality of life and undermine the financial viability of advertisers.

Such a regulatory scheme may involve volume and content restrictions, supported by an operational system of regulation. For starters, the UK government may consider imposing volume restrictions on alcohol marketing. This strategy could work if the bans are not merely symbolic but play a key role in controlling the total volume of alcohol advertising that children and young adults are exposed to. The government must be careful to ensure that these volume restrictions do not result in price reductions or shifts in marketing to

other media channels. This might happen because of increased competition in the industry, which could be countered through advertisement to attract more consumers. The second action may entail minimising exposure to attractive advertisements. This can be done by adjusting the content of alcohol, tobacco, and HFSS advertisements in films. The proposed approach has been tried and tested in France where advertisements can only feature information about the product, such as the name, percentage alcohol based on volume, and the mode of consumption. Third, successful regulation in the UK requires a clear legislative framework. The government must enforce certain actions, such as pre-screening of advertisements, establishment of a complaints system, in effect sanctions, and an autonomous monitoring system that regularly checks the content and volume of alcohol in advertisements. Therefore, the UK government has to promote stricter regulations since the current regulations are failing to reduce or stop the high content of tobacco, alcohol, and HFSS in VOD services.

The study identified that regulation of alcohol and HFSS content in televised sporting events suffers from potential cross-border issues. Exposure of viewers to alcohol and HFSS content may differ from one televised sporting event to another based on the strength of the regulations in the host country. That means that restrictions on alcohol and HFSS advertising may be vulnerable to challenge within the international scene. Alcohol and HFSS advertising restrictions do not distinguish between foreign and domestic products, and this neutral character presents a potential opportunity for them to be challenged [425]. Due to this possibility, further studies must be conducted to investigate how

differences in regulations in different countries affect overall exposure of viewers to alcohol and HFSS contents. Future analysis of alcohol and HFSS exposures must also focus on other sporting events. Such a wide approach will help create strategies for effective and continuous monitoring of alcohol and HFSS advertising in the UK and other parts of the world.

The current study has shown that the 2019 FIFA Women's World Cup was a major source of HFSS exposure through advertising made through sports sponsorship and research shows that this exposure is likely to promote the consumption of HFSS among young people. Because of the potential impact of such exposure, certain future actions must be taken to potentially safeguard the health of populations in the UK. Due to exposure to HFSS advertising on children and young adults, the current regulations governing advertising must be revised to include televised sporting events. For such revisions to be effective, the society must accept the fact that sponsorship of televised sporting events contributes immensely to exposure to HFSS contents. Children and young people must be protected from exposure to HFSS content during sporting events before the 9pm watershed. Advertisers must also come up with strategies which guarantee benefits to sporting event sponsors while at the same time minimising potential risk to the population's health and well-being. With the changing dynamics of advertisements, additional studies must be carried out to track HFSS advertisements through sponsorship at sporting events. These studies will help examine the rate of population exposure over time and uncover potential loopholes in the regulation of HFSS advertisements.

From this and past studies, it is evident that there has been an increasing trend of exposure to tobacco, alcohol, and HFSS imagery in films and televised sporting events. A potential reason for this is the increasing use of influencers in these media channels. Alcohol and HFSS food companies have found a way to bypass the existing codes and advertise to young people. Maybe, further studies could also focus on investigating the role of influencers in facilitating exposure to alcohol and junk food portrayed in films and televised sporting events.

Most studies undertaken in the UK and other contexts have focused on ascertaining whether VoD and televised events present a medium of exposure to alcohol, tobacco, and HFSS foods. However, little research exists on the effect of different approaches to regulating the marketing of these products to children and adolescents [283]. Many advertisers are also using alibi marketing to evade existing restrictions[284], and this could explain the lack of change over the years despite increased research in this domain. More focus should be placed on understanding how brands use alibi advertising and how potential restrictions can be used in this context.

The coding approach used in the study can be used in future research. Changes can be made to the method as appropriate and as researchers see fit. However, replicating a coding scheme is often not considered inappropriate in qualitative research [426], and future studies can make the process more time efficient by using analysis software such as the automated content recognition for automated coding system discussed by Ballan et al.[427]. It is important to note that one of

the challenges experienced in the study was the time-consuming nature of the coding process. Future studies must allocate adequate time to guarantee successful coding.

6.6 Recommendations

The current study is limited in scope since it covers only two VOD services (Amazon Prime Video and Netflix) watched in the UK for a limited period of one year, as well as a few football matches spanning 2018 and 2019. The selected videos may not necessarily represent the most viewed films in the UK, thereby casting doubt on the rate of exposure. Further studies must be carried out featuring larger samples of films to compare differences in tobacco, alcohol, and HFSS imagery. These studies must lead to better regulation of VOD services. Where possible, the UK and the rest of the world must start looking at regulation of VOD services in countries of registration. The UK government must work towards adopting a co-regulatory approach of video on demand editorial content. The co-regulatory approach would be significant in enforcing the standards of VOD editorial content and will ensure that service providers that contravene these standards are issued with notices. In line with this suggestion, the UK government must work towards establishing a co-regulatory approach that regulates video on demand advertising. A key element that must be contained in the regulations is the duty to encourage VOD service providers to establish codes of conduct governing the proper promotion of food and drink by sponsorship. Even with these regulations in place, it is important for public policy efforts to remerge and promote certain healthy food and drink products.

Public policy efforts could be carried out through product placement, sponsorship, or advertising.

Sporting events have become a key international currency, hence the increase in advertising effort. Given the potential negative exposure to unhealthy lifestyle habits, it is important that the current regulations on alcohol and HFSS advertisement include televised sporting events. Potential regulations may involve volume restrictions, content restrictions, and the development of an effective system of regulation. It is possible to impose volume restrictions on tobacco, alcohol, and HFSS marketing as long as the proposed bans are not simply symbolic. The bans must contribute substantially to the total volume of alcohol advertising to which young people are exposed. The UK government can also limit exposure to attractive advertisements by encouraging advertisers to adjust their content. For instance, an advertisement featuring alcohol products may be restricted to contain information about the product, such as the name, percentage of alcohol by volume, and the mode of consumption of the product. Apart from these efforts, regulation must feature a clear legislative framework. The governing body must ensure that all the advertisements are pre-screened before being aired. In addition, there must be a complaints system, in effect sanctions, and an autonomous monitoring system that regularly checks the content and volume of tobacco, alcohol, and HFSS marketing. In sum, it is necessary for current regulations to be revisited with a view to making changes which will prohibit the type of exposures reported in this study. Regulations in the UK must be supported by international regulations seeking to prohibit the advertisement of junk food during popular sporting events.

REFERENCES

(1) World Health Organization. *Global status report on alcohol and health 2018*. https://www.who.int/publications-detail-redirect/9789241565639 (accessed 2021-08-05).

(2) Bertoglia, M. P.; Gormaz, J. G.; Libuy, M.; Sanhueza, D.; Gajardo, A.; Srur, A.; Wallbaum, M.; Erazo, M. The Population Impact of Obesity, Sedentary Lifestyle, and Tobacco and Alcohol Consumption on the Prevalence of Type 2 Diabetes: Analysis of a Health Population Survey in Chile, 2010. *PLoS One* **2017**, *12* (5), e0178092. https://doi.org/10.1371/journal.pone.0178092.

(3) Reeve, B.; Gostin, L. O. "Big" Food, Tobacco, and Alcohol: Reducing Industry Influence on Noncommunicable Disease Prevention Laws and Policies. *Int J Health Policy Manag* **2019**, *8* (7), 450–454. https://doi.org/10.15171/ijhpm.2019.30.

(4) Nagheer, D.; Irvin, R.; Younger-Coleman, N. Overview of the Prevalence and Associated Risk, Factors of Lifestyle Diseases in University Students. *International Journal of Clinical Medicine* **2017**, *8* (5), 344–352. https://doi.org/10.4236/ijcm.2017.85032.

(5) Masana, L.; Ros, E.; Sudano, I.; Angoulvant, D.; lifestyle expert working group. Is There a Role for Lifestyle Changes in Cardiovascular Prevention? What, When and How? *Atheroscler Suppl* **2017**, *26*, 2–15. https://doi.org/10.1016/S1567-5688(17)30020-X.

(6) Daines, C. L.; Hansen, D.; Novilla, M. L. B.; Crandall, A. Effects of Positive and Negative Childhood Experiences on Adult Family Health.

BMC Public Health **2021**, *21* (1), 651. https://doi.org/10.1186/s12889-021-10732-w.

(7) Novais, M.; Henriques, T.; Vidal-Alves, M. J.; Magalhães, T. When Problems Only Get Bigger: The Impact of Adverse Childhood Experience on Adult Health. *Frontiers in Psychology* **2021**, *12*.

(8) Annerbäck, E.-M.; Sahlqvist, L.; Svedin, C. G.; Wingren, G.; Gustafsson, P. A. Child Physical Abuse and Concurrence of Other Types of Child Abuse in Sweden-Associations with Health and Risk Behaviors. *Child Abuse Negl* **2012**, *36* (7–8), 585–595. https://doi.org/10.1016/j.chiabu.2012.05.006.

(9) Moran, P. B.; Vuchinich, S.; Hall, N. K. Associations between Types of Maltreatment and Substance Use during Adolescence. *Child Abuse Negl* **2004**, *28* (5), 565–574. https://doi.org/10.1016/j.chiabu.2003.12.002.

(10) Alcalá, H. E.; von Ehrenstein, O. S.; Tomiyama, A. J. Adverse Childhood Experiences and Use of Tobacco Products. *J Community Health* **2016**, *41* (5), 969–976. https://doi.org/10.1007/s10900-016-0179-5.

(11) Crouch, E.; Radcliff, E.; Strompolis, M.; Wilson, A. Adverse Childhood Experiences (ACEs) and Alcohol Abuse among South Carolina Adults. *Subst Use Misuse* **2018**, *53* (7), 1212–1220. https://doi.org/10.1080/10826084.2017.1400568.

(12) Pilowsky, D. J.; Keyes, K. M.; Hasin, D. S. Adverse Childhood Events and Lifetime Alcohol Dependence. *Am J Public Health* **2009**, *99* (2), 258–263. https://doi.org/10.2105/AJPH.2008.139006.

(13) Thomas, F.; Thomas, C.; Hooper, L.; Rosenberg, G.; Vohra, J.; Bauld, L. Area Deprivation, Screen Time and Consumption of Food and Drink High in Fat Salt and Sugar (HFSS) in Young People: Results from a Cross-Sectional Study in the UK. *BMJ Open* **2019**, *9* (6), e027333. https://doi.org/10.1136/bmjopen-2018-027333.

(14) WHO. *Tobacco*. World Health Organization. https://www.who.int/news-room/fact-sheets/detail/tobacco (accessed 2021-09-28).

(15) *WHO reports progress in the fight against tobacco epidemic*. World Health Organization. https://www.who.int/news/item/27-07-2021-who-reports-progress-in-the-fight-against-tobacco-epidemic (accessed 2022-03-24).

(16) Jerzyński, T.; Stimson, G. V.; Shapiro, H.; Król, G. Estimation of the Global Number of E-Cigarette Users in 2020. *Harm Reduction Journal* **2021**, *18* (1), 109. https://doi.org/10.1186/s12954-021-00556-7.

(17) Fagbamigbe, A. F.; Desai, R.; Sewpaul, R.; Kandala, N.-B.; Sekgala, D.; Reddy, P. Age at the Onset of Tobacco Smoking in South Africa: A Discrete-Time Survival Analysis of the Prognostic Factors. *Archives of Public Health* **2020**, *78* (1), 128. https://doi.org/10.1186/s13690-020-00503-1.

(18) World Health Organization. *WHO launches new report on global tobacco use trends*. https://www.who.int/news/item/19-12-2019-who-launches-new-report-on-global-tobacco-use-trends (accessed 2021-08-05).

(19) Alotaibi, S. A.; Durgampudi, P. K. Factors Associated with Tobacco Smoking among Saudi College Students: A Systematic Review. *Tob Prev Cessat* **2020**, *6*, 36. https://doi.org/10.18332/tpc/122444.

(20) *WHO Global Report on Trends in Prevalence of Tobacco Use 2000-2025*; World Health Organization, 2019. https://apps.who.int/iris/bitstream/handle/10665/330221/9789240000032-eng.pdf (accessed 2022-03-24).

(21) National Health Service. *Part 2: Young people who smoke*. NHS Digital. https://digital.nhs.uk/data-and-information/publications/statistical/smoking-drinking-and-drug-use-among-young-people-in-england/2018/part-2-young-people-who-smoke (accessed 2021-08-05).

(22) Action on Smoking and Health. *Young People and Smoking*; 2019. https://ash.org.uk/wp-content/uploads/2019/09/190913-ASH-Factsheet_Youth-Smoking.pdf.

(23) *Part 4: Smoking patterns among young people*. NHS Digital. https://digital.nhs.uk/data-and-information/publications/statistical/statistics-on-smoking/statistics-on-smoking-england-2019/part-4-smoking-patterns-in-children-copy (accessed 2022-08-12).

(24) Jones, L. Vaping: How Popular Are e-Cigarettes? *BBC News*. September 14, 2019. https://www.bbc.com/news/business-44295336 (accessed 2022-03-24).

(25) Rahim, Z. *Vaping: Number of British people using e-cigarettes rises by 12.5 per cent, study suggests*. The Independent.

https://www.independent.co.uk/news/health/vaping-britain-ecigarettes-smoking-rates-study-public-health-england-a9117461.html (accessed 2022-03-24).

(26) Office for National Statistics. *Adult smoking habits in the UK: 2019*. https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandlifeexpectancies/bulletins/adultsmokinghabitsingreatbritain/2019.

(27) *Economics of tobacco: education, income, and smoking*. Truth Initiative. https://truthinitiative.org/research-resources/targeted-communities/economics-tobacco-what-education-and-income-tell-us-about (accessed 2022-08-12).

(28) Perelman, J.; Alves, J.; Pfoertner, T.; Moor, I.; Federico, B.; Kuipers, M. A. G.; Richter, M.; Rimpela, A.; Kunst, A. E.; Lorant, V. The Association between Personal Income and Smoking among Adolescents: A Study in Six European Cities. *Addiction* **2017**, *112* (12), 2248–2256. https://doi.org/10.1111/add.13930.

(29) Wang, M.; Luo, X.; Xu, S.; Liu, W.; Ding, F.; Zhang, X.; Wang, L.; Liu, J.; Hu, J.; Wang, W. Trends in Smoking Prevalence and Implication for Chronic Diseases in China: Serial National Cross-Sectional Surveys from 2003 to 2013. *The Lancet Respiratory Medicine* **2019**, *7* (1), 35–45. https://doi.org/10.1016/S2213-2600(18)30432-6.

(30) Jeon, J.; Holford, T. R.; Levy, D. T.; Feuer, E. J.; Cao, P.; Tam, J.; Clarke, L.; Clarke, J.; Kong, C. Y.; Meza, R. Smoking and Lung Cancer Mortality in the US from 2015-2065: A Comparative Modeling

Approach. *Ann Intern Med* **2018**, *169* (10), 684–693. https://doi.org/10.7326/M18-1250.

(31) Walser, T.; Cui, X.; Yanagawa, J.; Lee, J. M.; Heinrich, E.; Lee, G.; Sharma, S.; Dubinett, S. M. Smoking and Lung Cancer. *Proc Am Thorac Soc* **2008**, *5* (8), 811–815. https://doi.org/10.1513/pats.200809-100TH.

(32) Laniado-Laborín, R. Smoking and Chronic Obstructive Pulmonary Disease (COPD). Parallel Epidemics of the 21st Century. *Int J Environ Res Public Health* **2009**, *6* (1), 209–224. https://doi.org/10.3390/ijerph6010209.

(33) Yoshida, T.; Tuder, R. M. Pathobiology of Cigarette Smoke-Induced Chronic Obstructive Pulmonary Disease. *Physiological Reviews* **2007**, *87* (3), 1047–1082. https://doi.org/10.1152/physrev.00048.2006.

(34) *Women and Smoking: A Report of the Surgeon General*. CDC. https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5112a4.htm (accessed 2022-03-24).

(35) How Smoking Affects Reproductive Health. *FDA* **2021**.

(36) Hull, M. G.; North, K.; Taylor, H.; Farrow, A.; Ford, W. C. Delayed Conception and Active and Passive Smoking. The Avon Longitudinal Study of Pregnancy and Childhood Study Team. *Fertil Steril* **2000**, *74* (4), 725–733. https://doi.org/10.1016/s0015-0282(00)01501-6.

(37) Kovac, J. R.; Khanna, A.; Lipshultz, L. I. The Effects of Cigarette Smoking on Male Fertility. *Postgrad Med* **2015**, *127* (3), 338–341. https://doi.org/10.1080/00325481.2015.1015928.

(38) Vine, M. F. Smoking and Male Reproduction: A Review. *International Journal of Andrology* **1996**, *19* (6), 323–337. https://doi.org/10.1111/j.1365-2605.1996.tb00523.x.

(39) Wong, P. K. K.; Christie, J. J.; Wark, J. D. The Effects of Smoking on Bone Health. *Clin Sci (Lond)* **2007**, *113* (5), 233–241. https://doi.org/10.1042/CS20060173.

(40) Sopori, M. Effects of Cigarette Smoke on the Immune System. *Nat Rev Immunol* **2002**, *2* (5), 372–377. https://doi.org/10.1038/nri803.

(41) Zyl-Smit, R. N. van; Richards, G.; Leone, F. T. Tobacco Smoking and COVID-19 Infection. *The Lancet Respiratory Medicine* **2020**, *8* (7), 664–665. https://doi.org/10.1016/S2213-2600(20)30239-3.

(42) Kondo, T.; Nakano, Y.; Adachi, S.; Murohara, T. Effects of Tobacco Smoking on Cardiovascular Disease. *Circ J* **2019**, *83* (10), 1980–1985. https://doi.org/10.1253/circj.CJ-19-0323.

(43) Hill, J.; Jane, A. Smoking and Type 2 Diabetes. *The American Journal of Nursing 109* (4), 26–26.

(44) National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health. *The Health Consequences of Smoking—50 Years of Progress: A Report of the Surgeon General*; Reports of the Surgeon General; Centers for Disease Control and Prevention (US): Atlanta (GA), 2014.

(45) Makadia, L. D.; Roper, P. J.; Andrews, J. O.; Tingen, M. S. Tobacco Use and Smoke Exposure in Children: New Trends, Harm, and Strategies to Improve Health Outcomes. *Curr Allergy Asthma Rep* **2017**, *17* (8), 55. https://doi.org/10.1007/s11882-017-0723-0.

(46) Hugg, T. T.; Jaakkola, M. S.; Ruotsalainen, R. O.; Pushkarev, V. J.; Jaakkola, J. J. K. Parental Smoking Behaviour and Effects of Tobacco Smoke on Children's Health in Finland and Russia. *European Journal of Public Health* **2008**, *18* (1), 55–62. https://doi.org/10.1093/eurpub/ckm053.

(47) Health. *The Health Consequences of Tobacco Use Among Young People*; Centers for Disease Control and Prevention (US), 2012.

(48) Chilmonczyk, B. A.; Salmun, L. M.; Megathlin, K. N.; Neveux, L. M.; Palomaki, G. E.; Knight, G. J.; Pulkkinen, A. J.; Haddow, J. E. Association between Exposure to Environmental Tobacco Smoke and Exacerbations of Asthma in Children. *New England Journal of Medicine* **1993**, *328* (23), 1665–1669. https://doi.org/10.1056/NEJM199306103282303.

(49) Milberger, S.; Biederman, J.; Faraone, S.; Chen, L.; Jones, J. ADHD Is Associated With Early Initiation of Cigarette Smoking in Children and Adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry* **1997**, *36* (1), 37–44. https://doi.org/10.1097/00004583-199701000-00015.

(50) NHS. *Passive smoking*. https://www.nhs.uk/live-well/quit-smoking/passive-smoking-protect-your-family-and-friends/ (accessed 2021-08-05).

(51) Ferrante, G.; Simoni, M.; Cibella, F.; Ferrara, F.; Liotta, G.; Malizia, V.; Corsello, G.; Viegi, G.; La Grutta, S. Third-Hand Smoke Exposure and Health Hazards in Children. *Monaldi Arch Chest Dis* **2013**, *79* (1), 38–43. https://doi.org/10.4081/monaldi.2013.108.

(52) Janson, C. The Effect of Passive Smoking on Respiratory Health in Children and Adults. *Int J Tuberc Lung Dis* **2004**, *8* (5), 510–516.

(53) DiFranza, J. R.; Aligne, C. A.; Weitzman, M. Prenatal and Postnatal Environmental Tobacco Smoke Exposure and Children's Health. *Pediatrics* **2004**, *113* (4 Suppl), 1007–1015.

(54) Cancer Research UK. *What is passive smoking?*. Cancer Research UK. https://www.cancerresearchuk.org/about-cancer/causes-of-cancer/smoking-and-cancer/what-is-passive-smoking (accessed 2021-08-05).

(55) Cnattingius, S. The Epidemiology of Smoking during Pregnancy: Smoking Prevalence, Maternal Characteristics, and Pregnancy Outcomes. *Nicotine Tob Res* **2004**, *6 Suppl 2*, S125-140. https://doi.org/10.1080/14622200410001669187.

(56) Alberg, A. J.; Wallace, K.; Silvestri, G. A.; Brock, M. V. Invited Commentary: The Etiology of Lung Cancer in Men Compared With Women. *Am J Epidemiol* **2013**, *177* (7), 613–616. https://doi.org/10.1093/aje/kws444.

(57) Sung, H.-Y.; Chang, L.-C.; Wen, Y.-W.; Tsai, Y.-W. The Costs of Smoking and Secondhand Smoke Exposure in Taiwan: A Prevalence-Based Annual Cost Approach. *BMJ Open* **2014**, *4* (7), e005199. https://doi.org/10.1136/bmjopen-2014-005199.

(58) Yousuf, H.; Hofstra, M.; Tijssen, J.; Leenen, B.; Lindemans, J. W.; van Rossum, A.; Narula, J.; Hofstra, L. Estimated Worldwide Mortality Attributed to Secondhand Tobacco Smoke Exposure, 1990-

2016. *JAMA Network Open* **2020**, *3* (3), e201177. https://doi.org/10.1001/jamanetworkopen.2020.1177.

(59) Dunbar, A.; Gotsis, W.; Frishman, W. Second-Hand Tobacco Smoke and Cardiovascular Disease Risk: An Epidemiological Review. *Cardiology in Review* **2013**, *21* (2), 94–100. https://doi.org/10.1097/CRD.0b013e31827362e4.

(60) Venn, A.; Britton, J. Exposure to Secondhand Smoke and Biomarkers of Cardiovascular Disease Risk in Never-Smoking Adults. *Circulation* **2007**, *115* (8), 990–995. https://doi.org/10.1161/CIRCULATIONAHA.106.648469.

(61) Asomaning, K.; Miller, D. P.; Liu, G.; Wain, J. C.; Lynch, T. J.; Su, L.; Christiani, D. C. Second Hand Smoke, Age of Exposure and Lung Cancer Risk. *Lung Cancer* **2008**, *61* (1), 13–20. https://doi.org/10.1016/j.lungcan.2007.11.013.

(62) Besaratinia, A.; Pfeifer, G. P. Second-Hand Smoke and Human Lung Cancer. *The Lancet Oncology* **2008**, *9* (7), 657–666. https://doi.org/10.1016/S1470-2045(08)70172-4.

(63) Koronaiou, K.; Delipalla, S. The Economic Cost of Tobacco Smoking and Secondhand Smoke in Greece: Musculoskeletal Disorders the Leading Contributor to Smoking-Related Morbidity. *Tobacco Prevention & Cessation* **2019**, *5*. https://doi.org/10.18332/tpc/113091.

(64) Renwick, C.; Wu, Q.; Breton, M. O.; Thorley, R.; Britton, J.; Lewis, S.; Ratschen, E.; Parrott, S. Cost-Effectiveness of a Complex Intervention to Reduce Children's Exposure to Second-Hand Smoke in

the Home. *BMC Public Health* **2018**, *18* (1), 1252. https://doi.org/10.1186/s12889-018-6140-z.

(65) Goodchild, M.; Nargis, N.; Tursan d'Espaignet, E. Global Economic Cost of Smoking-Attributable Diseases. *Tob Control* **2018**, *27* (1), 58–64. https://doi.org/10.1136/tobaccocontrol-2016-053305.

(66) Action on Smoking and Health. *New data shows smokers are getting the message on e-cigarettes*. Action on Smoking and Health. https://ash.org.uk/media-and-news/press-releases-media-and-news/ash-news-release-new-data-shows-smokers-are-getting-the-message-on-e-cigarettes/ (accessed 2021-08-05).

(67) Hampson, L. *Cost of cigarettes and tobacco rises*. The Independent. https://www.independent.co.uk/life-style/health-and-families/cost-of-cigarettes-tobacco-rises-b1946844.html (accessed 2022-02-21).

(68) NHS. *Statistics on smoking, England - 2016*. https://digital.nhs.uk/data-and-information/publications/statistical/statistics-on-smoking/statistics-on-smoking-england-2016.

(69) HM Treasury. *Tobacco Levy: Consultation*; 2014. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/384769/tobacco_levy_consultation.pdf.

(70) Jha, P.; Peto, R. Global Effects of Smoking, of Quitting, and of Taxing Tobacco. *N Engl J Med* **2014**, *370* (1), 60–68. https://doi.org/10.1056/NEJMra1308383.

(71) World Health Organization. *WHO report on the global tobacco epidemic, 2008 : the MPOWER package / World Health Organization.*

Wellcome Collection. https://wellcomecollection.org/works/ajuqrhke (accessed 2021-08-05).

(72) Action on Smoking and Health. *Tobacco Policy and the European Union*; 2016. https://ash.org.uk/wp-content/uploads/2019/10/Tobacco-Policy-EU.pdf.

(73) Bertollini, R.; Ribeiro, S.; Mauer-Stender, K.; Galea, G. Tobacco Control in Europe: A Policy Review. *European Respiratory Review* **2016**, *25* (140), 151–157. https://doi.org/10.1183/16000617.0021-2016.

(74) Peeters, S.; Costa, H.; Stuckler, D.; McKee, M.; Gilmore, A. B. The Revision of the 2014 European Tobacco Products Directive: An Analysis of the Tobacco Industry's Attempts to 'Break the Health Silo.' *Tobacco Control* **2016**, *25* (1), 108–117. https://doi.org/10.1136/tobaccocontrol-2014-051919.

(75) World Health Organization. *WHO Framework Convention on Tobacco Control*; 2003. http://apps.who.int/iris/bitstream/handle/10665/42811/9241591013.pdf?sequence=1.

(76) Action on Smoking and Health. *UK tobacco control policy and expenditure: An overview*. https://ash.org.uk/information-and-resources/briefings/uk-tobacco-control-policy-and-expenditure-an-overview/.

(77) The Health Foundation. *Towards a smoke-free generation: a tobacco control plan for England*. Policy Navigator.

https://navigator.health.org.uk/theme/towards-smoke-free-generation-tobacco-control-plan-england (accessed 2021-08-05).

(78) McGovern, P. E. *Uncorking the Past: The Quest for Wine, Beer, and Other Alcoholic Beverages*, 1st ed.; University of California Press, 2009.

(79) Room, R.; Jernigan, D.; Carlini-Marlatt, B.; Gureje, O.; Mäkelä, K.; Marshall, M.; Medina-Mora, M. E.; Monteiro, M.; Parry, C.; Partanen, J.; Riley, L.; Saxena, S. Alcohol in Developing Societies: A Public Health Approach. *Alcohol in developing societies: a public health approach.* **2002**.

(80) Colson, E.; Scudder, T. *For Prayer and Profit: The Ritual, Economic, and Social Importance of Beer in Gwembe District, Zambia, 1950-1982*; Standford University Press: Stanford (Calif.), 1988.

(81) *Global Information System on Alcohol and Health*. World Health Organization. https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health (accessed 2022-08-12).

(82) NHS. *Statistics on obesity, physical activity and diet, England, 2020 - Part 3: Adult overweight and obesity*. NHS Digital. https://digital.nhs.uk/data-and-information/publications/statistical/statistics-on-obesity-physical-activity-and-diet/england-2020/part-3-adult-obesity-copy (accessed 2021-08-06).

(83) *Alcohol in the UK*. Alcohol Change UK. https://alcoholchange.org.uk/alcohol-facts/fact-sheets/alcohol-statistics (accessed 2022-08-12).

(84) Olayinka, O.; Ozoekwe, U.; Halari, C. D.; Halari, M.; Alao, O. J.; Ige, T. O.; Medavarapu, S. The Prevalence of Alcohol Consumption and Common Influencing Factors to Start Alcohol Consumption in Early Age: Health Fair Study in Dominica. *Archives of Medicine* **2016**, *8* (6). https://doi.org/10.21767/1989-5216.1000170.

(85) Danielsson, A.-K.; Wennberg, P.; Hibell, B.; Romelsjö, A. Alcohol Use, Heavy Episodic Drinking and Subsequent Problems among Adolescents in 23 European Countries: Does the Prevention Paradox Apply? *Addiction* **2012**, *107* (1), 71–80. https://doi.org/10.1111/j.1360-0443.2011.03537.x.

(86) Gimeno, C.; Dorado, M. L.; Roncero, C.; Szerman, N.; Vega, P.; Balanzá-Martínez, V.; Alvarez, F. J. Treatment of Comorbid Alcohol Dependence and Anxiety Disorder: Review of the Scientific Evidence and Recommendations for Treatment. *Front Psychiatry* **2017**, *8*, 173. https://doi.org/10.3389/fpsyt.2017.00173.

(87) Nelson, T. F.; Xuan, Z.; Babor, T.; Brewer, R. D.; Chaloupka, F. J.; Gruenewald, P.; Holder, H.; Klitzner, M.; Mosher, J.; Ramirez, R. L.; Reynolds, R.; Toomey, T. L.; Naimi, T. S. Efficacy and the Strength of Evidence of U.S. Alcohol Control Policies. *Am J Prev Med* **2013**, *45* (1), 19–28. https://doi.org/10.1016/j.amepre.2013.03.008.

(88) Patrick, M. E.; Terry-McElrath, Y. M.; Miech, R. A.; Schulenberg, J. E.; O'Malley, P. M.; Johnston, L. D. Age-Specific Prevalence of Binge and High-Intensity Drinking among US Young Adults: Changes from 2005 to 2015. *Alcohol Clin Exp Res* **2017**, *41* (7), 1319–1328. https://doi.org/10.1111/acer.13413.

(89) Schmidt, L. A.; Mäkelä, P.; Rehm, J.; Room, R. Alcohol: Equity and Social Determinants. *Equity, social determinants and public health programmes* **2010**, 11–29.

(90) Cherpitel, C. J. Focus on: The Burden of Alcohol Use—Trauma and Emergency Outcomes. *Alcohol Res* **2014**, *35* (2), 150–154.

(91) Stickel, F.; Moreno, C.; Hampe, J.; Morgan, M. Y. The Genetics of Alcohol Dependence and Alcohol-Related Liver Disease. *J Hepatol* **2017**, *66* (1), 195–211. https://doi.org/10.1016/j.jhep.2016.08.011.

(92) Chartier, K. G.; Thomas, N. S.; Kendler, K. S. Interrelationship between Family History of Alcoholism and Generational Status in the Prediction of Alcohol Dependence in U.S. Hispanics. *Psychol Med* **2017**, *47* (1), 137–147. https://doi.org/10.1017/S0033291716002105.

(93) Daniels, J.; Struthers, H.; Lane, T.; Maleke, K.; McIntyre, J.; Coates, T. "Booze Is the Main Factor That Got Me Where I Am Today": Alcohol Use and HIV Risk for MSM in Rural South Africa. *AIDS Care* **2018**, *30* (11), 1452–1458. https://doi.org/10.1080/09540121.2018.1475626.

(94) Shield, K. D.; Parry, C.; Rehm, J. Chronic Diseases and Conditions Related to Alcohol Use. *Alcohol Res* **2014**, *35* (2), 155–171.

(95) Office for National Statistics. *Adult drinking habits in Great Britain: 2017*. https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/drugusealcoholandsmoking/bulletins/opinionsandlifestylesurveyadultdrinkinghabitsingreatbritain/2017 (accessed 2021-08-05).

(96) *Should my child drink alcohol?*. NHS. https://www.nhs.uk/common-health-questions/childrens-health/should-my-child-drink-alcohol/ (accessed 2022-08-12).

(97) Chikritzhs, T.; Livingston, M. Alcohol and the Risk of Injury. *Nutrients* **2021**, *13* (8), 2777. https://doi.org/10.3390/nu13082777.

(98) Donovan, J. E.; Molina, B. S. G. Childhood Risk Factors for Early-Onset Drinking. *J Stud Alcohol Drugs* **2011**, *72* (5), 741–751.

(99) Swahn, M. H.; Culbreth, R. E.; Staton, C. A.; Self-Brown, S. R.; Kasirye, R. Alcohol-Related Physical Abuse of Children in the Slums of Kampala, Uganda. *Int J Environ Res Public Health* **2017**, *14* (10), 1124. https://doi.org/10.3390/ijerph14101124.

(100) Witkiewitz, K.; Kranzler, H. R.; Hallgren, K. A.; O'Malley, S. S.; Falk, D. E.; Litten, R. Z.; Hasin, D. S.; Mann, K. F.; Anton, R. F. Drinking Risk Level Reductions Associated with Improvements in Physical Health and Quality of Life among Individuals with Alcohol Use Disorder. *Alcohol Clin Exp Res* **2018**, *42* (12), 2453–2465. https://doi.org/10.1111/acer.13897.

(101) Thørrisen, M. M.; Bonsaksen, T.; Hashemi, N.; Kjeken, I.; Mechelen, W. van; Aas, R. W. Association between Alcohol Consumption and Impaired Work Performance (Presenteeism): A Systematic Review. *BMJ Open* **2019**, *9* (7), e029184. https://doi.org/10.1136/bmjopen-2019-029184.

(102) McKetta, S.; Keyes, K. M. Heavy and Binge Alcohol Drinking and Parenting Status in the United States from 2006 to 2018: An Analysis of Nationally Representative Cross-Sectional Surveys. *PLoS Med*

2019, *16* (11), e1002954. https://doi.org/10.1371/journal.pmed.1002954.

(103) The Costs of Alcohol to Society, 2020. https://www.ias.org.uk/wp-content/uploads/2020/12/The-costs-of-alcohol-to-society.pdf (accessed 2022-11-14).

(104) *Alcohol Misuse: How Much Does It Cost?*; Cabinet Office, 2003. https://ranzetta.typepad.com/files/economic-costs-uk-2003.pdf (accessed 2022-11-14).

(105) Burton, R.; Henn, C.; Lavoie, D.; O'Connor, R.; Perkins, C.; Sweeney, K.; Greaves, F.; Ferguson, B.; Beynon, C.; Belloni, A.; Musto, V.; Marsden, J.; Sheron, N. A Rapid Evidence Review of the Effectiveness and Cost-Effectiveness of Alcohol Control Policies: An English Perspective. *Lancet* **2017**, *389* (10078), 1558–1580. https://doi.org/10.1016/S0140-6736(16)32420-5.

(106) Rehm, J.; Mathers, C.; Popova, S.; Thavorncharoensap, M.; Teerawattananon, Y.; Patra, J. Global Burden of Disease and Injury and Economic Cost Attributable to Alcohol Use and Alcohol-Use Disorders. *The Lancet* **2009**, *373* (9682), 2223–2233. https://doi.org/10.1016/S0140-6736(09)60746-7.

(107) Greenmyer, J. R.; Klug, M. G.; Kambeitz, C.; Popova, S.; Burd, L. A Multicountry Updated Assessment of the Economic Impact of Fetal Alcohol Spectrum Disorder: Costs for Children and Adults. *J Addict Med* **2018**, *12* (6), 466–473. https://doi.org/10.1097/ADM.0000000000000438.

(108) Bouchery, E. E.; Harwood, H. J.; Sacks, J. J.; Simon, C. J.; Brewer, R. D. Economic Costs of Excessive Alcohol Consumption in the U.S., 2006. *Am J Prev Med* **2011**, *41* (5), 516–524. https://doi.org/10.1016/j.amepre.2011.06.045.

(109) Strizek, J. Alcohol-Related Harm to Others: Frames and Challenges for Survey Research. *Drugs: Education, Prevention and Policy* **2020**, *27* (6), 445–450. https://doi.org/10.1080/09687637.2020.1726290.

(110) Campbell, D.; editor, D. C. H. policy. Alcohol-Related Crime, Lost Output and Ill Health Costs UK £52bn a Year. *The Guardian*. December 2, 2016. https://www.theguardian.com/society/2016/dec/02/alcohol-related-lost-output-and-ill-health-costs-uk-52bn-a-year (accessed 2022-08-12).

(111) World Health Organization. *Working Document for Development of an Action Plan to Strengthen Implementation of the Global Strategy to Reduce the Harmful Use of Alcohol*; 2020. https://www.who.int/docs/default-source/alcohol/working-document-for-action-plan-web-consultation-november-2020.pdf?sfvrsn=6ce39316_0.

(112) World Health Organization. *Global Status Report on Alcohol and Health 2014*; 2014. https://apps.who.int/iris/bitstream/handle/10665/112736/9789240692763_eng.pdf?sequence=1.

(113) Department of Health & Social Care. *2010 to 2015 government policy: obesity and healthy eating*. GOV.UK. https://www.gov.uk/government/publications/2010-to-2015-

government-policy-obesity-and-healthy-eating/2010-to-2015-government-policy-obesity-and-healthy-eating (accessed 2021-08-05).

(114) Griffith, R.; Leicester, A.; O'Connell, M. *Price-based measures to reduce alcohol consumption*. https://doi.org/10.1920/BN.IFS.2012.00138.

(115) Institute of Alcohol Studies. *Wales: Alcohol pricing is a legislative priority*. IAS. https://www.ias.org.uk/news/wales-alcohol-pricing-is-a-legislative-priority/ (accessed 2021-08-05).

(116) The Association of Directors of Public Health. *Policy Position: Alcohol*; 2017. http://www.adph.org.uk/wp-content/uploads/2017/11/ADPH-Policy-Position-Alcohol.pdf.

(117) Gorski, M. T.; Roberto, C. A. Public Health Policies to Encourage Healthy Eating Habits: Recent Perspectives. *J Healthc Leadersh* **2015**, *7*, 81–90. https://doi.org/10.2147/JHL.S69188.

(118) Popkin, B. M. Relationship between Shifts in Food System Dynamics and Acceleration of the Global Nutrition Transition. *Nutr Rev* **2017**, *75* (2), 73–82. https://doi.org/10.1093/nutrit/nuw064.

(119) Popkin, B. M.; Adair, L. S.; Ng, S. W. NOW AND THEN: The Global Nutrition Transition: The Pandemic of Obesity in Developing Countries. *Nutr Rev* **2012**, *70* (1), 3–21. https://doi.org/10.1111/j.1753-4887.2011.00456.x.

(120) Menyanu, E.; Russell, J.; Charlton, K. Dietary Sources of Salt in Low- and Middle-Income Countries: A Systematic Literature Review. *Int J Environ Res Public Health* **2019**, *16* (12), 2082. https://doi.org/10.3390/ijerph16122082.

(121) Hill, J.; Mchiza, Z.; Puoane, T.; Steyn, N. P. Food Sold by Street-Food Vendors in Cape Town and Surrounding Areas: A Focus on Food and Nutrition Knowledge as Well as Practices Related to Food Preparation of Street-Food Vendors. *Journal of Hunger & Environmental Nutrition* **2019**, *14* (3), 401–415. https://doi.org/10.1080/19320248.2018.1434104.

(122) Taillie, L. S.; Busey, E.; Stoltze, F. M.; Dillman Carpentier, F. R. Governmental Policies to Reduce Unhealthy Food Marketing to Children. *Nutr Rev* **2019**, *77* (11), 787–816. https://doi.org/10.1093/nutrit/nuz021.

(123) Nielsen, S. J.; Popkin, B. M. Changes in Beverage Intake between 1977 and 2001. *Am J Prev Med* **2004**, *27* (3), 205–210. https://doi.org/10.1016/j.amepre.2004.05.005.

(124) Han, E.; Powell, L. M. Consumption Patterns of Sugar Sweetened Beverages in the United States. *J Acad Nutr Diet* **2013**, *113* (1), 43–53. https://doi.org/10.1016/j.jand.2012.09.016.

(125) Thomson, N. Perceptions of the Healthiness of Sugar-Sweetened Beverage in Five Countries in the Asia Pacific Region. *Asia Pacific Food and Nutrition Collaboration* **2017**, No. 5.

(126) Nguyen, H. *Consumption of several types of soft drinks remained stable year-over-year in Great Britain*. YouGov. https://yougov.co.uk/topics/consumer/articles-reports/2021/02/18/soft-drinks-gb-research-2020 (accessed 2022-12-22).

(127) Ridler, G. *UK seventh-highest consumer of soft drinks*. foodmanufacture.co.uk.

https://www.foodmanufacture.co.uk/Article/2018/07/24/UK-seventh-highest-consumer-of-soft-drinks (accessed 2022-12-22).

(128) British Soft Drinks Association. *Changing Tastes: The UK Soft Drinks Annual Report*; 2015. https://www.britishsoftdrinks.com/write/mediauploads/publications/bsda_annual_report_2015.pdf.

(129) World Health Organization. *Global Health Observatory Data Repository (Eastern Mediterranean Region) - Policies, strategies and action plans - Data by country*. WHO. https://apps.who.int/gho/data/node.main-emro.A907?lang=en (accessed 2021-08-05).

(130) GOV.UK. *National Diet and Nutrition Survey*. GOV.UK. https://www.gov.uk/government/collections/national-diet-and-nutrition-survey (accessed 2021-08-05).

(131) Baker, C. Obesity Statistics in England. *House of Commons Library* **2021**.

(132) NHS. *Health survey for England 2018 [NS]*. NHS Digital. https://digital.nhs.uk/data-and-information/publications/statistical/health-survey-for-england/2018 (accessed 2021-08-06).

(133) Gregory, A. More than 42m UK Adults 'Will Be Overweight by 2040.' *The Guardian*. May 18, 2022. https://www.theguardian.com/society/2022/may/19/more-than-42m-uk-adults-will-be-overweight-by-2040 (accessed 2022-08-12).

(134) *Obesity Statistics 2022: Facts and Figures in the UK*. Health Express. //www.healthexpress.co.uk/obesity-statistics-uk (accessed 2022-12-22).

(135) *Health Survey for England 2019 [NS]*. NHS. https://digital.nhs.uk/data-and-information/publications/statistical/health-survey-for-england/2019/main-findings (accessed 2022-12-22).

(136) *Childhood obesity: applying All Our Health*. GOV.UK. https://www.gov.uk/government/publications/childhood-obesity-applying-all-our-health/childhood-obesity-applying-all-our-health (accessed 2022-12-22).

(137) Mozaffarian, D.; Afshin, A.; Benowitz, N. L.; Bittner, V.; Daniels, S. R.; Franch, H. A.; Jacobs, D. R.; Kraus, W. E.; Kris-Etherton, P. M.; Krummel, D. A.; Popkin, B. M.; Whitsel, L. P.; Zakai, N. A. AHA Scientific Statement Population Approaches to Improve Diet, Physical Activity, and Smoking Habits A Scientific Statement from the American Heart Association. *Circulation* **2012**, *126* (12), 10.1161/CIR.0b013e318260a20b. https://doi.org/10.1161/CIR.0b013e318260a20b.

(138) Department of Health and Social Care. *New obesity strategy unveiled as country urged to lose weight to beat coronavirus (COVID-19) and protect the NHS*. GOV.UK. https://www.gov.uk/government/news/new-obesity-strategy-unveiled-as-country-urged-to-lose-weight-to-beat-coronavirus-covid-19-and-protect-the-nhs (accessed 2021-08-06).

(139) Sahoo, K.; Sahoo, B.; Choudhury, A. K.; Sofi, N. Y.; Kumar, R.; Bhadoria, A. S. Childhood Obesity: Causes and Consequences. *J Family Med Prim Care* **2015**, *4* (2), 187–192. https://doi.org/10.4103/2249-4863.154628.

(140) Bonder, R.; Davis, C.; Kuk, J. L.; Loxton, N. J. Compulsive "Grazing" and Addictive Tendencies towards Food. *Eur Eat Disord Rev* **2018**, *26* (6), 569–573. https://doi.org/10.1002/erv.2642.

(141) Johnson, F.; Wardle, J. Variety, Palatability, and Obesity1234. *Adv Nutr* **2014**, *5* (6), 851–859. https://doi.org/10.3945/an.114.007120.

(142) Mies, G. W.; Treur, J. L.; Larsen, J. K.; Halberstadt, J.; Pasman, J. A.; Vink, J. M. The Prevalence of Food Addiction in a Large Sample of Adolescents and Its Association with Addictive Substances. *Appetite* **2017**, *118*, 97–105. https://doi.org/10.1016/j.appet.2017.08.002.

(143) Davis, C. Attention-Deficit/Hyperactivity Disorder: Associations with Overeating and Obesity. *Curr Psychiatry Rep* **2010**, *12* (5), 389–395. https://doi.org/10.1007/s11920-010-0133-7.

(144) Avena, N. M.; Rada, P.; Hoebel, B. G. Sugar and Fat Bingeing Have Notable Differences in Addictive-like Behavior. *J Nutr* **2009**, *139* (3), 623–628. https://doi.org/10.3945/jn.108.097584.

(145) Njagi, P. G. Factors That Influence Consumption Patterns of Junk Foods in Fast Food Restaurants in Nairobi City County, Kenya, University of Nairobi, Nairobi, 2017. http://erepository.uonbi.ac.ke/handle/11295/102203 (accessed 2021-08-05).

(146) Joshi, Y.; Rahman, Z. Consumers' Sustainable Purchase Behaviour: Modeling the Impact of Psychological Factors. *Ecological Economics* **2019**, *159*, 235–243. https://doi.org/10.1016/j.ecolecon.2019.01.025.

(147) Stilley, K. M.; Inman, J. J.; Wakefield, K. L.; article., J. D. served as editor and B. R. served as associate editor for this. Planning to Make Unplanned Purchases? The Role of In-Store Slack in Budget Deviation. *Journal of Consumer Research* **2010**, *37* (2), 264–278. https://doi.org/10.1086/651567.

(148) Caspi, C. E.; Lenk, K.; Pelletier, J. E.; Barnes, T. L.; Harnack, L.; Erickson, D. J.; Laska, M. N. Association between Store Food Environment and Customer Purchases in Small Grocery Stores, Gas-Marts, Pharmacies and Dollar Stores. *Int J Behav Nutr Phys Act* **2017**, *14*, 76. https://doi.org/10.1186/s12966-017-0531-x.

(149) Huitink, M.; Poelman, M. P.; Seidell, J. C.; Pleus, M.; Hofkamp, T.; Kuin, C.; Dijkstra, S. C. Can Unhealthy Food Purchases at Checkout Counters Be Discouraged by Introducing Healthier Snacks? A Real-Life Experiment in Supermarkets in Deprived Urban Areas in the Netherlands. *BMC Public Health* **2020**, *20* (1), 542. https://doi.org/10.1186/s12889-020-08608-6.

(150) Hemmingsson, E. Early Childhood Obesity Risk Factors: Socioeconomic Adversity, Family Dysfunction, Offspring Distress, and Junk Food Self-Medication. *Curr Obes Rep* **2018**, *7* (2), 204–209. https://doi.org/10.1007/s13679-018-0310-2.

(151) Kenny, T.-A.; Fillion, M.; MacLean, J.; Wesche, S. D.; Chan, H. M. Calories Are Cheap, Nutrients Are Expensive – The Challenge of

Healthy Living in Arctic Communities. *Food Policy* **2018**, *80*, 39–54. https://doi.org/10.1016/j.foodpol.2018.08.006.

(152) GOV.UK. *Restricting promotions of products high in fat, sugar and salt by location and by price: government response to public consultation*. GOV.UK. https://www.gov.uk/government/consultations/restricting-promotions-of-food-and-drink-that-is-high-in-fat-sugar-and-salt/outcome/restricting-promotions-of-products-high-in-fat-sugar-and-salt-by-location-and-by-price-government-response-to-public-consultation (accessed 2022-03-19).

(153) Grummon, A. H.; Smith, N. R.; Golden, S. D.; Frerichs, L.; Smith Taillie, L.; Brewer, N. T. Health Warnings on Sugar-Sweetened Beverages: Simulation of Impacts on Diet and Obesity Among U.S. Adults. *Am J Prev Med* **2019**, *57* (6), 765–774. https://doi.org/10.1016/j.amepre.2019.06.022.

(154) World Health Organization. *Obesity and overweight*. https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight (accessed 2021-08-05).

(155) Lagström, H.; Stenholm, S.; Akbaraly, T.; Pentti, J.; Vahtera, J.; Kivimäki, M.; Head, J. Diet Quality as a Predictor of Cardiometabolic Disease–Free Life Expectancy: The Whitehall II Cohort Study. *The American Journal of Clinical Nutrition* **2020**, *111* (4), 787–794. https://doi.org/10.1093/ajcn/nqz329.

(156) Nomura, S.; Yoneoka, D.; Tanaka, S.; Ishizuka, A.; Ueda, P.; Nakamura, K.; Uneyama, H.; Hayashi, N.; Shibuya, K. Forecasting

Disability-Adjusted Life Years for Chronic Diseases: Reference and Alternative Scenarios of Salt Intake for 2017–2040 in Japan. *BMC Public Health* **2020**, *20*, 1475. https://doi.org/10.1186/s12889-020-09596-3.

(157) Selvarajah, V.; Mäki-Petäjä, K. M.; Pedro, L.; Bruggraber, S. F. A.; Burling, K.; Goodhart, A. K.; Brown, M. J.; McEniery, C. M.; Wilkinson, I. B. Novel Mechanism for Buffering Dietary Salt in Humans. *Hypertension* **2017**, *70* (5), 930–937. https://doi.org/10.1161/HYPERTENSIONAHA.117.10003.

(158) *Annex C: data on the distribution, determinants and burden of non-communicable diseases in England*. GOV.UK. https://www.gov.uk/government/publications/nhs-health-check-programme-review/annex-c-data-on-the-distribution-determinants-and-burden-of-non-communicable-diseases-in-england (accessed 2022-08-12).

(159) Lee, H.; Ahn, R.; Kim, T. H.; Han, E. Impact of Obesity on Employment and Wages among Young Adults: Observational Study with Panel Data. *Int J Environ Res Public Health* **2019**, *16* (1), 139. https://doi.org/10.3390/ijerph16010139.

(160) Candari, C. J.; Cylus, J.; Nolte, E. *Assessing the Economic Costs of Unhealthy Diets and Low Physical Activity: An Evidence Review and Proposed Framework*; European Observatory Health Policy Series; European Observatory on Health Systems and Policies: Copenhagen (Denmark), 2017.

(161) Turner, G. M.; Larsen, K. A.; Candy, S.; Ogilvy, S.; Ananthapavan, J.; Moodie, M.; James, S. W.; Friel, S.; Ryan, C. J.; Lawrence, M. A. Squandering Australia's Food Security—The Environmental and Economic Costs of Our Unhealthy Diet and the Policy Path We're On. *Journal of Cleaner Production* **2018**, *195*, 1581–1599. https://doi.org/10.1016/j.jclepro.2017.07.072.

(162) da Costa Peres, C. M.; Gardone, D. S.; Costa, B. V. de L.; Duarte, C. K.; Pessoa, M. C.; Mendes, L. L. Retail Food Environment around Schools and Overweight: A Systematic Review. *Nutr Rev* **2020**, *78* (10), 841–856. https://doi.org/10.1093/nutrit/nuz110.

(163) Blakely, T.; Nghiem, N.; Genc, M.; Mizdrak, A.; Cobiac, L.; Mhurchu, C. N.; Swinburn, B.; Scarborough, P.; Cleghorn, C. Modelling the Health Impact of Food Taxes and Subsidies with Price Elasticities: The Case for Additional Scaling of Food Consumption Using the Total Food Expenditure Elasticity. *PLoS One* **2020**, *15* (3), e0230506. https://doi.org/10.1371/journal.pone.0230506.

(164) Chriqui, J. F.; Chaloupka, F. J.; Powell, L. M.; Eidson, S. S. A Typology of Beverage Taxation: Multiple Approaches for Obesity Prevention and Obesity Prevention-Related Revenue Generation. *J Public Health Policy* **2013**, *34* (3), 403–423. https://doi.org/10.1057/jphp.2013.17.

(165) Powell, L. M.; Chriqui, J. F.; Khan, T.; Wada, R.; Chaloupka, F. J. Assessing the Potential Effectiveness of Food and Beverage Taxes and Subsidies for Improving Public Health: A Systematic Review of

Prices, Demand and Body Weight Outcomes. *Obes Rev* **2013**, *14* (2), 110–128. https://doi.org/10.1111/obr.12002.

(166) Baker, P.; Machado, P.; Santos, T.; Sievert, K.; Backholer, K.; Hadjikakou, M.; Russell, C.; Huse, O.; Bell, C.; Scrinis, G.; Worsley, A.; Friel, S.; Lawrence, M. Ultra-Processed Foods and the Nutrition Transition: Global, Regional and National Trends, Food Systems Transformations and Political Economy Drivers. *Obes Rev* **2020**, *21* (12), e13126. https://doi.org/10.1111/obr.13126.

(167) Vandevijvere, S.; Soupen, A.; Swinburn, B. Unhealthy Food Advertising Directed to Children on New Zealand Television: Extent, Nature, Impact and Policy Implications. *Public Health Nutr* **2017**, *20* (17), 3029–3040. https://doi.org/10.1017/S1368980017000775.

(168) Whalen, R.; Harrold, J.; Child, S.; Halford, J.; Boyland, E. Children's Exposure to Food Advertising: The Impact of Statutory Restrictions. *Health Promot Int* **2019**, *34* (2), 227–235. https://doi.org/10.1093/heapro/dax044.

(169) Kelly, B.; Vandevijvere, S.; Ng, S.; Adams, J.; Allemandi, L.; Bahena-Espina, L.; Barquera, S.; Boyland, E.; Calleja, P.; Carmona-Garcés, I. C.; Castronuovo, L.; Cauchi, D.; Correa, T.; Corvalán, C.; Cosenza-Quintana, E. L.; Fernández-Escobar, C.; González-Zapata, L. I.; Halford, J.; Jaichuen, N.; Jensen, M. L.; Karupaiah, T.; Kaur, A.; Kroker-Lobos, M. F.; Mchiza, Z.; Miklavec, K.; Parker, W.; Potvin Kent, M.; Pravst, I.; Ramírez-Zea, M.; Reiff, S.; Reyes, M.; Royo-Bordonada, M. Á.; Rueangsom, P.; Scarborough, P.; Tiscornia, M. V.; Tolentino-Mayo, L.; Wate, J.; White, M.; Zamora-Corrales, I.; Zeng,

L.; Swinburn, B. Global Benchmarking of Children's Exposure to Television Advertising of Unhealthy Foods and Beverages across 22 Countries. *Obes Rev* **2019**, *20* (Suppl 2), 116–128. https://doi.org/10.1111/obr.12840.

(170) Roberto, C. A.; Larsen, P. D.; Agnew, H.; Baik, J.; Brownell, K. D. Evaluating the Impact of Menu Labeling on Food Choices and Intake. *Am J Public Health* **2010**, *100* (2), 312–318. https://doi.org/10.2105/AJPH.2009.160226.

(171) Dumanovsky, T.; Huang, C. Y.; Nonas, C. A.; Matte, T. D.; Bassett, M. T.; Silver, L. D. Changes in Energy Content of Lunchtime Purchases from Fast Food Restaurants after Introduction of Calorie Labelling: Cross Sectional Customer Surveys. *BMJ* **2011**, *343*, d4464. https://doi.org/10.1136/bmj.d4464.

(172) Hawley, K. L.; Roberto, C. A.; Bragg, M. A.; Liu, P. J.; Schwartz, M. B.; Brownell, K. D. The Science on Front-of-Package Food Labels. *Public Health Nutr* **2013**, *16* (3), 430–439. https://doi.org/10.1017/S1368980012000754.

(173) Shoychet, G.; Bodell, L. The Impact of Calorie Labelling on Food Consumption: The Moderating Role of Body Dissatisfaction. *Western Undergraduate Psychology Journal* **2020**, *8* (1).

(174) Cole, M.; Peek, H.; Cowen, D. UK Consumer Perceptions of a Novel Till-Receipt "traffic-Light" Nutrition System. *Health Promot Int* **2019**, *34* (4), 640–647. https://doi.org/10.1093/heapro/day007.

(175) *Check the label*. Food Standards Agency. https://www.food.gov.uk/safety-hygiene/check-the-label (accessed 2022-03-25).

(176) Emrich, T. E.; Qi, Y.; Lou, W. Y.; L'Abbe, M. R. Traffic-Light Labels Could Reduce Population Intakes of Calories, Total Fat, Saturated Fat, and Sodium. *PLoS One* **2017**, *12* (2), e0171188. https://doi.org/10.1371/journal.pone.0171188.

(177) Department of Health and Social Care. *Healthy Lives, Healthy People: our strategy for public health in England*. GOV.UK. https://www.gov.uk/government/publications/healthy-lives-healthy-people-our-strategy-for-public-health-in-england (accessed 2021-08-05).

(178) Griffith, R.; O'Connell, M.; Smith, K.; Stroud, R. *The potential impacts of banning television advertising of HFSS food and drink before the watershed*. https://ifs.org.uk/publications/14132 (accessed 2021-08-09).

(179) Clarke, J. *Junk food ads to be subject to heavier online restrictions and 9pm watershed*. The Independent. https://www.independent.co.uk/business/junk-food-ads-to-be-subject-to-heavier-online-restrictions-and-9pm-watershed-b1871907.html (accessed 2021-11-09).

(180) National Cancer Institute. *The Role of the Media in Promoting and Reducing Tobacco Use*. https://cancercontrol.cancer.gov/brp/tcrb/monographs/monograph-19 (accessed 2021-08-05).

(181) Morgenstern, M.; Sargent, J. D.; Engels, R. C. M. E.; Scholte, R. H. J.; Florek, E.; Hunt, K.; Sweeting, H.; Mathis, F.; Faggiano, F.; Hanewinkel, R. Smoking in Movies and Adolescent Smoking Initiation. *Am J Prev Med* **2013**, *44* (4), 339–344. https://doi.org/10.1016/j.amepre.2012.11.037.

(182) Bhaumik, S.; Arora, M.; Singh, A.; Sargent, J. D. Impact of Entertainment Media Smoking on Adolescent Smoking Behaviours. *Cochrane Database of Systematic Reviews* **2015**, No. 6. https://doi.org/10.1002/14651858.CD011720.

(183) Marcon, A.; Pesce, G.; Calciano, L.; Bellisario, V.; Dharmage, S. C.; Garcia-Aymerich, J.; Gislasson, T.; Heinrich, J.; Holm, M.; Janson, C.; Jarvis, D.; Leynaert, B.; Matheson, M. C.; Pirina, P.; Svanes, C.; Villani, S.; Zuberbier, T.; Minelli, C.; Accordini, S. Trends in Smoking Initiation in Europe over 40 Years: A Retrospective Cohort Study. *PLoS One* **2018**, *13* (8), e0201881. https://doi.org/10.1371/journal.pone.0201881.

(184) Farrelly, M. C.; Duke, J. C.; Nonnemaker, J.; MacMonegle, A. J.; Alexander, T. N.; Zhao, X.; Delahanty, J. C.; Rao, P.; Allen, J. A. Association between the Real Cost Media Campaign and Smoking Initiation among Youths — United States, 2014–2016. *MMWR Morb Mortal Wkly Rep* **2017**, *66* (02), 47–50. https://doi.org/10.15585/mmwr.mm6602a2.

(185) Mejia, R.; Pérez, A.; Peña, L.; Kollath-Cattano, C.; Morello, P.; Braun, S.; Hardin, J. W.; Thrasher, J. F.; Sargent, J. Smoking in Movies and Adolescent Smoking Initiation: A Longitudinal Study among

Argentinian Adolescents. *J Pediatr* **2017**, *180*, 222–228. https://doi.org/10.1016/j.jpeds.2016.10.001.

(186) Katz, S. J.; Erkkinen, M.; Lindgren, B.; Hatsukami, D. Assessing the Impact of Conflicting Health Warning Information on Intentions to Use E-Cigarettes - An Application of the Heuristic-Systematic Model. *J Health Commun* **2018**, *23* (10–11), 874–885. https://doi.org/10.1080/10810730.2018.1533052.

(187) Donaldson, E. A.; Hoffman, A. C.; Zandberg, I.; Blake, K. Media Exposure and Tobacco Product Addiction Beliefs: Findings from the 2015 Health Information National Trends Survey (HINTS–FDA 2015). *Addict Behav* **2017**, *72*, 106–113. https://doi.org/10.1016/j.addbeh.2017.04.001.

(188) Zhu, Y. Pro-Smoking Information Scanning Using Social Media Predicts Young Adults' Smoking Behavior. *Comput. Hum. Behav.* **2017**, *77* (C), 19–24. https://doi.org/10.1016/j.chb.2017.08.004.

(189) Kuipers, M. A. G.; Beard, E.; West, R.; Brown, J. Associations between Tobacco Control Mass Media Campaign Expenditure and Smoking Prevalence and Quitting in England: A Time Series Analysis. *Tobacco Control* **2018**, *27* (4), 455–462. https://doi.org/10.1136/tobaccocontrol-2017-053662.

(190) Vogel, E. A.; Ramo, D. E.; Rubinstein, M. L.; Delucchi, K. L.; Darrow, S. M.; Costello, C.; Prochaska, J. J. Effects of Social Media on Adolescents' Willingness and Intention to Use E-Cigarettes: An Experimental Investigation. *Nicotine & Tobacco Research* **2021**, *23* (4), 694–701. https://doi.org/10.1093/ntr/ntaa003.

(191) Namkoong, K.; Nah, S.; Record, R. A.; Van Stee, S. K. Communication, Reasoning, and Planned Behaviors: Unveiling the Effect of Interactive Communication in an Anti-Smoking Social Media Campaign. *Health Commun* **2017**, *32* (1), 41–50. https://doi.org/10.1080/10410236.2015.1099501.

(192) Nowell-Smith, G. *The History of Cinema: A Very Short Introduction*; 2017.

(193) Mingant, N.; Tirtaine, C.; Augros, J. *Film Marketing into the Twenty-First Century*; 2015.

(194) Johnson, E. K.; Len-Ríos, M.; Shoenberger, H.; Han, K. J. A Fatal Attraction: The Effect of TV Viewing on Smoking Initiation among Young Women. *Communication Research* **2019**, *46* (5), 688–707. https://doi.org/10.1177/0093650216641183.

(195) Bennett, M.; Hair, E. C.; Liu, M.; Pitzer, L.; Rath, J. M.; Vallone, D. M. Exposure to Tobacco Content in Episodic Programs and Tobacco and E-Cigarette Initiation. *Preventive Medicine* **2020**, *139*, 106169. https://doi.org/10.1016/j.ypmed.2020.106169.

(196) Wakefield, M.; Durrant, R.; Terry-McElrath, Y.; Ruel, E.; Balch, G. I.; Anderson, S.; Szczypka, G.; Emery, S.; Flay, B. Appraisal of Anti-Smoking Advertising by Youth at Risk for Regular Smoking: A Comparative Study in the United States, Australia, and Britain. *Tobacco Control* **2003**, *12* (suppl 2), ii82–ii86. https://doi.org/10.1136/tc.12.suppl_2.ii82.

(197) Sohn, M.; Jung, M. Effect of Viewing Smoking Scenes in Motion Pictures on Subsequent Smoking Desire in Audiences in South Korea.

JMIR Public Health Surveill **2017**, *3* (3), e46. https://doi.org/10.2196/publichealth.7093.

(198) Bekalu, M. A.; Viswanath, K. Smoking Portrayal in Ethiopian Movies: A Theory-Based Content Analysis. *Health Promotion International* **2019**, *34* (4), 687–696. https://doi.org/10.1093/heapro/day013.

(199) Kulkarni, M. M.; Kamath, V. G.; Kamath, A.; Lewis, S.; Bogdanovica, I.; Bains, M.; Cranwell, J.; Fogarty, A.; Arora, M.; Nazar, G. P.; Ballal, K.; Bhagwath, R.; Britton, J. Exposure to Tobacco Imagery in Popular Films and the Risk of Ever Smoking among Children in Southern India. *Tobacco Control* **2020**. https://doi.org/10.1136/tobaccocontrol-2019-055353.

(200) Houghton, D.; Houghton, F. An Examination of Portrayals of Smoking in Graphic Novels/Comic Books: A Picture Is Worth a Thousand Words. *Tob Prev Cessat* **2020**, *6*, 41. https://doi.org/10.18332/tpc/122867.

(201) Murray, J. M.; Kimbrough, E. O.; Krupka, E. L.; Ramalingam, A.; Kumar, R.; Power, J. M.; Sanchez-Franco, S.; Sarmiento, O. L.; Kee, F.; Hunter, R. F. Confirmatory Factor Analysis Comparing Incentivized Experiments with Self-Report Methods to Elicit Adolescent Smoking and Vaping Social Norms. *Sci Rep* **2020**, *10* (1), 15818. https://doi.org/10.1038/s41598-020-72784-z.

(202) Lyons, A.; McNeill, A.; Chen, Y.; Britton, J. Tobacco and Tobacco Branding in Films Most Popular in the UK from 1989 to 2008. *Thorax* **2010**, *65* (5), 417–422. https://doi.org/10.1136/thx.2009.130716.

(203) Glantz, S.; Titus, K.; Mitchell, S.; Polansky, J.; Kaufmann, R. Smoking in Top-Grossing Movies -- United States, 1991-2009. *Medscape* **2010**, *59* (32), 1014–1017.

(204) Barker, A.; Cranwell, J.; Fitzpatrick, I.; Whittamore, K.; Alfayad, K.; Haridy, A.; Murray, R.; Britton, J. Tobacco and Tobacco Branding in Films Most Popular in the UK from 2009 to 2017. *Thorax* **2020**, *75* (12), 1103–1108. https://doi.org/10.1136/thoraxjnl-2020-214743.

(205) Sargent, J. D.; DiFranza, J. R. Tobacco Control for Clinicians Who Treat Adolescents. *CA Cancer J Clin* **2003**, *53* (2), 102–123. https://doi.org/10.3322/canjclin.53.2.102.

(206) Healton, C.; Farrelly, M. C.; Weitzenkamp, D.; Lindsey, D.; Haviland, M. L. Youth Smoking Prevention and Tobacco Industry Revenue. *Tobacco Control* **2006**, *15* (2), 103–106. https://doi.org/10.1136/tc.2005.012237.

(207) McGee, R.; Ketchel, J. Tobacco Imagery on New Zealand Television 2002–2004. *Tob Control* **2006**, *15* (5), 412–414. https://doi.org/10.1136/tc.2006.016048.

(208) Eslick, G. D.; Eslick, M. G. Smoking and The Simpsons. *Med. J. Aust.* **2009**, *190* (11).

(209) Lyons, A.; McNeill, A.; Britton, J. Alcohol Imagery on Popularly Viewed Television in the UK. *Journal of Public Health* **2014**, *36* (3), 426–434. https://doi.org/10.1093/pubmed/fdt074.

(210) Barker, A. B.; Whittamore, K.; Britton, J.; Cranwell, J. Content Analysis of Tobacco Content in UK Television. *Tobacco Control*

2019, *28* (4), 381–385. https://doi.org/10.1136/tobaccocontrol-2018-054427.

(211) Carter, O. B. J.; Donovan, R. J.; Weller, N. M.; Jalleh, G. Impact of Smoking Images in Magazines on the Smoking Attitudes and Intentions of Youth: An Experimental Investigation. *Tobacco Control* **2007**, *16* (6), 368–372. https://doi.org/10.1136/tc.2007.020446.

(212) Chapman, S.; Jones, Q.; Bauman, A.; Palin, M. Incidental Depiction of Cigarettes and Smoking in Australian Magazines, 1990-1993. *Aust J Public Health* **1995**, *19* (3), 313–315. https://doi.org/10.1111/j.1753-6405.1995.tb00451.x.

(213) BMA Board of Science. *Forever Cool: The Influence of Smoking Imagery on Young People*; 2008. https://www.stir.ac.uk/media/stirling/services/faculties/management/documents/Angus---Forever-Cool-the-influence-of-smoking-imagery.pdf.

(214) Ilakkuvan, V. Exploring the Influence of Pro- and Anti-Tobacco Content in Social Media on Young Adults' Tobacco Use Behaviors, The George Washington University, 2018. https://www.proquest.com/openview/a646f10a4953333ddf07501191c85aff/1?pq-origsite=gscholar&cbl=18750&diss=y.

(215) Pérez, A.; Thrasher, J.; Cabrera, N.; Forsyth, S.; Peña, L.; Sargent, J. D.; Mejía, R. Exposure to Tobacco in Video Games and Smoking among Gamers in Argentina. *Tobacco Control* **2019**, *28* (4), 427–433. https://doi.org/10.1136/tobaccocontrol-2017-053973.

(216) McDaniel, P. A.; Forsyth, S. R. Exploiting the “Video Game Craze”: A Case Study of the Tobacco Industry’s Use of Video Games as a Marketing Tool. *PLOS ONE* **2019**, *14* (7), e0220407. https://doi.org/10.1371/journal.pone.0220407.

(217) Niederdeppe, J.; Kellogg, M.; Skurka, C.; Avery, R. J. Market-Level Exposure to State Antismoking Media Campaigns and Public Support for Tobacco Control Policy in the United States, 2001–2002. *Tobacco Control* **2018**, *27* (2), 177–184. https://doi.org/10.1136/tobaccocontrol-2016-053506.

(218) Kaur, J.; Kishore, J.; Kumar, M. Effect of Anti-Tobacco Audiovisual Messages on Knowledge and Attitude towards Tobacco Use in North India. *Indian J Community Med* **2012**, *37* (4), 227–231. https://doi.org/10.4103/0970-0218.103470.

(219) McVey, D.; Stapleton, J. Can Anti-Smoking Television Advertising Affect Smoking Behaviour? Controlled Trial of the Health Education Authority for England’s Anti-Smoking TV Campaign. *Tob Control* **2000**, *9* (3), 273–282. https://doi.org/10.1136/tc.9.3.273.

(220) Robinson, A.; Sweeting, H.; Hunt, K. UK News Media Representations of Smoking, Smoking Policies and Tobacco Bans in Prisons. *Tobacco Control* **2018**, *27* (6), 622–630. https://doi.org/10.1136/tobaccocontrol-2017-053868.

(221) HM Government. *Safe. Sensible. Social. The next Steps in the National Alcohol Strategy*; 2007. https://lx.iriss.org.uk/sites/default/files/resources/Safe%2C%20sensible.pdf.

(222) Atkinson, A. M.; Sumnall, H.; Measham, F. Depictions of Alcohol Use in a UK Government Partnered Online Social Marketing Campaign: “Hollyoaks” “The Morning after the Night Before.” *Drugs: Education, Prevention & Policy* **2011**, *18* (6), 454–467. https://doi.org/10.3109/09687637.2010.534745.

(223) *International Handbook of Children, Media and Culture*; Drotner, K., Livingstone, S., Eds.; 2021.

(224) van Hoof, J. J.; de Jong, M. D. T.; Fennis, B. M.; Gosselt, J. F. There’s Alcohol in My Soap: Portrayal and Effects of Alcohol Use in a Popular Television Series. *Health Educ Res* **2009**, *24* (3), 421–429. https://doi.org/10.1093/her/cyn037.

(225) Anderson, P.; de Bruijn, A.; Angus, K.; Gordon, R.; Hastings, G. Impact of Alcohol Advertising and Media Exposure on Adolescent Alcohol Use: A Systematic Review of Longitudinal Studies. *Alcohol Alcohol* **2009**, *44* (3), 229–243. https://doi.org/10.1093/alcalc/agn115.

(226) Engels, R. C. M. E.; Hermans, R.; van Baaren, R. B.; Hollenstein, T.; Bot, S. M. Alcohol Portrayal on Television Affects Actual Drinking Behaviour. *Alcohol Alcohol* **2009**, *44* (3), 244–249. https://doi.org/10.1093/alcalc/agp003.

(227) Sargent, J. D.; Wills, T. A.; Stoolmiller, M.; Gibson, J.; Gibbons, F. X. Alcohol Use in Motion Pictures and Its Relation with Early-Onset Teen Drinking. *J Stud Alcohol* **2006**, *67* (1), 54–65. https://doi.org/10.15288/jsa.2006.67.54.

(228) Dal Cin, S.; Worth, K. A.; Dalton, M. A.; Sargent, J. D. Youth Exposure to Alcohol Use and Brand Appearances in Popular

Contemporary Movies. *Addiction* **2008**, *103* (12), 1925–1932. https://doi.org/10.1111/j.1360-0443.2008.02304.x.

(229) Jernigan, D.; Noel, J.; Landon, J.; Thornton, N.; Lobstein, T. Alcohol Marketing and Youth Alcohol Consumption: A Systematic Review of Longitudinal Studies Published since 2008. *Addiction* **2017**, *112 Suppl 1*, 7–20. https://doi.org/10.1111/add.13591.

(230) Jernigan, D.; Ross, C. S. The Alcohol Marketing Landscape: Alcohol Industry Size, Structure, Strategies, and Public Health Responses. *J Stud Alcohol Drugs Suppl* **2020**, No. Suppl 19, 13–25. https://doi.org/10.15288/jsads.2020.s19.13.

(231) Lyons, A.; McNeill, A.; Gilmore, I.; Britton, J. Alcohol Imagery and Branding, and Age Classification of Films Popular in the UK. *Int J Epidemiol* **2011**, *40* (5), 1411–1419. https://doi.org/10.1093/ije/dyr126.

(232) Hanewinkel, R.; Sargent, J. D.; Poelen, E. A. P.; Scholte, R.; Florek, E.; Sweeting, H.; Hunt, K.; Karlsdottir, S.; Jonsson, S. H.; Mathis, F.; Faggiano, F.; Morgenstern, M. Alcohol Consumption in Movies and Adolescent Binge Drinking in 6 European Countries. *Pediatrics* **2012**, *129* (4), 709–720. https://doi.org/10.1542/peds.2011-2809.

(233) Hanewinkel, R.; Sargent, J. D. Longitudinal Study of Exposure to Entertainment Media and Alcohol Use among German Adolescents. *Pediatrics* **2009**, *123* (3), 989–995. https://doi.org/10.1542/peds.2008-1465.

(234) O'Hara, R. E.; Gibbons, F. X.; Li, Z.; Gerrard, M.; Sargent, J. D. Specificity of Early Movie Effects on Adolescent Sexual Behavior and

Alcohol Use. *Soc Sci Med* **2013**, *96*, 200–207. https://doi.org/10.1016/j.socscimed.2013.07.032.

(235) Hanewinkel, R.; Sargent, J. D.; Hunt, K.; Sweeting, H.; Engels, R. C. M. E.; Scholte, R. H. J.; Mathis, F.; Florek, E.; Morgenstern, M. Portrayal of Alcohol Consumption in Movies and Drinking Initiation in Low-Risk Adolescents. *Pediatrics* **2014**, *133* (6), 973–982. https://doi.org/10.1542/peds.2013-3880.

(236) Smith, L. A.; Foxcroft, D. R. The Effect of Alcohol Advertising, Marketing and Portrayal on Drinking Behaviour in Young People: Systematic Review of Prospective Cohort Studies. *BMC Public Health* **2009**, *9* (1), 51. https://doi.org/10.1186/1471-2458-9-51.

(237) Young, B.; Lewis, S.; Katikireddi, S. V.; Bauld, L.; Stead, M.; Angus, K.; Campbell, M.; Hilton, S.; Thomas, J.; Hinds, K.; Ashie, A.; Langley, T. Effectiveness of Mass Media Campaigns to Reduce Alcohol Consumption and Harm: A Systematic Review. *Alcohol Alcohol* **2018**, *53* (3), 302–316. https://doi.org/10.1093/alcalc/agx094.

(238) Wakefield, M. A.; Loken, B.; Hornik, R. C. Use of Mass Media Campaigns to Change Health Behaviour. *Lancet* **2010**, *376* (9748), 1261–1271. https://doi.org/10.1016/S0140-6736(10)60809-4.

(239) Jepson, R. G.; Harris, F. M.; Platt, S.; Tannahill, C. The Effectiveness of Interventions to Change Six Health Behaviours: A Review of Reviews. *BMC Public Health* **2010**, *10* (1), 538. https://doi.org/10.1186/1471-2458-10-538.

(240) Yadav, R.-P.; Kobayashi, M. A Systematic Review: Effectiveness of Mass Media Campaigns for Reducing Alcohol-Impaired Driving and

Alcohol-Related Crashes. *BMC Public Health* **2015**, *15*, 857. https://doi.org/10.1186/s12889-015-2088-4.

(241) Derzon, J. H.; Lipsey, M. W. A Meta-Analysis of the Effectiveness of Mass-Communication for Changing Substance-Use Knowledge, Attitudes, and Behavior. In *Mass media and drug prevention: Classic and contemporary theories and research*; Lawrence Erlbaum Associates Publishers: Mahwah, NJ, US, 2002; pp 231–258.

(242) Kelly, B.; Vandevijvere, S.; Freeman, B.; Jenkin, G. New Media but Same Old Tricks: Food Marketing to Children in the Digital Age. *Curr Obes Rep* **2015**, *4* (1), 37–45. https://doi.org/10.1007/s13679-014-0128-5.

(243) Parkinson, J. Anti-Obesity Drive: Junk Food TV Adverts to Be Banned before 9pm. *BBC News*. June 24, 2021. https://www.bbc.com/news/uk-politics-57593599 (accessed 2021-12-14).

(244) Sweney, M. UK to Ban Junk Food Advertising Online and before 9pm on TV from 2023. *The Guardian*. June 23, 2021. https://www.theguardian.com/media/2021/jun/23/uk-to-ban-junk-food-advertising-online-and-before-9pm-on-tv-from-2023 (accessed 2021-09-28).

(245) Livingstone, S.; Ólafsson, K.; Staksrud, E. Risky Social Networking Practices among "Underage" Users: Lessons for Evidence-Based Policy. *Journal of Computer-Mediated Communication* **2013**, *18* (3), 303–320. https://doi.org/10.1111/jcc4.12012.

(246) Orciari, M. *Fast food companies still target kids with marketing for unhealthy products*. YaleNews. https://news.yale.edu/2013/11/04/fast-food-companies-still-target-kids-marketing-unhealthy-products (accessed 2021-09-28).

(247) Constantinides, E.; Fountain, S. J. Web 2.0: Conceptual Foundations and Marketing Issues. *J Direct Data Digit Mark Pract* **2008**, *9* (3), 231–244. https://doi.org/10.1057/palgrave.dddmp.4350098.

(248) Buijzen, M.; Schuurman, J.; Bomhof, E. Associations between Children's Television Advertising Exposure and Their Food Consumption Patterns: A Household Diary-Survey Study. *Appetite* **2008**, *50* (2–3), 231–239. https://doi.org/10.1016/j.appet.2007.07.006.

(249) Ferguson, C. J.; Contreras, S.; Kilburn, M. Advertising and Fictional Media Effects on Healthy Eating Choices in Early and Later Childhood. *Psychology of Popular Media Culture* **2014**, *3* (3), 164–173. https://doi.org/10.1037/ppm0000016.

(250) Wilcox, B. L.; Kunkel, D.; Cantor, J.; Dowrick, P.; Linn, S.; Palmer, E. *Report of the APA Task Force on Advertising and Children*; American Psychological Association, 2004. https://www.apa.org/pi/families/resources/advertising-children.pdf.

(251) Pretlow, R. A. Addiction to Highly Pleasurable Food as a Cause of the Childhood Obesity Epidemic: A Qualitative Internet Study. *Eat Disord* **2011**, *19* (4), 295–307. https://doi.org/10.1080/10640266.2011.584803.

(252) Coon, K. A.; Tucker, K. L. Television and Children's Consumption Patterns. A Review of the Literature. *Minerva Pediatr* **2002**, *54* (5), 423–436.

(253) Halford, J. C. G.; Gillespie, J.; Brown, V.; Pontin, E. E.; Dovey, T. M. Effect of Television Advertisements for Foods on Food Consumption in Children. *Appetite* **2004**, *42* (2), 221–225. https://doi.org/10.1016/j.appet.2003.11.006.

(254) Boyland, E. J.; Harrold, J. A.; Kirkham, T. C.; Halford, J. C. G. The Extent of Food Advertising to Children on UK Television in 2008. *Int J Pediatr Obes* **2011**, *6* (5–6), 455–461. https://doi.org/10.3109/17477166.2011.608801.

(255) de Droog, S. M.; Buijzen, M.; Valkenburg, P. M. Use a Rabbit or a Rhino to Sell a Carrot? The Effect of Character–Product Congruence on Children's Liking of Healthy Foods. *Journal of Health Communication* **2012**, *17* (9), 1068–1080. https://doi.org/10.1080/10810730.2011.650833.

(256) Eagle, L.; Bulmer, S.; De Bruin, A.; Kitchen, P. J. Exploring the Link between Obesity and Advertising in New Zealand. *Journal of Marketing Communications* **2004**, *10* (1), 49–67. https://doi.org/10.1080/1352726042000207199.

(257) Kent, M. P.; Dubois, L.; Wanless, A. Food Marketing on Children's Television in Two Different Policy Environments. *Int J Pediatr Obes* **2011**, *6* (2–2), e433-441. https://doi.org/10.3109/17477166.2010.526222.

(258) Dhar, T.; Baylis, K. Fast-Food Consumption and the Ban on Advertising Targeting Children: The Quebec Experience. *Journal of Marketing Research* **2011**, *48* (5), 799–813. https://doi.org/10.1509/jmkr.48.5.799.

(259) Whalen, R.; Harrold, J.; Child, S.; Halford, J.; Boyland, E. The Health Halo Trend in UK Television Food Advertising Viewed by Children: The Rise of Implicit and Explicit Health Messaging in the Promotion of Unhealthy Foods. *Int J Environ Res Public Health* **2018**, *15* (3), 560. https://doi.org/10.3390/ijerph15030560.

(260) *New restrictions on the television advertising of food and drink products to children*. Ofcom. https://www.ofcom.org.uk/about-ofcom/latest/media/media-releases/2006/new-restrictions-on-the-television-advertising-of-food-and-drink-products-to-children (accessed 2022-03-25).

(261) Ofcom. *Television Advertising of Food and Drink Products to Children: Final Statement*; 2007. https://www.ofcom.org.uk/__data/assets/pdf_file/0028/47746/Television-Advertising-of-Food-and-Drink-Products-to-Children-Final-statement-.pdf.

(262) Ofcom. *HFSS Advertising Restrictions: Final Review*; 2010. https://www.ofcom.org.uk/__data/assets/pdf_file/0024/31857/hfss-review-final.pdf.

(263) National Programs. *Core Principles*. BBBPrograms. https://bbbprograms.org/programs/all-programs/cfbai/core_principles (accessed 2021-08-06).

(264) Jennings, W. G.; Henderson, B. B. Social Learning Theory. In *The Encyclopedia of Theoretical Criminology*; American Cancer Society, 2014; pp 1–8. https://doi.org/10.1002/9781118517390.wbetc026.

(265) Akers, R. L.; Jennings, W. G. The Social Learning Theory of Crime and Deviance. In *Handbook on Crime and Deviance*; Krohn, M. D., Hendrix, N., Penly Hall, G., Lizotte, A. J., Eds.; Handbooks of Sociology and Social Research; Springer International Publishing: Cham, 2019; pp 113–129. https://doi.org/10.1007/978-3-030-20779-3_6.

(266) Deaton, S. Social Learning Theory in the Age of Social Media: Implications for Educational Practitioners. *Journal of Educational Technology* **2015**, *12* (1), 1–6.

(267) Gottfredson, N. C.; Hussong, A. M.; Ennett, S. T.; Rothenberg, W. A. The Role of Parental Engagement in the Inter-Generational Transmission of Smoking Behavior and Identity. *J Adolesc Health* **2017**, *60* (5), 599–605. https://doi.org/10.1016/j.jadohealth.2016.11.004.

(268) Macy, J. T.; Chassin, L.; Presson, C. C. Smoking Behaviors and Attitudes During Adolescence Prospectively Predict Support for Tobacco Control Policies in Adulthood. *Nicotine Tob Res* **2012**, *14* (7), 871–879. https://doi.org/10.1093/ntr/ntr301.

(269) Jacobson, J. L.; Akkaya-Hocagil, T.; Ryan, L. M.; Dodge, N. C.; Richardson, G. A.; Olson, H. C.; Coles, C. D.; Day, N. L.; Cook, R. J.; Jacobson, S. W. Effects of Prenatal Alcohol Exposure on Cognitive and Behavioral Development: Findings from a Hierarchical Meta-

Analysis of Data from Six Prospective Longitudinal U.S. Cohorts. *Alcoholism: Clinical and Experimental Research* **2021**, *45* (10), 2040–2058. https://doi.org/10.1111/acer.14686.

(270) Jackson, J. *Ofcom to take on regulation of video-on-demand services*. the Guardian. http://www.theguardian.com/media/2015/oct/14/video-on-demand-ofcom-atvod (accessed 2021-08-06).

(271) Chilton, L. *Netflix and other streaming services to be regulated by Ofcom as part of reported UK government plans*. The Independent. https://www.independent.co.uk/arts-entertainment/tv/news/netflix-ofcom-bbc-uk-government-b1869617.html (accessed 2021-08-06).

(272) *Tobacco Control Laws*. Tobacco Control Laws. https://www.tobaccocontrollaws.org/ (accessed 2022-10-12).

(273) *WHO Report on the Global Tobacco Epidemic, 2021 - Addressing New and Emerging Products*; World Health Organization, 2021.

(274) Anderson, C. L.; Mons, U.; Winkler, V. Global Progress in Tobacco Control: The Question of Policy Compliance. *Glob Health Action 13* (1), 1844977. https://doi.org/10.1080/16549716.2020.1844977.

(275) *WHO Framework Convention on Tobacco Control*. FCTC. https://fctc.who.int/who-fctc/overview (accessed 2022-10-12).

(276) Cairney, P. The Transformation of UK Tobacco Control. **2019**. https://doi.org/10.1093/oso/9780198843719.003.0005.

(277) Elias, J.; Ling, P. M. Origins of Tobacco Harm Reduction in the UK: The 'Product Modification Programme' (1972–1991). *Tob Control* **2018**, *27* (E1), e12–e18. https://doi.org/10.1136/tobaccocontrol-2017-054021.

(278) *Alcohol*. ASA. https://www.asa.org.uk/topic/alcohol.html (accessed 2022-10-12).

(279) Askew, K. *EU 'must legislate' on unhealthy marketing for kids: "Industry self-regulation is not working."* foodnavigator.com. https://www.foodnavigator.com/Article/2021/11/10/EU-must-legislate-on-unhealthy-marketing-for-kids-Industry-self-regulation-is-not-working (accessed 2022-10-12).

(280) Directive XX/XXXX of the European Parliament and of the Council XXX on the Approximation of the Laws of Member States on the Protection of Children from the Marketing of Nutritionally Poor Food, 2021.

(281) Yau, A.; Berger, N.; Law, C.; Cornelsen, L.; Greener, R.; Adams, J.; Boyland, E. J.; Burgoine, T.; Vocht, F. de; Egan, M.; Er, V.; Lake, A. A.; Lock, K.; Mytton, O.; Petticrew, M.; Thompson, C.; White, M.; Cummins, S. Changes in Household Food and Drink Purchases Following Restrictions on the Advertisement of High Fat, Salt, and Sugar Products across the Transport for London Network: A Controlled Interrupted Time Series Analysis. *PLOS Medicine* **2022**, *19* (2), e1003915. https://doi.org/10.1371/journal.pmed.1003915.

(282) Kovic, Y.; Noel, J. K.; Ungemack, J. A.; Burleson, J. A. The Impact of Junk Food Marketing Regulations on Food Sales: An Ecological Study. *Obesity Reviews* **2018**, *19* (6), 761–769. https://doi.org/10.1111/obr.12678.

(283) Adams, J.; Tyrrell, R.; Adamson, A. J.; White, M. Effect of Restrictions on Television Food Advertising to Children on Exposure

to Advertisements for ‘Less Healthy’ Foods: Repeat Cross-Sectional Study. *PLOS ONE* **2012**, *7* (2), e31578. https://doi.org/10.1371/journal.pone.0031578.

(284) Murray, R.; Breton, M. O.; Britton, J.; Cranwell, J.; Grant-Braham, B. Carlsberg Alibi Marketing in the UEFA Euro 2016 Football Finals: Implications of Probably Inappropriate Alcohol Advertising. *BMC Public Health* **2018**, *18* (1), 553. https://doi.org/10.1186/s12889-018-5449-y.

(285) Barker, A.; Opazo-Breton, M.; Thomson, E.; Britton, J.; Grant-Braham, B.; Murray, R. L. Quantifying Alcohol Audio-Visual Content in UK Broadcasts of the 2018 Formula 1 Championship: A Content Analysis and Population Exposure. *BMJ Open* **2020**, *10* (8), e037035. https://doi.org/10.1136/bmjopen-2020-037035.

(286) Barker, A. B.; Smith, J.; Hunter, A.; Britton, J.; Murray, R. L. Quantifying Tobacco and Alcohol Imagery in Netflix and Amazon Prime Instant Video Original Programming Accessed from the UK: A Content Analysis. *BMJ Open* **2019**, *9* (2), e025807. https://doi.org/10.1136/bmjopen-2018-025807.

(287) BBC. Record-Breaking World Cup Figures for BBC. *BBC Sport*. July 16, 2018. https://www.bbc.co.uk/sport/football/44850988 (accessed 2021-08-06).

(288) Record Numbers Watched Women’s World Cup. *BBC Sport*. https://www.bbc.com/sport/football/50096999 (accessed 2022-08-10).

(289) Berger, A. A. *Dictionary of Advertising and Marketing Concepts*; Left Coast Press, 2013.

(290) Kasten, K. *Media Exposure and Risk: Proven Practices*; Elsevier, 2013.

(291) Dalton, M. A.; Tickle, J. J.; Sargent, J. D.; Beach, M. L.; Ahrens, M. B.; Heatherton, T. F. The Incidence and Context of Tobacco Use in Popular Movies from 1988 to 1997. *Prev Med* **2002**, *34* (5), 516–523. https://doi.org/10.1006/pmed.2002.1013.

(292) *IMDb*. https://help.imdb.com/article/imdb/track-movies-tv/ratings-faq/G67Y87TFYYP6TWAV# (accessed 2022-11-15).

(293) Lyons, A.; McNeill, A.; Britton, J. Tobacco Imagery on Prime Time UK Television. *Tobacco Control* **2014**, *23* (3), 257–263. https://doi.org/10.1136/tobaccocontrol-2012-050650.

(294) Cranwell, J.; Murray, R.; Lewis, S.; Leonardi-Bee, J.; Dockrell, M.; Britton, J. Adolescents' Exposure to Tobacco and Alcohol Content in YouTube Music Videos. *Addiction* **2015**, *110* (4), 703–711. https://doi.org/10.1111/add.12835.

(295) Lyons, A. Tobacco and Alcohol in Films and on Television, The University of Nottingham, 2012. http://eprints.nottingham.ac.uk/12482/1/Final_dfaft_thesis.pdf (accessed 2022-10-12).

(296) Kulkarni, M. M.; Kamath, V. G.; Cranwell, J.; Britton, J.; Nazar, G. P.; Arora, M.; Ballal, K.; Kamath, A. Assessment of Tobacco Imagery and Compliance with Tobacco-Free Rules in Popular Indian Films. *Tobacco Control* **2020**, *29* (1), 119–121. https://doi.org/10.1136/tobaccocontrol-2018-054613.

(297) *The nutrient profiling model*. GOV.UK. https://www.gov.uk/government/publications/the-nutrient-profiling-model (accessed 2022-02-21).

(298) Barker, A. B.; Bal, J.; Ruff, L.; Murray, R. L. Exposure to Tobacco, Alcohol and 'Junk Food' Content in Reality TV Programmes Broadcast in the UK between August 2019–2020. *Journal of Public Health* **2022**, fdac046. https://doi.org/10.1093/pubmed/fdac046.

(299) United Nations. *Strict alcohol laws which cut intake more than 40 per cent in Russia, linked to historically high life expectancy*. UN News. https://news.un.org/en/story/2019/10/1048282 (accessed 2021-09-28).

(300) Gallopel-Morvan, K.; Spilka, S.; Mutatayi, C.; Rigaud, A.; Lecas, F.; Beck, F. France's Évin Law on the Control of Alcohol Advertising: Content, Effectiveness and Limitations. *Addiction* **2017**, *112* (S1), 86–93. https://doi.org/10.1111/add.13431.

(301) Adams, J.; Coleman, J.; White, M. Alcohol Marketing in Televised International Football: Frequency Analysis. *BMC Public Health* **2014**, *14* (1), 473. https://doi.org/10.1186/1471-2458-14-473.

(302) Graham, A.; Adams, J. Alcohol Marketing in Televised English Professional Football: A Frequency Analysis. *Alcohol Alcohol* **2014**, *49* (3), 343–348. https://doi.org/10.1093/alcalc/agt140.

(303) *Learning on Screen*. https://learningonscreen.ac.uk/ (accessed 2021-08-06).

(304) Cranwell, J.; Opazo-Breton, M.; Britton, J. Adult and Adolescent Exposure to Tobacco and Alcohol Content in Contemporary YouTube Music Videos in Great Britain: A Population Estimate. *J Epidemiol*

Community Health **2016**, *70* (5), 488–492. https://doi.org/10.1136/jech-2015-206402.

(305) Sargent, J. D.; Stoolmiller, M.; Worth, K. A.; Dal Cin, S.; Wills, T. A.; Gibbons, F. X.; Gerrard, M.; Tanski, S. Exposure to Smoking Depictions in Movies: Its Association with Established Adolescent Smoking. *Arch Pediatr Adolesc Med* **2007**, *161* (9), 849–856. https://doi.org/10.1001/archpedi.161.9.849.

(306) Dixon, H. G.; Scully, M. L.; Wakefield, M. A.; White, V. M.; Crawford, D. A. The Effects of Television Advertisements for Junk Food versus Nutritious Food on Children's Food Attitudes and Preferences. *Soc Sci Med* **2007**, *65* (7), 1311–1323. https://doi.org/10.1016/j.socscimed.2007.05.011.

(307) Chang, F.; Miao, N.; Lee, C.; Chen, P.; Chiu, C.; Lee, S. The Association of Media Exposure and Media Literacy with Adolescent Alcohol and Tobacco Use. *J Health Psychol* **2016**, *21* (4), 513–525. https://doi.org/10.1177/1359105314530451.

(308) *What are the health risks of smoking?*. nhs.uk. https://www.nhs.uk/common-health-questions/lifestyle/what-are-the-health-risks-of-smoking/ (accessed 2022-08-12).

(309) Gendall, P.; Hoek, J.; Edwards, R.; Glantz, S. Effect of Exposure to Smoking in Movies on Young Adult Smoking in New Zealand. *PLOS ONE* **2016**, *11* (3), e0148692. https://doi.org/10.1371/journal.pone.0148692.

(310) Farrelly, M. C.; Kamyab, K.; Nonnemaker, J.; Crankshaw, E.; Allen, J. A. Movie Smoking and Youth Initiation: Parsing Smoking Imagery

and Other Adult Content. *PLOS ONE* **2012**, *7* (12), e51935. https://doi.org/10.1371/journal.pone.0051935.

(311) Alfayad, K.; Murray, R. L.; Britton, J.; Barker, A. B. Content Analysis of Netflix and Amazon Prime Instant Video Original Films in the UK for Alcohol, Tobacco and Junk Food Imagery. *Journal of Public Health* **2021**, No. fdab022. https://doi.org/10.1093/pubmed/fdab022.

(312) Critchlow, N.; Bauld, L.; Thomas, C.; Hooper, L.; Vohra, J. Awareness of Marketing for High Fat, Salt or Sugar Foods, and the Association with Higher Weekly Consumption among Adolescents: A Rejoinder to the UK Government's Consultations on Marketing Regulation. *Public Health Nutr 23* (14), 2637–2646. https://doi.org/10.1017/S1368980020000075.

(313) Hanewinkel, R.; Sargent, J. D. Exposure to Smoking in Popular Contemporary Movies and Youth Smoking in Germany. *Am J Prev Med* **2007**, *32* (6), 466–473. https://doi.org/10.1016/j.amepre.2007.02.025.

(314) Morgenstern, M.; Poelen, E. A. P.; Scholte, R.; Karlsdottir, S.; Jonsson, S. H.; Mathis, F.; Faggiano, F.; Florek, E.; Sweeting, H.; Hunt, K.; Sargent, J. D.; Hanewinkel, R. Smoking in Movies and Adolescent Smoking: Cross-Cultural Study in Six European Countries. *Thorax* **2011**, *66* (10), 875–883. https://doi.org/10.1136/thoraxjnl-2011-200489.

(315) Strasburger, V. C.; Jordan, A. B.; Donnerstein, E. Health Effects of Media on Children and Adolescents. *Pediatrics* **2010**, *125* (4), 756–767. https://doi.org/10.1542/peds.2009-2563.

(316) Livingstone, S.; Helsper, E. Advertising Foods to Children: Understanding Promotion in the Context of Children's Daily Lives. **2004**.

(317) Kelly, B.; Baur, L. A.; Bauman, A. E.; King, L. Tobacco and Alcohol Sponsorship of Sporting Events Provide Insights about How Food and Beverage Sponsorship May Affect Children's Health. *Health Promot J Austr* **2011**, *22* (2), 91–96. https://doi.org/10.1071/he11091.

(318) Bailey, R.; Wise, K.; Bolls, P. How Avatar Customizability Affects Children's Arousal and Subjective Presence during Junk Food-Sponsored Online Video Games. *Cyberpsychol Behav* **2009**, *12* (3), 277–283. https://doi.org/10.1089/cpb.2008.0292.

(319) The Telegraph. Netflix Hits the Buffers as Explosive UK Growth Cools. *The Telegraph*. August 12, 2017. https://www.telegraph.co.uk/business/2017/08/12/netflix-hits-buffers-explosive-uk-growth-cools/ (accessed 2021-08-06).

(320) Statista. *Netflix households in the UK 2014-2020*. Statista. https://www.statista.com/statistics/529734/netflix-households-in-the-uk/ (accessed 2021-08-06).

(321) Stoll, J. *Netflix subscribers count worldwide 2013-2021*. Statista. https://www.statista.com/statistics/250934/quarterly-number-of-netflix-streaming-subscribers-worldwide/ (accessed 2021-08-06).

(322) eMarketer. *Amazon prime has room to grow in the UK - eMarketer*. https://www.emarketer.com/Article/Amazon-Prime-Has-Room-Grow-UK/1015627 (accessed 2021-08-06).

(323) Dresden, B.; Barnard, J. Legal and Regulatory Controls on Advertising and Marketing to Children in the United Kingdom. *Young Consumers* **2003**, *5* (1), 77–83. https://doi.org/10.1108/17473610410814094.

(324) Valcke, P.; Stevens, D. Graduated Regulation of 'Regulatable' Content and the European Audiovisual Media Services Directive: One Small Step for the Industry and One Giant Leap for the Legislator? *Telematics and Informatics* **2007**, *24* (4), 285–302. https://doi.org/10.1016/j.tele.2007.01.004.

(325) bbfc. *View what's right for you*. Home. https://www.bbfc.co.uk/ (accessed 2021-08-06).

(326) Barrientos-Gutierrez, I.; Kollath-Cattano, C.; Mejía, R.; Arillo-Santillán, E.; Hanewinkel, R.; Morgenstern, M.; Sargent, J. D.; Thrasher, J. F. Comparison of Tobacco and Alcohol Use in Films Produced in Europe, Latin America, and the United States. *BMC Public Health* **2015**, *15* (1), 1096. https://doi.org/10.1186/s12889-015-2378-x.

(327) Barker, A. B.; Whittamore, K.; Britton, J.; Murray, R. L.; Cranwell, J. A Content Analysis of Alcohol Content in UK Television. *Journal of Public Health* **2019**, *41* (3), 462–469. https://doi.org/10.1093/pubmed/fdy142.

(328) Escalon, H.; Courbet, D.; Julia, C.; Srour, B.; Hercberg, S.; Serry, A.-J. Exposure of French Children and Adolescents to Advertising for Foods High in Fat, Sugar or Salt. *Nutrients* **2021**, *13* (11), 3741. https://doi.org/10.3390/nu13113741.

(329) Chandaria, J.; Hunter, J.; Williams, A. The Carbon Footprint of Watching Television, Comparing Digital Terrestrial Television with Video-on-Demand. In *Proceedings of the 2011 IEEE International Symposium on Sustainable Systems and Technology*; 2011; pp 1–6. https://doi.org/10.1109/ISSST.2011.5936908.

(330) Wayne, M. L. Netflix, Amazon, and Branded Television Content in Subscription Video on-Demand Portals. *Media, Culture & Society* **2018**, *40* (5), 725–741. https://doi.org/10.1177/0163443717736118.

(331) Ofcom. *Making video-on-demand services more accessible*. Ofcom. https://www.ofcom.org.uk/about-ofcom/latest/features-and-news/making-video-on-demand-programme-services-more-accessible (accessed 2021-08-06).

(332) Ofcom. *Children and Parents: Media Use and Attitudes Report 2019*; 2020. https://www.ofcom.org.uk/__data/assets/pdf_file/0023/190616/children-media-use-attitudes-2019-report.pdf.

(333) World Health Organization. *Alcohol*. https://www.who.int/news-room/fact-sheets/detail/alcohol (accessed 2021-08-06).

(334) World Health Organization. *Global Status Report on Alcohol and Health*; 2011. https://www.who.int/substance_abuse/publications/global_alcohol_report/msbgsruprofiles.pdf.

(335) Boyland, E. J.; Nolan, S.; Kelly, B.; Tudur-Smith, C.; Jones, A.; Halford, J. C.; Robinson, E. Advertising as a Cue to Consume: A Systematic Review and Meta-Analysis of the Effects of Acute

Exposure to Unhealthy Food and Nonalcoholic Beverage Advertising on Intake in Children and Adults. *Am J Clin Nutr* **2016**, *103* (2), 519–533. https://doi.org/10.3945/ajcn.115.120022.

(336) Cancer Research UK. *Teens likely to crave junk food after watching TV ads*. Cancer Research UK - Science blog. https://news.cancerresearchuk.org/2018/01/15/teens-likely-to-crave-junk-food-after-watching-tv-ads/ (accessed 2021-08-06).

(337) Zimmerman, F. J.; Shimoga, S. V. The Effects of Food Advertising and Cognitive Load on Food Choices. *BMC Public Health* **2014**, *14* (1), 342. https://doi.org/10.1186/1471-2458-14-342.

(338) Dovey, T. M.; Torab, T.; Yen, D.; Boyland, E. J.; Halford, J. C. G. Responsiveness to Healthy Advertisements in Adults: An Experiment Assessing beyond Brand Snack Selection and the Impact of Restrained Eating. *Appetite* **2017**, *112*, 102–106. https://doi.org/10.1016/j.appet.2017.01.015.

(339) World Health Organization. *Policies to limit marketing of unhealthy foods to children fall short of protecting their health and rights*. https://www.euro.who.int/en/health-topics/disease-prevention/nutrition/news/news/2018/10/policies-to-limit-marketing-of-unhealthy-foods-to-children-fall-short-of-protecting-their-health-and-rights (accessed 2021-08-06).

(340) Scully, M.; Dixon, H.; Wakefield, M. Association between Commercial Television Exposure and Fast-Food Consumption among Adults. *Public Health Nutr* **2009**, *12* (1), 105–110. https://doi.org/10.1017/S1368980008002012.

(341) Scully, M.; Wakefield, M.; Niven, P.; Chapman, K.; Crawford, D.; Pratt, I. S.; Baur, L. A.; Flood, V.; Morley, B.; NaSSDA Study Team. Association between Food Marketing Exposure and Adolescents' Food Choices and Eating Behaviors. *Appetite* **2012**, *58* (1), 1–5. https://doi.org/10.1016/j.appet.2011.09.020.

(342) ASA. *Advertising codes*. https://www.asa.org.uk/codes-and-rulings/advertising-codes.html (accessed 2021-08-06).

(343) Kończak, J. Sponsorship Communication in Poland during the Football World Cup in 2018. *Studia medioznawcze* **2019**, *19* (2). http://dx.doi.org/10.33077/uw.24511617.ms.2019.2.91.

(344) FIFA. *Partners*. https://www.fifa.com/about-fifa/commercial/origin1904-p.cxm.fifa.com/about-fifa/commercial/partners (accessed 2021-08-06).

(345) Al-Ansari, B.; Thow, A.-M.; Day, C. A.; Conigrave, K. M. Extent of Alcohol Prohibition in Civil Policy in Muslim Majority Countries: The Impact of Globalization. *Addiction* **2016**, *111* (10), 1703–1713. https://doi.org/10.1111/add.13159.

(346) Fernandez, K. *Rules and laws on drugs and alcohol in Saudi Arabia | Expatica*. Expat Guide to Saudi Arabia | Expatica. https://www.expatica.com/sa/living/gov-law-admin/rules-and-laws-on-drugs-and-alcohol-in-saudi-arabia-71303/ (accessed 2021-08-06).

(347) Expat Woman. *Alcohol in Saudi Arabia: A Complete Guide*. ExpatWoman.com. https://www.expatwoman.com/saudi-arabia/guide/faqs/alcohol-in-saudi-arabia-complete-guide (accessed 2021-08-06).

(348) AdC. *Changes in Russian alcohol advertising regulations.* http://adconsul.org/en/articles/45 (accessed 2021-10-03).

(349) *Belgium: Alcohol advertising self-regulation continues*. Movendi International. https://movendi.ngo/news/2019/04/21/belgium-alcohol-advertising-self-regulation-continues/ (accessed 2021-10-03).

(350) Harris, J. L.; Bargh, J. A.; Brownell, K. D. Priming Effects of Television Food Advertising on Eating Behavior. *Health Psychol* **2009**, *28* (4), 404–413. https://doi.org/10.1037/a0014399.

(351) Tarabashkina, L.; Quester, P.; Crouch, R. Food Advertising, Children's Food Choices and Obesity: Interplay of Cognitive Defences and Product Evaluation: An Experimental Study. *Int J Obes (Lond)* **2016**, *40* (4), 581–586. https://doi.org/10.1038/ijo.2015.234.

(352) O'Brien, K. S.; Kypri, K. Alcohol Industry Sponsorship and Hazardous Drinking among Sportspeople. *Addiction* **2008**, *103* (12), 1961–1966. https://doi.org/10.1111/j.1360-0443.2008.02371.x.

(353) *Center on Alcohol Marketing and Youth*. https://wwwapp.bumc.bu.edu/BEDAC_Camy (accessed 2021-08-06).

(354) Badenhausen, K. *Anheuser-Busch Launches Revolutionary Incentive-Based Sponsorship Model*. Forbes. https://www.forbes.com/sites/kurtbadenhausen/2018/04/02/anheuser-busch-launches-revolutionary-incentive-based-sponsorship-model/ (accessed 2021-08-06).

(355) CNBC. *McDonald's ends Olympics sponsorship deal early*. CNBC. https://www.cnbc.com/2017/06/16/mcdonalds-ends-olympics-sponsorship-deal-early.html (accessed 2021-08-06).

(356) Coca-Cola Australia. *Powerade Varieties*. https://www.coca-colacompany.com/au/brands/powerade (accessed 2021-08-06).

(357) Noel, J. K.; Babor, T. F.; Robaina, K. Industry Self-Regulation of Alcohol Marketing: A Systematic Review of Content and Exposure Research. *Addiction* **2017**, *112 Suppl 1*, 28–50. https://doi.org/10.1111/add.13410.

(358) Connor, J. P.; Kavanagh, D. J.; Andrade, J.; May, J.; Feeney, G. F. X.; Gullo, M. J.; White, A. M.; Fry, M.-L.; Drennan, J.; Previte, J.; Tjondronegoro, D. Alcohol Consumption in Young Adults: The Role of Multisensory Imagery. *Addict Behav* **2014**, *39* (3), 721–724. https://doi.org/10.1016/j.addbeh.2013.11.023.

(359) Paul, S.; Tom, E.; Petros, I. The Regulation of Television Sports Broadcasting: A Comparative Analysis. *Media, Culture & Society* **2015**, *37* (5), 720–736. https://doi.org/10.1177/0163443715577244.

(360) Fleming, M. *World Cup 2018 final in numbers: Global TV audience, Fifa's revenue and cost of hosting tournament*. The Sun. https://www.thesun.co.uk/world-cup-2018/6782884/world-cup-2018-final-in-numbers/ (accessed 2021-08-06).

(361) Richter, F. *Infographic: The Biggest Game on Earth?*. Statista Infographics. https://www.statista.com/chart/14646/fifa-world-cup-final-tv-viewership/ (accessed 2021-08-06).

(362) Barker, A. B.; Bal, J.; Murray, R. L. A Content Analysis and Population Exposure Estimate Of Guinness Branded Alcohol Marketing During the 2019 Guinness Six Nations. *Alcohol and*

Alcoholism **2021**, *56* (5), 617–620. https://doi.org/10.1093/alcalc/agab039.

(363) Pollitt, E. *Study: Gamers buying the booze that's advertised in games*. B&T. https://www.bandt.com.au/esports-alcohol-advertising/ (accessed 2021-10-04).

(364) Chambers, T. Alcohol Sponsorship and Esports: Reinforcing the Need for Legislative Restrictions on Alcohol Sponsorship. *Alcohol and Alcoholism* **2020**, *55* (2), 144–146. https://doi.org/10.1093/alcalc/agz104.

(365) Swinburn, B.; Vandevijvere, S.; Kraak, V.; Sacks, G.; Snowdon, W.; Hawkes, C.; Barquera, S.; Friel, S.; Kelly, B.; Kumanyika, S.; L'Abbé, M.; Lee, A.; Lobstein, T.; Ma, J.; Macmullan, J.; Mohan, S.; Monteiro, C.; Neal, B.; Rayner, M.; Sanders, D.; Walker, C.; INFORMAS. Monitoring and Benchmarking Government Policies and Actions to Improve the Healthiness of Food Environments: A Proposed Government Healthy Food Environment Policy Index. *Obes Rev* **2013**, *14 Suppl 1*, 24–37. https://doi.org/10.1111/obr.12073.

(366) Stewart, B. W.; Wild, C. P. *World Cancer Report 2014*; International Agency for Research on Cancer, 2014.

(367) Biro, F. M.; Wien, M. Childhood Obesity and Adult Morbidities1234. *Am J Clin Nutr* **2010**, *91* (5), 1499S-1505S. https://doi.org/10.3945/ajcn.2010.28701B.

(368) *Coca-Cola*. FIFA. https://www.fifa.com/about-fifa/commercial/partners/origin1904-p.cxm.fifa.com/about-fifa/commercial/partners/coca-cola (accessed 2022-03-25).

(369) Office for National Statistics. *Population estimates for the UK, England and Wales, Scotland and Northern Ireland - Office for National Statistics*. https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/mid2019estimates (accessed 2021-08-06).

(370) World Health Organization. *Marketing of Foods High in Fat, Salt and Sugar to Children: Update 2012-2013*; 2013. https://www.euro.who.int/__data/assets/pdf_file/0019/191125/e96859.pdf.

(371) Woodruff, K. Alcohol Advertising and Violence Against Women: A Media Advocacy Case Study. *Health Education Quarterly* **1996**, *23* (3), 330–345. https://doi.org/10.1177/109019819602300305.

(372) Jones, S.; Reid, A. Sex and Sexism in Australian Alcohol Advertising: (Why) Are Women More Offended than Men? *Faculty of Health and Behavioural Sciences - Papers (Archive)* **2011**, 211–230.

(373) Atkinson, A. M.; Meadows, B. R.; Emslie, C.; Lyons, A.; Sumnall, H. R. 'Pretty in Pink' and 'Girl Power': An Analysis of the Targeting and Representation of Women in Alcohol Brand Marketing on Facebook and Instagram. *International Journal of Drug Policy* **2022**, *101*, 103547. https://doi.org/10.1016/j.drugpo.2021.103547.

(374) Emslie, C.; Hunt, K.; Lyons, A. Older and Wiser? Men's and Women's Accounts of Drinking in Early Mid-Life. *Sociology of Health & Illness* **2012**, *34* (4), 481–496. https://doi.org/10.1111/j.1467-9566.2011.01424.x.

(375) Ofcom. *Section nine: Commercial references on TV*. Ofcom. https://www.ofcom.org.uk/tv-radio-and-on-demand/broadcast-codes/broadcast-code/section-nine-commercial-references-tv (accessed 2021-08-07).

(376) MacLean, A.; Bonington, J. Sports Sponsorship in the UK: The Impact of Regulatory Intervention. *Journal of Sponsorship* **2008**, *1* (4), 380–387.

(377) Boyland, E. J.; Harrold, J. A.; Dovey, T. M.; Allison, M.; Dobson, S.; Jacobs, M.-C.; Halford, J. C. G. Food Choice and Overconsumption: Effect of a Premium Sports Celebrity Endorser. *J Pediatr* **2013**, *163* (2), 339–343. https://doi.org/10.1016/j.jpeds.2013.01.059.

(378) Kraak, V. I.; Story, M. Influence of Food Companies' Brand Mascots and Entertainment Companies' Cartoon Media Characters on Children's Diet and Health: A Systematic Review and Research Needs. *Obes Rev* **2015**, *16* (2), 107–126. https://doi.org/10.1111/obr.12237.

(379) Alfayad, K.; Murray, R. L.; Barker, A. B. Population Exposure to Junk Food Advertising during the 2019 FIFA Women's World Cup: Implications for Public Health, University of Nottingham, Nottingham, UK, 2021.

(380) White, A. M. Gender Differences in the Epidemiology of Alcohol Use and Related Harms in the United States. *Topic Series: Women and Alcohol* **2020**, *40* (2).

(381) *Excessive Alcohol Use and Risks to Men's Health*. CDC. https://www.cdc.gov/alcohol/fact-sheets/mens-health.htm (accessed 2021-11-15).

(382) *Alcohol sponsorship of women's football questioned*. Gateshead Council. https://www.gateshead.gov.uk/article/11978/Alcohol-sponsorship-of-women-s-football-questioned (accessed 2021-11-15).

(383) Women's Sports Foundation. *Benefits - Why Sports Participation for Girls and Women*. Women's Sports Foundation. https://www.womenssportsfoundation.org/advocacy/benefits-sports-participation-girls-women/ (accessed 2021-12-15).

(384) Meredith, R. Female Role Models "vital" for Girls in Sport, Stormont Research Shows. *BBC News*. April 20, 2021. https://www.bbc.com/news/uk-northern-ireland-56802667 (accessed 2021-12-15).

(385) Brook, S. Heineken Targets the Women Other Beers Do Not Reach. *The Guardian*. September 27, 2004. https://www.theguardian.com/media/2004/sep/27/advertising1 (accessed 2022-01-10).

(386) Glenday, J. *Heineken backs women's sport with Euro 2022, Champion's League and W Series sponsorships*. The Drum. https://www.thedrum.com/news/2021/08/27/heineken-backs-women-s-sport-with-euro-2022-champion-s-league-and-w-series (accessed 2021-11-15).

(387) d'Angelo, C.; Gloinson, E. R.; Draper, A.; Guthrie, S. *Food Consumption in the UK: Trends, Attitudes and Drivers*; RAND Europe: Santa Monica, California; Cambridge, UK, 2020.

(388) Aboagye, H. *Why women's sports enthusiasts are a vital but untapped audience for British brands*. Fourth Source. https://www.fourthsource.com/branding/why-womens-sports-enthusiasts-are-a-vital-but-untapped-audience-for-british-brands-23955 (accessed 2021-12-15).

(389) Benjamin, K. *Facebook and AA hit back at claims from teen-led campaign against HFSS ads*. https://www.campaignlive.co.uk/article/facebook-aa-hit-back-claims-teen-led-campaign-against-hfss-ads/1708631?utm_source=website&utm_medium=social (accessed 2022-01-10).

(390) Green, T. *Why Are Men's Sports More Valued Than Women's?* Dolphin Media. https://judolphinmedia.com/22438/news/why-are-mens-sports-more-valued-than-womens/ (accessed 2021-11-15).

(391) BBC. *Women's World Cup 2019 breaks viewing records on the BBC*. https://www.bbc.co.uk/mediacentre/latestnews/2019/bbc.com/mediacentre/latestnews/2019/womens-world-cup-audience/ (accessed 2021-08-06).

(392) FIFA. *FIFA women's world cup 2019 watched by more than 1 billion*. https://www.fifa.com/tournaments/womens/womensworldcup/france2019/news/fifa-women-s-world-cup-2019tm-watched-by-more-than-1-billion (accessed 2021-08-06).

(393) Critchlow, N.; Newberry Le Vay, J.; MacKintosh, A. M.; Hooper, L.; Thomas, C.; Vohra, J. Adolescents' Reactions to Adverts for Fast-Food and Confectionery Brands That Are High in Fat, Salt, and/or Sugar (HFSS), and Possible Implications for Future Research and Regulation: Findings from a Cross-Sectional Survey of 11–19 Year Olds in the United Kingdom. *Int J Environ Res Public Health* **2020**, *17* (5), 1689. https://doi.org/10.3390/ijerph17051689.

(394) Murray, K. *Nicotine And Alcohol*. Alcohol Rehab Guide. https://www.alcoholrehabguide.org/blog/nicotine-and-alcohol/ (accessed 2021-12-15).

(395) *UK Health Security Agency*. GOV.UK. https://www.gov.uk/government/organisations/uk-health-security-agency (accessed 2021-12-13).

(396) Odgers, C. L.; Caspi, A.; Nagin, D. S.; Piquero, A. R.; Slutske, W. S.; Milne, B. J.; Dickson, N.; Poulton, R.; Moffitt, T. E. Is It Important to Prevent Early Exposure to Drugs and Alcohol Among Adolescents? *Psychol Sci* **2008**, *19* (10), 1037–1044. https://doi.org/10.1111/j.1467-9280.2008.02196.x.

(397) Duke University. *Early Exposure To Drugs, Alcohol Creates Lifetime Of Health Risk*. ScienceDaily. https://www.sciencedaily.com/releases/2008/10/081016124244.htm (accessed 2021-12-13).

(398) Murray, F. *Why banning alcohol advertising for young people is the right move*. The Irish Times. https://www.irishtimes.com/opinion/why-

banning-alcohol-advertising-for-young-people-is-the-right-move-1.3156702 (accessed 2021-08-06).

(399) Nikel, D. *Alcohol in Norway: Regulations, Tax Rates & Where to Buy It*. Life in Norway. https://www.lifeinnorway.net/alcohol-in-norway/ (accessed 2021-12-13).

(400) OECD. *Preventing Harmful Alcohol Use*; OECD Health Policy Studies; OECD, 2021. https://doi.org/10.1787/6e4b4ffb-en.

(401) Jónsson, R. M.; Kristjánsson, S. Alcohol Policy and Public Opinion in Iceland, 1989-2012. *Nordic Studies on Alcohol and Drugs* **2013**, *30* (6), 539–549. https://doi.org/10.2478/nsad-2013-0050.

(402) Young, E. *How Iceland Got Teens to Say No to Drugs*. The Atlantic. https://www.theatlantic.com/health/archive/2017/01/teens-drugs-iceland/513668/ (accessed 2021-12-13).

(403) Russia Slaps Ban on Alcohol Advertising in Media. *BBC News*. July 23, 2012. https://www.bbc.com/news/world-europe-18960770 (accessed 2021-12-13).

(404) Yerby, N. *Alcohol Consumption In Russia Has Declined By 43% Since 2003*. Addiction Center. https://www.addictioncenter.com/news/2019/10/alcohol-consumption-russia-decline/ (accessed 2021-12-13).

(405) Bhattacharya, J.; Gathmann, C.; Miller, G. The Gorbachev Anti-Alcohol Campaign and Russia's Mortality Crisis. *Am Econ J Appl Econ* **2013**, *5* (2), 232–260.

(406) Neufeld, M.; Bunova, A.; Gornyi, B.; Ferreira-Borges, C.; Gerber, A.; Khaltourina, D.; Yurasova, E.; Rehm, J. Russia's National Concept to

Reduce Alcohol Abuse and Alcohol-Dependence in the Population 2010–2020: Which Policy Targets Have Been Achieved? *Int J Environ Res Public Health* **2020**, *17* (21), 8270. https://doi.org/10.3390/ijerph17218270.

(407) Levintova, M. Russian Alcohol Policy in the Making. *Alcohol and Alcoholism* **2007**, *42* (5), 500–505. https://doi.org/10.1093/alcalc/agm040.

(408) *Lack of regulation leaves door open to harmful digital marketing of alcohol*. World Health Organization. https://www.euro.who.int/en/health-topics/disease-prevention/alcohol-use/news/news/2020/07/lack-of-regulation-leaves-door-open-to-harmful-digital-marketing-of-alcohol (accessed 2021-12-13).

(409) Meiksin, R.; Er, V.; Thompson, C.; Adams, J.; Boyland, E.; Burgoine, T.; Cornelsen, L.; de Vocht, F.; Egan, M.; Lake, A. A.; Lock, K.; Mytton, O.; White, M.; Yau, A.; Cummins, S. Restricting the Advertising of High Fat, Salt and Sugar Foods on the Transport for London Estate: Process and Implementation Study. *Social Science & Medicine* **2021**, 114548. https://doi.org/10.1016/j.socscimed.2021.114548.

(410) Leonard-Bedwell, N. *Report criticises 'health halo effect' used to market HFSS products to teens*. The Grocer. https://www.thegrocer.co.uk/health/report-criticises-health-halo-effect-used-to-market-hfss-products-to-teens/661089.article (accessed 2021-12-13).

(411) Morrison, O. *Report calls out 'health halos' on HFSS products aimed at teens*. foodnavigator.com. https://www.foodnavigator.com/Article/2021/10/25/Report-calls-out-health-halos-on-HFSS-products-aimed-at-teens (accessed 2021-12-13).

(412) Viggars, M. *#WhereEveryonePays: Sponsorship of Football by HFSS Brands*. Healthy Stadia. https://healthystadia.eu/whereeveryonepays-sponsorship-of-football-by-hfss-brands/ (accessed 2021-12-13).

(413) ASA. *Advertising codes*. https://www.asa.org.uk/codes-and-rulings/advertising-codes.html (accessed 2021-08-06).

(414) Sheldon, M. *The United Kingdom will limit the promotion of foods high in fat, sugar and salt*. NYC Food Policy Center (Hunter College). https://www.nycfoodpolicy.org/food-policy-snapshot-uk-hfss-foods-promotion-restriction/ (accessed 2021-08-06).

(415) Bradley, S. D. Neural Network Simulations Support Heuristic Processing Model of Cultivation Effects. *Media Psychology* **2007**, *10* (3), 449–469. https://doi.org/10.1080/15213260701533078.

(416) Li, Z. TV Series Exposure and Its Influence on American People's Social Judgments toward Asian Americans. *Theses - ALL* **2020**.

(417) Leiva, M. T. G. VoD Platforms and Prominence: A European Regulatory Approach: *Media International Australia* **2020**, *180* (1). https://doi.org/10.1177/1329878X20967456.

(418) *Video on Demand market size, share & COVID-19 impact analysis, by revenue model (subscription video on demand (SVOD), transactional video on demand (TVoD), advertisement based video on demand*

(AVOD)), content type (sports, music, TV entertainment, kids, movies, and others), and regional forecast, 2020-2027. Fortune Business Insights. https://www.fortunebusinessinsights.com/industry-reports/video-on-demand-market-100140 (accessed 2021-12-15).

(419) FIFA. *More than half the world watched record-breaking 2018 World Cup*. https://www.fifa.com/tournaments/mens/worldcup/2018russia/media-releases/origin1904-p.cxm.fifa.commore-than-half-the-world-watched-record-breaking-2018-world-cup (accessed 2021-12-15).

(420) Barker, A. B.; Britton, J.; Grant-Braham, B.; Murray, R. L. Alcohol Audio-Visual Content in Formula 1 Television Broadcasting. *BMC Public Health* **2018**, *18* (1), 1155. https://doi.org/10.1186/s12889-018-6068-3.

(421) Alonso Dos Santos, M.; Pérez Campos, C.; Crespo Hervás, J. The Effectiveness of Advertising Alcohol Products in Sports Sponsorship. *Psychology & Marketing* **2020**, *37* (4), 556–563. https://doi.org/10.1002/mar.21325.

(422) Carr, S.; O'Brien, K. S.; Ferris, J.; Room, R.; Livingston, M.; Vandenberg, B.; Donovan, R. J.; Lynott, D. Child and Adolescent Exposure to Alcohol Advertising in Australia's Major Televised Sports. *Drug and Alcohol Review* **2016**, *35* (4), 406–411. https://doi.org/10.1111/dar.12326.

(423) *Governance of Sport*; 2014. https://publications.parliament.uk/pa/bills/lbill/2014-2015/0020/15020.pdf.

(424) Chambers, T.; Sassi, F. Unhealthy Sponsorship of Sport. *BMJ : British Medical Journal (Online)* **2019**, *367*. https://doi.org/10.1136/bmj.l6718.

(425) Gould, E. Trade Treaties and Alcohol Advertising Policy. *Journal of Public Health Policy* **2005**, *26* (3), 359–376.

(426) Roberts, K.; Dowell, A.; Nie, J.-B. Attempting Rigour and Replicability in Thematic Analysis of Qualitative Research Data; a Case Study of Codebook Development. *BMC Medical Research Methodology* **2019**, *19* (1), 66. https://doi.org/10.1186/s12874-019-0707-y.

(427) Ballan, L.; Bertini, M.; Jain, A. A System for Automatic Detection and Recognition of Advertising Trademarks in Sports Videos. In *Proceedings of the 16th ACM international conference on Multimedia*; MM '08; Association for Computing Machinery: New York, NY, USA, 2008; pp 991–992. https://doi.org/10.1145/1459359.1459544.