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A systematic review of research exploring the response of consumers, retailers and tobacco companies to standardised packaging in the United Kingdom

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BE THE DIFFERENCE

Acknowledgements

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What this study adds:

- **Standardised packaging for cigarettes and rolling tobacco is associated with increased salience of health warnings, but more evidence is needed regarding other impacts on consumers, particularly smoking behavioural outcomes.**

- **Tobacco companies delayed the implementation of standardised packaging.**

- **Compliance with the legislation was high, although retailers continued to sell some cigarettes and rolling tobacco in fully-branded packaging after standardised packaging was mandatory.**

- **Standardised packaging was associated with an increase in the price of cigarettes and rolling tobacco.**

- **Future tobacco control policy options include fixed pack sizes, pack inserts promoting cessation and dissuasive cigarettes.**

Abstract

Introduction

The UK fully implemented standardised packaging for cigarettes and rolling tobacco in May 2017, after a twelve month transition period. We conducted a systematic review of published research exploring consumer, tobacco company and retail response to this policy.

Methods

We searched for peer-reviewed published studies which explored consumer, retailer or tobacco company response to standardised packaging in the UK. Studies were screened against inclusion criteria. Data from included studies were extracted into standardised forms and each study was critically appraised. Findings were reported by narrative synthesis.

Results

Eleven papers, reporting on ten studies, were included, with five studies examining consumer responses to standardised packaging, and five studies exploring the response of tobacco companies and changes in the retail environment. In three consumer studies standardised packaging was associated with increased warning salience, but there was limited evidence of the impacts on smoking behaviour. Evidence from tobacco company and retail studies showed that standardised packs were not widely available until late in the transition period, although compliance with the legislation was high. Tobacco prices, for rolling tobacco and for cigarettes in each price segment (premium, mid-price, value), increased from May 2016 to October 2017.

Discussion

Standardised packaging appears to have increased warning salience but there is a need for research, after it was fully implemented, on perceptions of appeal and harm, behavioural impact, and unintended consequences, if any. Possible pack, price and retail related policy options are discussed.

Executive Summary

Background / Introduction

The 'Standardised Packaging of Tobacco Products Regulations' and 'Tobacco and Related Products Regulations' requires cigarettes and rolling tobacco, which constitute most of the tobacco market in the UK, to come in drab brown coloured packs with pictorial health warnings on at least 65% of the principal display areas and text warnings on at least 50% of the secondary display areas. Aside from being a uniform drab brown colour, the legislation bans these packs from featuring any markings or financial incentives (including price-marks), or information which promotes a product or encourages consumption by creating an erroneous impression about its characteristics or any reference to taste, smell or flavour. The legislation also sets a minimum pack size of 20 sticks for cigarettes and 30 grams for hand-rolling tobacco. We hereafter refer to these as standardised packs. Tobacco companies were given a twelve month phase-in period, between 20 May 2016 and 19 May 2017, to transition from fully-branded to standardised packs.

Aims

The primary aim was to conduct a systematic review of all published research exploring the response of consumers, tobacco companies and retailers to standardised packaging in the UK. The findings will inform the Department of Health and Social Care's Post-Implementation Review in 2020. The secondary aim was to outline future pack, price or retail related policy options based on the response of tobacco companies and retailers and consideration of standardised packaging legislation elsewhere.

Methods

The search strategy included searches for peer-reviewed studies in the academic literature from generic and topic-specific electronic databases from various fields (health, business and marketing, social sciences, psychology and anthropology) and contact with individuals who had previously been involved in work on tobacco packaging in the UK. The search results were screened against inclusion criteria to identify potentially relevant studies. All peer-reviewed research that had been published or accepted for publication (by 15 February 2019), and which explored consumer, retailer or tobacco company response to standardised tobacco packaging in the UK, was eligible for inclusion. There were no limits on study design, although work focusing exclusively on legal aspects of standardised packaging was not eligible for inclusion. Each included study was externally critically appraised. Data from studies identified as meeting the inclusion criteria were extracted into standardised data extraction forms. A narrative synthesis was employed as a meta-analysis was not feasible given the heterogeneity of outcome measures and study designs employed.

Key findings and conclusions

A total of 350 records were identified following initial searching, and after screening 11 journal articles, describing ten studies, were included. Five studies explored consumer responses to standardised packaging and five explored tobacco companies' responses and changes in the retail environment.

All five consumer studies were conducted during the transition period, when both fully-branded and standardised packs were on the market. Three studies found that the health warnings were more salient on standardised packs. One study found that the look of standardised packs was associated with greater thoughts of the health risks associated with smoking. No studies assessed appeal. Three studies explored behavioural outcomes, with one finding that the likely response of smokers to the legislation would be to cut down smoking (60%) or to quit (46%); one study found that the look of

standardised packs was associated with greater thoughts of quitting; and one study that standardised packaging might encourage switching to other tobacco products or to e-cigarettes.

The studies exploring tobacco companies' response to standardised packaging and changes in the retail environment showed that standardised packs were not widely available until the end of the twelve month transition period. They also showed that compliance with the legislation was high, although retailers continued to sell some cigarettes and rolling tobacco in fully-branded packaging after standardised packaging was mandatory. In terms of pricing, these studies suggested that recommended retail pricing (RRP) and sales prices of leading rolling tobacco variants and leading cigarettes (in all price-segments) increased from May 2016 to October 2017.

This review found a relatively small number of publications and studies exploring how consumers, retailers or tobacco companies responded to standardised packaging in the UK. By synthesising this research, which involved the use of diverse research methods and samples, a strength of this review is that it provides a fuller picture of what has happened in the UK market since standardised packaging was phased-in from May 2016. All included studies were externally critically appraised for study quality. In terms of limitations, the review was restricted to studies published as peer reviewed articles, and data extraction was conducted by only a single reviewer. With respect to the studies included, all the consumer studies were conducted during the transition period, which offers no insight into response to standardised packaging when all packs on the market are standardised and no longer novel. In addition, the surveys were cross-sectional, and reliant on convenience sampling and self-report.

Possible future policy options

The report ends by considering possible pack, price and retail related policy options, based on the studies reviewed and consideration of standardised packaging legislation elsewhere.

1   Introduction/Background

While smoking prevalence and consumption are in long-term decline in the UK, smoking remains the leading cause of premature death. For instance, in 2016 in England there were 77,900 of deaths attributable to smoking, representing almost one in six of all deaths.[1] Nearly four in ten (37.7%) cancer cases in 2015 were attributable to known risk factors, with smoking contributing to 15.1% of all attributable cancer cases, far higher than for other causes.[2] To reduce the morbidity and mortality associated with smoking a raft of tobacco control measures have been introduced across the UK this century, including a ban on tobacco advertising, promotion and sponsorship, the inclusion of pictorial warnings on the packaging of tobacco products (although only on the pack reverse), and a ban on the open display of tobacco products within tobacco selling retailers. However, fully-branded tobacco packaging is a powerful promotional tool and remained so in spite of these policy changes.

1.1   Regulatory steps towards standardised packaging

In 2011, the UK Government's White Paper 'Healthy Lives: Healthy People' set out a Tobacco Control Plan to discourage smoking initiation and encourage cessation,[3] with one of the key actions to consult on possible options to reduce the promotional impact of packaging. The Public Health Research Consortium was subsequently funded to conduct a systematic review of the potential impacts of standardised tobacco packaging,[4,5] which formed the basis of the UK Government's public consultation in 2012. An update to the review was published in September 2013.[6] In September 2013 the Scottish Government announced that it would introduce standardised (or 'plain') packaging, while the UK Secretary of State for Health announced that the decision would be postponed until further evidence emerged from Australia. In November 2013 the UK Government announced an amendment to the Children and Families Bill, which enabled the introduction of standardised packaging, and set up a further independent review of standardised packaging by Sir Cyril Chantler. Chantler was tasked with reviewing the evidence related to standardised packaging, including the systematic review and update, tobacco industry documents and evidence from Australia.

In June 2014, the consultation on the introduction of regulations for standardised packaging was published, with draft regulations sent to the EU for scrutiny in August 2014. In February 2015 the Department of Health's Impact Assessment of standardised packaging suggested that it would lead to a net benefit of £25 billion to the UK Government ten years post-implementation. In March 2015, MPs in the House of Commons voted in favour of standardised packaging, with Philip Morris International and British American Tobacco filing separate lawsuits challenging the legislation in March 2015. In May 2016, a day before standardised packaging was due to come into force, the High Court ruled that the legislation could proceed.

1.2   Changes to the packaging

The 'Standardised Packaging of Tobacco Products Regulations'[7] and the 'Tobacco and Related Products Regulations',[8] which transposes the 'Tobacco Products Directive'[9] into UK law, were phased in between 20 May 2016 and 19 May 2017, making the UK the third country to fully implement this measure, following Australia in December 2012 and France in January 2017. The legislation requires all cigarettes and rolling tobacco sold in the UK to come in 'drab brown' coloured packs. These packs must display pictorial health warnings on at least 65% of the principal display areas, with these warnings required to be at least 52mm wide and 44mm high. A general warning (Smoking kills – quit now) and information message (Tobacco smoke contains over 70 substances known to cause cancer) are required to cover at least 50% of the secondary display areas, start from the bottom of the pack, and have a minimum width of 20mm. Packs are allowed to display a brand and variant name, but the position on the surface area on which they appear, as well as the font size, style and typeface, and text colour is standardised, see Figure 1.

Standardised packs are not allowed to feature any other markings or financial incentives (such as price-marks), or information which promotes a product or encourages consumption by creating an erroneous impression about its characteristics (e.g. that it is less harmful than other brands) or any reference to taste, smell or flavour. The legislation also sets a minimum pack size of 20 sticks for factory-made cigarettes and 30 grams for hand-rolling tobacco. Factory-made cigarettes must come in flip-top packs or shoulder boxes, and be cuboid shaped, although bevelled or rounded edges are permitted.

Figure 1: Example of fully-branded pack and standardised packs (pack front and reverse shown for each)

1.3   Objectives of standardised packaging

The primary aims of standardised packaging are to discourage initiation, encourage cessation, and help ex-smokers avoid relapse. It is predicted that standardised packaging will achieve this aim by reducing the appeal of tobacco products, increasing the effectiveness of the on-pack warnings, reducing the ability of the pack to mislead consumers about the harms of smoking, and having a positive effect on smoking-related attitudes, beliefs, intentions and behaviours.[10]

1.4   Aims of this review

Building upon the systematic review of standardised packaging research[4,5] and an update of the literature,[6] a Cochrane review was conducted in 2017.[11] As the cut-off date for study inclusion in the Cochrane review was January 2016, before the start of the transition period in the UK (May 2016), there was a need to update the evidence for standardised packaging in the UK. Our primary aim was to synthesise research exploring how consumers, retailers and tobacco companies have responded to standardised packaging in order to help understand the impacts of the policy, including any unintended consequences.

As Section 21 of the Standardised Packaging of Tobacco Products Regulations requires the Secretary of State to publish a report within five years of the regulations coming into force to assess the extent to which the objectives of standardised packaging are being met and whether those objectives remain appropriate,[7] a secondary aim was to outline possible future pack, price or retail related policy options based on the response of tobacco companies and retailers and consideration of standardised packaging legislation elsewhere. The findings, and discussion of future options for extending standardised packaging, will feed into this Post-Implementation Review.

2 Project Aims/Objective

2.1 Aims

The primary aim of the project was to synthesise research exploring how consumers, retailers and tobacco companies have responded to standardised packaging in order to help understand the impacts of the policy, including any unintended consequences. A secondary aim was to outline possible future pack, price or retail related policy options based on the response of tobacco companies and retailers and consideration of standardised packaging legislation elsewhere.

2.1.1 Research questions

The review aimed to answer the following research questions:
1. What effect, if any, does standardised packaging have on socio-cognitive outcomes, including changes in the salience of health warnings, appeal of packaging, and perceptions of product strength and harm?
2. What effect, if any, does standardised packaging have on smoking-related behavioural intentions and behavioural outcomes, including cessation, cessation-related behaviours (e.g. accessing a cessation service), consumption and switching to other products (e.g. non-combustible nicotine containing products, illicit tobacco)?
3. Are there any differential effects in response to standardised packaging by sex, age, socio-economic status and ethnicity?
4. Have tobacco companies and retailers altered their pricing practices in response to standardised packaging, and if so how?
5. To what extent have tobacco companies and retailers complied with standardised packaging regulations?
6. Have tobacco companies and retailers continued to promote tobacco products following the introduction of standardised packaging, and if so how?

3   Design and Methods

3.1   Inclusion and exclusion criteria

To understand the impacts of standardised packaging, all peer-reviewed research that had been published or accepted for publication in an academic journal, and which explored consumer, retailer or tobacco company response to standardised tobacco packaging in the UK, was eligible for inclusion. Peer-reviewed conference abstracts, while providing less detail, were also eligible. The evaluation of standardised packaging in Australia similarly included research exploring the response of consumers, retailers and tobacco companies.[12]

All primary study designs and data collection methods were eligible for inclusion, although we excluded work focusing exclusively on legal aspects of standardised packaging as this was beyond the remit of our review. Reviews, editorials and news items were ineligible. Studies not accepted for publication, or which ended before the start of the transition period (20 May 2016), were excluded.

3.2   Search strategy and study selection procedure

The search strategy involved systematic searches for peer-reviewed studies in the academic literature from generic and topic-specific electronic databases from various fields (health, medicine, business and marketing, social sciences, psychology and anthropology) that are subscribed to by the University of Stirling. These included: Business Source Complete, Cochrane Library, Medline, PsycINFO, SocINDEX, World Advertising Research Center, Web of Science Core Collection. The search terms were a combination of tobacco-related terms, packaging-related terms and terms for the UK (see Appendix 1 for a sample search strategy). The Bielefeld Academic Search Engine (BASE) for online institutional repositories and the Society for Research on Nicotine and Tobacco (SRNT)-Europe 2018 and SRNT 2019 conference programmes were also searched with a selection of these terms. A Web of Science Citation Search was made for publications citing previous reviews of standardised packaging.[5,11,13-15] In addition, we contacted individuals who had previously been involved in work on tobacco packaging in the UK to gauge awareness of research that had not been retrieved in the searches.

All searches were run on 15 August 2018, with results limited to records published since the beginning of 2016. No language limitations were applied. All results were uploaded to a RefWorks database and duplicate records were removed. All the searches were run again on 15 February 2019 with results limited to records published since the beginning of 2018 and/or added to the database since 2018. Results were uploaded to the same database and duplicate records were removed.

Study titles and abstracts were screened by one reviewer against the inclusion criteria (described above), to identify potentially relevant studies. Potentially relevant studies identified at this stage were obtained in full text and screened for relevance by one reviewer. A second reviewer checked the inclusion/exclusion decisions made at both screening stages. Those not meeting the inclusion criteria were eliminated.

3.3   Critical appraisal

Each of the studies was appraised for methodological soundness. The assessment was completed by two external assessors (AOE and DK, from the EPPI-Centre, Institute of Education, University College London) due to the potential conflict of interest resulting from the researchers in the systematic review team being co-authors on some of the included studies. The two external assessors conducted independent critical appraisals using EPPI-Reviewer 4 software.[16] They met after the first study appraised to discuss the appraisal tool, make adaptations to enhance clarity of the tool, and reconcile

any disagreements in the appraisal. The external assessors then met to discuss and reconcile their appraisals after every few studies.

Four different quality tools were used, depending on the type of study being assessed, as described in section 3.3.1.

3.3.1 Development and description of the critical appraisal tools

It was determined that there were four broad categories of research design in the sample of studies:

1. Qualitative analysis of interview data
2. Quantitative analysis of sales data
3. Quantitative analysis of data from human participants (two sub-types: survey data and experimental data)
4. Structured observations of documents or places

The external assessors started with an informal (i.e. not systematic) search for critical appraisal, quality assessment, and risk of bias tools for each of these study designs. They conducted search engine searches; examined tools that they had used in the past; looked at the tools used in other systematic reviews; explored the list of public code sets available through EPPI-Reviewer 4 software;[16] and consulted the resources and publications pages of various research groups and organisations known to work on systematic review methods (e.g. Cochrane, Critical Appraisal Skills Programme). On the basis of this exploratory work, the external assessors determined that no existing tool was completely fit for purpose and therefore developed tools as described below.

For *qualitative analysis of interview data* studies, they used the Critical Appraisal Skills Programme (CASP)[17] Checklist for qualitative studies, but made several changes:
- Removed the item, "Is a qualitative methodology appropriate?"
- Removed the item, "How valuable is the research?"
- Added the item, "Was the data analysis sufficiently described?"
- Added the item, "Are the conclusions appropriate given the analyses and results?"
- Added the item, "Overall, are there concerns about the soundness of the study?"
- Restructured the checklist to reflect the same structure as the other tools as much as possible

The final "qualitative" tool contained 11 items under five domains: Aims, Data collection, Analysis, Contributions and Conclusions, and an Overall Summary; see Appendix 2.

Developing a tool for studies using *quantitative analysis of sales data* was less straightforward, as it appeared that there were no suitable tools to adapt. Even existing systematic reviews of sales data used tools that were intended for other research designs and commented in their discussion sections that the quality appraisal was limited as a result. One of the external assessors (AOE) ultimately constructed a completely new tool based on existing knowledge of statistics and quantitative research and added to this by consulting the limitations sections of systematic reviews of sales data to determine any methodological issues that might be distinct to this sort of data source. Both external assessors (AOE and DK) then made several iterations of refinements until the tool seemed fit for purpose. Importantly, most of the development of the tool was made in ignorance of the content of the primary studies to be assessed, so that the tool was not unduly tailored to the sample in this review. The final "sales data" tool contains 22 items under five domains: Aims, Data, Analysis, Inferences and Conclusions, and an Overall Summary (Appendix 2).

For the studies using *quantitative analysis of data from human participants,* the external assessors wanted the items and structure to be as comparable to the other tools as possible. They therefore constructed a tool by adapting the "sales data" tool described above and integrating some items from the "Surveys" quality appraisal tool used in a previous systematic review on plain packaging,[4] plus

some items from their own knowledge and experience. The core items applied to all quantitative studies with human participant data and they constructed an additional, optional sub-section specifically for appraising experimental studies. The final "human participants" tool contains 18 items under five domains: Aims, Data, Analysis, Inferences and Conclusions, and an Overall Summary; plus, an additional section on "Experiment" consisting of five items; see Appendix 2.

For the structured observations studies which reflected structured data collection from documents and site visits, the external assessors adapted the "sales data" tool described above. Additional criteria were sourced and adapted from quality assessment tools used to assess structured observations/documentary studies (see HM Treasury[18]) as well as the authors' own experiences of conducting documentary analysis studies. After initial development, DK and AOE made iterations to the tool, and as above, most of the development of the tool was made in ignorance of the content of the primary studies to be assessed. The final "structured observations" tool contains 23 items under five domains: Aims, Data, Analysis, Inferences and Conclusions, and an Overall Summary; see Appendix 2.

3.3.2   Basis of assessment

The critical appraisals focused largely on the methodological procedures employed in the studies, and the link between the methods and the aims and conclusions of the study. It was therefore important to conduct an appraisal on each methodological component of a given study, as the rigour might differ from component to component. The critical appraisal assessed 14 methodological components of 10 different studies reported across 11 different publications, as shown in Appendix 3.

It is important to note that the critical appraisals were conducted at the level of the methodological components of the studies (column 3 in Appendix 3). As such, the overall assessments (i.e. ratings of soundness) are not based on individual findings. Several items of the critical appraisals pertained to whether methods were suitable given the study aims, and whether the conclusions were appropriate given the methods; it was these items that tended to generate the most concern about the studies. For example, the conclusions of some studies generalised beyond the sample included in the study in a way that was inappropriate given the sampling methods used. Whilst this may make the inferences made by the researchers unsound, the actual results of the analysis are not *necessarily* unsound. In any systematic review, the results and findings are extracted from the studies to be included in the synthesis and, taken in isolation, might therefore not be subject to the same concerns as the original study *if* the systematic reviewers do not make the same inferential overstatements that the original study authors made.

In other words, the soundness ratings are indicative of the potential risks in taking the original studies at face value. The systematic review offers an opportunity take these concerns into account in interpreting the findings.

3.4   Data extraction

Data from studies identified as meeting the inclusion criteria were extracted into a standardised data extraction form. For studies assessing consumer response, we used the same form employed in a previous systematic review.[4] For studies assessing retailer or tobacco company response to standardised packaging, we adapted the form to incorporate other types of outcome (e.g. retailer responses, tobacco companies' changes to pricing). In both cases data extracted included: general information (author, publication year, funder, conflict of interests); study characteristics (aims, design, data collection method and period); sample characteristics and study setting; any theoretical basis; outcome measures and results.

3.5   Method for synthesis

A narrative synthesis was employed as neither a quantitative meta-analysis nor a qualitative meta-ethnography was feasible given the heterogeneity of the outcome measures and study designs. The studies were initially grouped by those measuring consumer responses and those measuring industry responses. The extracted outcome measures were then grouped by those measuring similar actions. No outcomes measured the same action in the same way, so the extracted results are reported rather than synthesised in the following narrative. Study findings which have examined consumer responses to standardised packaging, are presented separately to findings which have examined industry responses to standardised packaging and the retail environment. The overall critical appraisal ratings for individual studies' methodological soundness are also reported in the main findings. In our synthesis (Section 4), we label each study by the first author's surname, year of publication, and a distinguishing letter where required (e.g. Bogdanovica 2017a[19]).

3.6   On-going research on standardised packaging in the UK

We contacted researchers that have been authors on tobacco packaging research in the UK to ask whether they were involved with, or aware of, any research assessing standardised packaging in the UK. We identified a number of studies, although the list may not be exhaustive:

- The 'Adult Tobacco Policy Survey' (ATPS), a longitudinal online survey with smokers and ex-smokers from across the UK, conducted before the transition period (April-May 2016), several months post-standardised packaging (October-November 2017) and approximately two years post-standardised packaging (May-June 2019). Study contact: Crawford Moodie, University of Stirling.
- The 'International Tobacco Control' (ITC) Policy Evaluation Project, a multi-country longitudinal telephone/online survey with smokers, ex-smokers and vapers in England in 2016 (July-November) and 2018 (February-July). Study contact: Geoff Fong, University of Waterloo.
- The 'Youth Tobacco and E-cigarette Survey', conducted in England and Scotland in 2017 (July-August) and 2018 (August-September). Study contact: David Hammond, University of Waterloo.
- A focus group study, as part of the 'Youth Tobacco Policy Survey' (YTPS), with 11-16 year olds in Scotland, England and Wales between June and July 2018. Study contact: Anne Marie Mackintosh, University of Stirling.
- A focus group study with 16-17 year olds in Scotland between November 2017 and November 2018, conducted as part of a PhD on tobacco packaging. Study contact: Crawford Moodie, University of Stirling.
- A cross-sectional school survey with 12-17 year olds in Scotland between November 2017 and November 2018, conducted as part of a PhD on tobacco packaging. Study contact: Crawford Moodie, University of Stirling.
- A qualitative study with 13-18 year olds from youth organisations in Scotland and England between March and December 2018, as part of the 'Young people's perceptions and experiences of standardised tobacco packaging and e-cigarettes' study. Study contact: Amanda Amos, University of Edinburgh.

4   Main Findings

Findings are presented in three sections. Section 4.1 presents an overview of the search results and the studies included in the review. Section 4.2 presents findings from studies which have examined consumer responses to standardised packaging, and section 4.3 presents findings from studies which have examined tobacco company responses and the retail environment.

4.1   Overview of included studies

The searches produced a total of 350 unique records to be screened against our criteria (see flowchart in Appendix 4), and 58 of these were assessed as full-text articles. Forty-seven articles were excluded as not meeting all of our criteria and eleven articles[19-29] reporting on ten studies were included for narrative synthesis. One article described two separate studies[19], and one study had distinct findings reported across three articles.[23-25]

Characteristics of included studies are shown in Appendix 5. Three studies took place in England (two in an English city[19,29] and one in two English regions[27]) and one study was in Scotland (in four communities[28]). Four studies collected data from England, Scotland and Wales[19,23-25] and two studies collected data from across the UK.[22,26] Nine studies were published online between 2017 and 2018[19-26,28,29], and one study was in press at the time of our study cut-off data (15 February 2019).[27] Across the ten studies, the earliest data were collected from May 2013[22] and the latest up to October 2017[23-25] (all studies had to include data from during or after the standardised packaging transition period, regardless of their overall start and end dates). Most studies were funded by Cancer Research UK (n=7)[19,20,22,23-25,27], one was funded by the National Institute for Health Research Public Health Research Programme[28], one study declared that there was no funding[29], and one study did not report a source of funding[21]; we contacted the authors who indicated that there was no funding. The authors of eight studies stated that they had no conflicts of interest to declare[19,20,22-26,28,29], one Cancer Research UK-funded study declared that a co-author was employed by the study's funder[27], and the authors of one study did not make a declaration[21]; we contacted the authors who indicated that they had no conflict of interest. None were funded by or declared tobacco industry interests.

Five were studies with consumers[19,21,27,29] and five studies explored tobacco companies' response to standardised packaging and changes in the retail environment.[20,22-26,28] Of the five consumer studies, four were cross-sectional surveys[19,21,27], one with children (11-15 years)[19], one with university students (median 19 years),[21] the others with adults (18-55+ years and 16-65+ years)[27,29]; sample sizes ranged from n=546 to n=2,033. One experimental consumer study using a within-subjects design was conducted with n=47 university staff and students.[29] Two of the consumer studies were conducted with smokers only[27,29], the other three used samples with mixed smoking status.[19,21] Of the five studies exploring the retail environment, three studies used sales data from a commercial source, one covering stores of all sizes (Nielsen Scantrack data, >75,000 stores)[22] and two studies covering small convenience stores (The Retail Data Partnership EPoS data, 500 stores and 2,414 stores).[20,23-25] One qualitative study collected data using interviews with 24 small independent retailers[28] and one study conducted an audit of five retailer magazines/websites, four supermarket websites and monthly store visits.[26] Overall, two studies examined responses to standardised packaging of cigarettes only[22,29]; the rest looked at responses to standardised packaging of cigarettes and roll-your-own (RYO, hand rolling or loose) tobacco.

The results of the independent critical appraisals of the included studies by the EPPI-Centre are shown in Appendix 6. Out of the ten included studies, the overall judgement was that nine of the studies gave a clear statement of their aims, and one did not[22]. Overall, the appraisers had 'no concerns' about the soundness of one study (a quantitative study using sales data) (Critchlow 2018[20]); 'some major concerns' about the soundness of two studies (both quantitative studies with human participants)

(Bogdanovica 2017b[19], Poundall 2018[21]) and 'some minor concerns' about the soundness of the remaining seven studies (Bogdanovica 2017a[19], Breton 2019[22], Critchlow 2019[23-25], Moodie 2018[26], Moodie 2019[27], Purves 2019[28], Retzler 2019[29]).

4.2 Consumer responses to standardised packaging

This section presents evidence from studies which have examined consumer responses to standardised packaging. Five studies were identified, all of which were conducted during the twelve month transition period. We report whether studies were conducted early in the transition period (the first six months), when very few standardised packs were on the market, or late in the transition period (the last six months), when fully-branded and standardised packs were on sale. Findings are reported under three headings: socio-cognitive and indirect behavioural outcomes (4.1.1), behavioural outcomes (4.1.2), and other outcomes (4.1.3).

4.2.1 Socio-cognitive and indirect behavioural outcomes

Three studies reported on socio-cognitive and indirect behavioural outcomes (Moodie 2019[27], Poundall 2018[21], Retzler 2019[29]). The outcomes examined were attention to health warnings, thoughts about health risks associated with smoking, awareness of cessation websites, and attitudes towards quitting.

Moodie 2019[27] conducted a cross-sectional survey using an online questionnaire with 1,865 current smokers aged 16 to 65+ years. The survey was conducted in the late transition period (February-April 2017), and therefore reflects consumer views during a period when standardised packs were on sale but fully-branded packs were also available. The aim of the study was to explore whether current use of standardised packs was associated with differences in the salience of health warnings (noticing them, reading them closely), thoughts about health risks due to the look of the pack, and thoughts about quitting due to the look of the pack. Respondents were also asked about their awareness of stop-smoking websites and engagement with these websites. The study was quality appraised as raising some minor concerns.

Retzler 2019[29] conducted an eye-tracking study with an experimental within-subjects design with 47 adult smokers aged 19-58 years. Data collection for this experimental study is reported to be "in the year following the legislative changes (2016–2017)" – the lead author (personal communication) confirmed that it was conducted during the transition period, from May 2016 on, but almost entirely from 1 February to 19 May 2017. The aims of the study were to directly compare attention (using eye movement data generated from eye trackers) to branding and warnings between fully-branded and standardised packs in smokers, and to determine whether this was affected by the amount smoked. Respondents were shown single images of the front of eight fully-branded packs and eight standardised cigarette packs presented in a random order for 10 seconds each. The study was quality appraised as raising some minor concerns.

Poundall 2018[21] conducted a cross-sectional survey using an online questionnaire with 546 university students (median age 19 years), including both smokers and non-smokers. The survey was conducted in the early transition period (October-November 2016), when standardised packs were not widely available (see Section 2.3). The aim was to investigate awareness of, and attitudes towards, the legislation, attention to health warnings, and (among smokers only) views on potential changes in smoking behaviour in response to the legislation. The study was quality appraised as raising some major concerns.

(i) Attention to health warnings

Improving attention to (and thereby effectiveness) of health warnings is one of the key public health objectives of standardised packaging. Health warnings on standardised packs were new, larger than on fully-branded packs, and displayed pictorial images on both front and back of pack. The three studies which examined this outcome reported that standardised packs increased attention to health warnings, either by comparing users of standardised packs with never users of standardised packs, or by comparing standardised packs with fully-branded packs.

Moodie 2019[27] found that smokers who currently used standardised packs were more likely than smokers who had never used standardised packs to notice warnings and to read and look closely at them. The study reported that 60.5% of respondents said they had noticed the warnings on packs often or very often in the last month, with higher levels of noticing warnings among current users of standardised packs than among never users of standardised packs (OR=2.86, 95% CI: 2.19 to 3.74, p<0.001). The association remained when adjusted for demographic (age, gender, social grade) and smoking characteristics (quit attempts in past 12 months, Heaviness of Smoking Index [HSI], and currently trying to quit/reduce) (adjusted OR=2.76, 95% CI: 2.10 to 3.63, p<0.001). Previous users of standardised packs were not significantly more likely than never users to have noticed warnings (OR=1.35, 95% CI: 0.92 to 1.98, p=0.13; adjusted OR=1.31, 95% CI: 0.88 to 1.95, p=0.18). The same study reported that 26.8% of respondents said they had often or very often read or looked closely at the warnings on packs, with current users of standardised packs being more likely than never users to have read or looked closely at the warnings on packs (OR=2.43, 95% CI: 1.70 to 3.46, p<0.001). The association remained when adjusted for demographic (age, gender, social grade) and smoking characteristics (quit attempts in past 12 months, HSI, and currently trying to quit/reduce) (adjusted OR=2.16, 95% CI: 1.51 to 3.10, p<0.001). Previous users of standardised packs were not significantly more likely than never users to have read or looked closely at warnings (OR=1.19, 95% CI: 0.71 to 1.99, p=0.51; adjusted OR=1.00, 95% CI: 0.59 to 1.69, p<0.001).

The Retzler 2019[29] experimental study, using eye tracking, observed that respondents attended more to health warnings on standardised packs than to those on fully-branded packs. Bonferroni-adjusted post-hoc pairwise comparisons showed there were more eye fixations for the health warning on standardised packs (M=12.77, SD=4.72) – those with a pictorial warning and brand name in standardised font on the pack front – than on fully-branded packs (M=5.49, SD=3.44; p<0.001) – those with only a text warning and full branding on the pack front. Participants attended more to health warnings when looking at standardised packs compared with fully-branded packs. In addition, Bonferroni-adjusted post-hoc pairwise comparisons showed more 'first fixations' to health warning areas on standardised packs (mean number of first fixations for standardised packs (M=6.48, SD=2.03), mean number of first fixations for fully-branded packs (M=1.35, SD=1.61)), and these fixations were of a longer duration (mean dwell-time for standardised packs (M=262.03, SD=158.51), mean dwell-time for fully-branded packs (M=35.62, SD=51.21); p-values not reported). The study also found that participants attended less to branding when looking at standardised packs compared with fully-branded packs. Bonferroni-adjusted post-hoc pairwise comparisons showed more eye fixations to the branding on fully-branded packs, with the mean number of fixations per pack (M=14.95, SD=5.09) greater than for standardised packs (M=5.78, SD=3.06; p<0.001).

Poundall 2018[21] showed respondents images of a fully-branded pack and a standardised pack and asked whether they noticed the health warnings, and whether they thought health warnings would put them off smoking or make them want to quit. Overall, more respondents said they noticed warnings on a standardised pack compared with a fully-branded pack, and were more likely to feel deterred from smoking, or to want to quit. Smokers and non-smokers were both significantly more likely to report noticing the health warnings on the standardised packs (p<0.001) than on the fully-branded packs. Among non-smokers, 99% reported noticing the warnings on standardised packs compared with 90% on the fully-branded packs (p<0.001). Most non-smokers (92%) reported that the warnings on the standardised packs deterred them from starting smoking, compared with 60% reporting the same for the fully-branded packs (p<0.001). Among smokers, virtually all (99%) reported

noticing the warnings on standardised packs, with 79% noticing them on fully-branded packs (p<0.001). Three-fifths (59%) of smokers reported that the warnings on the standardised packs made them want to quit, compared with 23% reporting the same for fully-branded packs (p=0.048).

(ii) Perceptions of harm

Encouraging more accurate perceptions of the harms and risks of smoking is another key objective of standardised packaging. The one study (Moodie 2019[27]) which examined this outcome found that smokers who used standardised packs thought more about the health risks of smoking than did smokers who did not use standardised packs. The study reported that 31.4% of respondents reported that the look of the pack they were currently using had made them think somewhat or a lot about the health risks of smoking. Those respondents who were current users of standardised packs were more likely than never users to indicate that they had thought about the health risks of smoking (OR=2.16, 95% CI: 1.57 to 2.99, p<0.001). The association remained when adjusted for demographic (age, gender, social grade) and smoking characteristics (quit attempts in past 12 months, HSI, and currently trying to quit/reduce) (adjusted OR=1.92, 95% CI: 1.38 to 2.68, p<0.001). Previous users of standardised packs were more likely than never users of standardised packs to say that they had thought about the health risks of smoking, although the differences were not statistically significant (OR=1.51, 95% CI: 0.96 to 2.37, p=0.07; adjusted OR=1.25, 95% CI: 0.78 to 1.99, p=0.36).

(iii) Awareness and attitudes regarding quitting

Standardised packaging is expected to encourage quitting related socio-cognitive outcomes. The one study (Moodie 2019[27]) which examined these outcomes found that smokers who used standardised packaging thought more about quitting smoking than did smokers who did not use standardised packs. Overall, 25% of smokers reported that the look of the pack they were currently using had made them think somewhat or a lot about quitting. Compared with never users of standardised packs, previous users (OR=2.05, 95% CI: 1.26 to 3.33 p=0.004; adjusted OR=1.90, 95% CI: 1.30 to 2.77, p<0.001) and current users (OR=2.22, 95% CI: 1.55 to 3.20, p<0.001) were more likely to have thought about quitting because of the look of the pack. For current users, this association was attenuated after adjusting for demographic (age, gender, social grade) and smoking characteristics (quit attempts in past 12 months, HSI, and currently trying to quit/reduce) (adjusted OR=1.64, 95% CI: 0.99 to 2.71, p=0.06).

Inclusion of a stop-smoking website address is mandatory on standardised packs. Moodie 2019[27] reported that 10.7% of smokers overall (11.8% of current users of standardised packs, 12.6% of previous users, and 3.5% of never users) noticed information or adverts about a stop-smoking websites in the last month. The most common sources of awareness were: GP surgeries (47.7%), warnings on packs of cigarettes or rolling tobacco (40.1%), TV (38.5%), on the internet (35.2%), posters/billboards (32.5%), social media (e.g. Twitter or Facebook) (23.5%), at a bus stop/on a bus (19.2%), radio (14.8%), newspapers/magazines (12.4%), and brochures/newsletter/flyer (11.9%). With respect to noticing warnings on packs of cigarettes or rolling tobacco, this was endorsed by 4.9% of current users, 4.9% of previous users, and 0.3% of never users. Because only a small number of previous and never users of standardised packs had noticed information about stop-smoking websites, only frequencies were reported.

4.2.2   Self-reported behavioural outcomes

Three studies reported on self-reported behavioural outcomes (Bogdanovica 2017a[19], Moodie 2019[27], Poundall 2018[21]). The outcomes examined were engagement with cessation websites, anticipated behaviour changes (including quitting and switching to a different brand or product), and changes to products smoked in the previous six months. None of the studies examined behavioural outcomes relating to uptake of smoking, prevalence of smoking, or actual cessation behaviour.

Moodie 2019[27] conducted a cross-sectional survey using an online questionnaire with 1,865 current smokers aged 16 to 65+ years. The survey was conducted in the late transition period (February-April 2017), when standardised and fully-branded packs were available. The aim of the study was to explore whether current usage of standardised packs was associated with differences in warning salience, and thoughts about health risks and thoughts about quitting due to the look of the pack. Respondents were also asked about their awareness of stop-smoking websites and engagement with these websites. The study was quality appraised as raising some minor concerns.

Bogdanovica 2017a[19] conducted a cross sectional survey with 2,033 adults (of whom 15.7% were smokers) aged 18-55+ years. The survey was conducted in the late transition period (March 2017), when standardised packs were widely available in the shops but fully-branded packs were also still available. The aim was to investigate awareness of standardised packaging, and whether participants had changed the products they usually smoked in the last six months (i.e. during the transition period). The study was quality appraised as raising some minor concerns.

Poundall 2018[21] conducted a cross-sectional survey using an online questionnaire with 546 university students (median age 19 years), including both smokers and non-smokers. The survey was conducted in the early transition period (October-November 2016), during which time standardised packs were not widely available. The aim was to investigate awareness of and attitudes towards the legislation, attention to health warnings, and smokers' views on potential changes smoking behaviour in response to the legislation. The study was quality appraised as raising some major concerns.

(i) Changes to products smoked
One study, conducted in the late transition period, reported that smokers had engaged in some switching of products smoked since the start of the transition period (Bogdanovica 2017a[19]). In the survey, the 15.7% of the sample who were current smokers (excluding 16 smokers who did not ever smoke the products listed) were asked whether they had made any changes in the products they smoked in the previous six months. Just under a third, 31.4%, of smokers (95% CI: 26.2–37.1%) reported switching to a different product since October 2016. Of those who said they had switched, 55.9% (95% CI: 45.1–66.1%) had changed to a cheaper brand, followed by switching to larger packs or e-cigarettes (small numbers, data not reported).

(ii) Intentions/anticipated changes
Two studies examined smokers' intentions or anticipated behaviour changes in response to standardised packaging (Moodie 2019[27], Poundall 2018[21]). Both studies suggested that standardised packaging encouraged thoughts and intentions in relating to quitting or cutting down, with one of the studies suggesting that standardised packaging might encourage switching to other tobacco products or to e-cigarettes.

Moodie 2019[27] found that, overall, 25% of smokers reported that the look of the pack they were currently using had made them think somewhat or a lot about quitting. Compared with never users of standardised packs, previous users (OR=2.05, 95% CI: 1.26 to 3.33 p=0.004; adjusted OR=1.90, 95% CI: 1.30 to 2.77, p<0.001) and current users (OR=2.22, 95% CI: 1.55 to 3.20, p<0.001) were more likely to say they had thought about quitting. For current users, the association remained after adjusting for demographic (age, gender, social grade) and smoking characteristics (quit attempts in past 12 months, HSI, and currently trying to quit/reduce).

In the Poundall 2018[21] survey, 46.2% of smokers reported that their likely response to the legislation would be to quit smoking, with 31.5% of frequent smokers (≥once a week) and 57.1% of infrequent smokers (<once a week) reporting this. Smokers who smoked less than once a month were more than three times as likely to believe that they would quit in response to the new legislation than those who smoked daily (OR=3.97, 95% CI: 1.77 to 8.87, p<0.001). Smokers of packs containing 20 cigarettes were more likely to believe that they would quit in response to the new legislation than those who smoked packs containing fewer cigarettes (10-14 packs, 15-19 packs) (OR=0.20, 95% CI: 0.06 to 0.64, p=0.007).

Age and sex were not significantly associated with whether smokers felt they were likely to quit in response to the new legislation. Three-fifths (60.8%) of smokers reported that their likely response to the new legislation would be to cut down on smoking (56.2% of frequent smokers and 64.3% of infrequent smokers).

Poundall 2018[21] also examined smokers' thoughts about other anticipated changes in response to the legislation, such as switching products. Approximately two-fifths (41.5%) of smokers reported that their likely response to the legislation would be to switch to rolling tobacco (53.4% of frequent smokers and 32.6% of infrequent smokers). Less than a third (28.7%) of smokers reported that their likely response to the legislation would be to switch to a cheaper brand (30.1% of frequent smokers and 27.6% of infrequent smokers). Around a fifth (19.3%) of smokers reported that their likely response to the legislation would be to switch to e-cigarettes (24.6% of frequent smokers and 15.3% of infrequent smokers).

(iii) Cessation behaviours

No study examined reported cessation behaviour. Only one study examined behaviour related to cessation – engagement by smokers with stop-smoking websites, which are mandatory on standardised packs – following the introduction of standardised packaging (Moodie 2019[27]). The study, which compared the views of current users of standardised packs with never and previous users of standardised packs, found that 3.9% of smokers overall reported having visited a stop-smoking website in the last month to get advice about quitting. When comparing respondents by use of standardised packs, 4.6% of current users, 2.3% of previous users and 1.0% of never users reported having visited a stop-smoking website in the last month. Because of the small numbers, no statistical analysis was conducted and only frequencies were reported.

4.2.3   Other outcomes

Three studies reported on awareness of the legislation and of standardised packs (Bogdanovica 2017a[19], Bogdanovica 2017b[19], Poundall 2018[21]), and one of these (Poundall 2018[21]) also reported on attitudes towards the legislation.

Bogdanovica 2017a[19] conducted a cross sectional survey with 2,033 adults (of whom 15.7% were smokers) aged 18-55+ years. The survey was conducted in the late transition period (March 2017), when standardised packs were widely available in the shops but fully-branded packs were also available. The study aim was to investigate awareness of standardised packaging, and whether participants had changed the products they usually smoked in the last six months (i.e. during the transition period). The study was quality appraised as raising some minor concerns.

A second study by the same author (Bogdanovica 2017b[19]) comprised a cross sectional survey using an online questionnaire with 1,041 children aged 11-15 years, of whom 2.4% were current smokers. The survey was conducted in the late transition period (March 2017) to investigate awareness of standardised packaging and susceptibility to smoking among 11–15 year olds. This study was quality appraised as raising some major concerns.

Poundall 2018[21] conducted a cross-sectional survey using an online questionnaire with 546 university students (median age 19), including both smokers and non-smokers. The survey was conducted in the early transition period (October-November 2016) to investigate awareness of and attitudes towards the legislation, attention to health warnings, and, among smokers, views on potential changes smoking behaviour in response to the legislation. This study was quality appraised as raising some major concerns.

(i) Awareness of the legislation

The Bogdanovica 2017a[19] survey of adults, conducted in the late transition period, found reasonably high levels of awareness of the legislation, with smokers having higher awareness than non-smokers: 90.5% (95% CI: 86.4 to 93.5%) smokers vs. 70.5% (95% CI: 68.3 to 72.7%) non-smokers. Being male (OR 1.33, 95% CI: 1.07 to 1.65, p=0.010) and being a smoker (OR 4.85, 95% CI: 3.16 to 7.43, p<0.001) were independently related to higher levels of awareness. Awareness was higher in older age groups (45-54 years: OR 1.52, 95% CI: 1.02 to 2.27, p=0.040; 55+ years: OR 1.72, 95% CI: 1.22 to 2.42, p=0.002) compared to the 18–24, 25–34 and 35–44 years age-groups. Awareness was found to be the lowest in the lowest socio-economic group (DE: OR 0.64, 95% CI: 0.86 to 2.32, p=0.004) compared to the AB, C1, C2 socio-economic groups. There were also regional differences in awareness across the Great Britain government regions. Across the sample, a third (32.4%) said they had noticed changes in tobacco packaging in the last 6 months, 26.2% said they had noticed the removal of branding, 12.8% had noticed the change in colour, and 9.4% had noticed the change in size of the tobacco packs. Changes in tobacco packaging in last 6 months were noticed more by current smokers (83.7%; 95% CI: 78.9–87.5%) than non-smokers (22.5% 20.5–24.6%); non-smokers comprised never smokers (20.7%; 95% CI: 18.2–23.4%) and ex-smokers (25.1%; 95% CI: 21.9–28.6%).

In the Bogdanovica 2017b[19] survey of children aged 11-15 years, also conducted in the late transition period, 20.2% of respondents reported that they had noticed any changes to the packaging in the last six months. Awareness of any pack changes was 49% among current smokers, 25.6% among susceptible never smokers, and 16.2% among non-susceptible never smokers.

The Poundall 2018[21] survey of university students was conducted in the early transition period, when standardised packs were not widely available. It found that 53.8% of the sample was aware of the new legislation. Being a smoker was associated with greater awareness of the new legislation (OR=2.15, 95% CI: 1.41 to 3.27, p<0.001). No other factors (age, sex, e-cigarette use, number of family members who smoke, number of close friends who smoke) were significantly associated with awareness of the new legislation. On being shown an image of a standardised pack, 11.7% of respondents said they had seen a standardised pack, with 88.3% not having seen a standardised pack or unsure.

(ii) Attitudes towards the legislation

The Poundall 2018[21] survey of university students, conducted in the early transition period, also examined opinions of the new packaging legislation and found overall approval. Across the sample, 59.3% thought the new legislation was a very good idea, 31.3% thought it was a fairly good idea, 3.5% were unsure and 5.9% thought it was a fairly bad or very bad idea. Among smokers, 83.6% thought it was either a very good or fairly good idea, compared with 93.9% of non-smokers who thought the new legislation was a very good or fairly good idea. Being a smoker was found to be associated with lower approval of the new legislation (OR=0.66, 95% CI: 0.45 to 0.95, p=0.03).

4.3   Tobacco company responses and changes in the retail environment

This section examines evidence of how tobacco manufacturers responded to standardised packaging and changes in the retail environment. Findings are reported under three headings: pack and product changes (including design, size, descriptors and brand names) (4.2.1), implementation of and compliance with the standardised packaging legislation (4.2.2) and price changes (4.2.3).

4.3.1   Pack and product changes

Three studies examined pack and product changes. Moodie 2018[26] examined changes to pack design and size, changes to brand and brand variant names, and changes to product design. Breton 2019[22]

examined changes to brand and brand variant names. Critchlow 2019[23-25] observed changes in product sales. All three studies were quality appraised as raising some minor concerns.

Moodie 2018[26] conducted a content analysis of four business magazines and one website aimed at retailers who sell tobacco products, routine surveillance of four supermarket online shopping websites, and monthly visits and informal interviews with a convenience sample of supermarkets, independent retailers, convenience stores, forecourt traders, and off-licences in both urban and suburban areas (sample size not reported). The study was conducted over 24 months, between May 2015 and June 2017, covering a year before transition, the transition year, and one month post-transition. The aim was to use routine surveillance of the cigarette and rolling tobacco market in the UK to explore how tobacco companies responded to the Standardised Packaging of Tobacco Products Regulations and the Tobacco Products Directive (TPD) by monitoring pack, brand and product changes pre-implementation and post-implementation. The accumulated data were examined for packaging, brand and product changes, developments and introductions, including: graphical or structural pack designs; pack sizes; brand launches, name changes, brand extensions, brand rationalisation; and product design innovations.

Breton 2019[22] conducted a descriptive analysis of cigarette sales data from >75,000 megastores, superstores, high street stores and convenience stores in the UK (from a commercial source; Nielsen Scantrack) by using line graphs to compare trends and a linear regression model. The study used continuous data from March 2013 to June 2017; three years pre- to one month post-transition. The study made 58,190 total valid observations of 1,064 cigarette products; an average of 658 fully-branded products (range = 431-824) and 138 standardised products (range = 8-226) per month. The aim of the study was to describe and quantify changes in brand diversity, price segmentation and sales volumes; and to estimate the association between the introduction of standardised cigarette packaging and cigarette pricing.

Critchlow 2019[23-25] conducted a descriptive analysis of monthly trends for sales data for 40 tobacco products: the top 20 leading fully-branded products (15 factory-made cigarettes (five value-, eight mid-, two premium-priced) and five roll-your-own tobacco (RYO; all mid-priced)) and their standardised equivalents, as sold by 300 small retailers in England, 100 in Scotland and 100 in Wales, including symbol group-affiliated and independent convenience stores. The study monitored monthly Electronic Point of Sale (EPoS) data from a commercial source (The Retail Data Partnership) from May 2016 to October 2017, i.e. continuous data throughout the transition period and five months post-transition. The aim of the study was to explore how tobacco products in standardised packaging (compliant) were introduced by tobacco companies into small retailers and how tobacco products in fully-branded packaging (non-compliant) were removed; whether small retailers complied with standardised packaging legislation; what changes occurred in pricing during the introduction of standardised packaging and how did they vary by type and price segment; and how closely did small retailers adhere to Recommended Retail Price (RRP) during the introduction of standardised packaging. The study measured the number of monitored products sold each month by each retailer and the average RRP and sales price for each product in each retailer.

Two of these studies (Moodie 2018[26], Breton 2019[22]) collected data from before the transition period. While our focus is on findings from the transition period onwards, in some studies we present analysis which includes data from before the transition period as this is how it is reported and it is not possible to isolate the data from after the transition period.

(i) Change in number of brand variants or brand variant name
The legislation bans the use of information on tobacco products that promotes a product or encourages consumption by creating an erroneous impression about its characteristics (e.g. that it is less harmful than other brands) or any reference to taste, smell or flavour. Three studies examined changes to brand and brand variant names.

Moodie 2018[26] observed that for cigarettes, during the transition period (and in some cases, during the months beforehand), with flavour and taste descriptors no longer permitted all companies changed 'Menthol' to 'Green' and 'Smooth' typically became 'Blue', 'Bright Blue' or 'Sky Blue'. For many 'Full Flavour' products, a colour descriptor was added to the name or, where colour was already included within the name, descriptors such as 'Real' or 'Original' were added. Other changes have been the inclusion of novel descriptors such as 'Legendary' (JPS Legendary Black). Natural American Spirit tobacco products were renamed American Spirit in October 2016, as the descriptor 'Natural' was no longer permitted, and in May 2017 the von-Eicken cigarette brand Allure became Alluvé, after the brand starting appearing in standardised packs. As the descriptor 'Superslims' was prohibited this was removed from packs of cigarettes of that style, and with 'King Size' a typical style of cigarette most companies opted to omit the term from packs. Finally, during the transition period, there was some evidence of cigarette brand rationalisation, with a number of brand migrations, e.g. Consulate Menthol and St. Moritz Menthol now under the Dunhill brand (Dunhill Consulate and Dunhill St. Moritz). A new cigarette brand variant (Lucky Strike Gold) was introduced in November 2016 (personal communication with study lead author).

For RYO tobacco, during the transition period, fewer brand or brand variant name changes were identified by Moodie 2018[26]. With 'Smooth' prohibited, some variant names changed (e.g. Cutters Choice Smooth became Cutters Choice Original and Cutters Choice Extra Smooth became Cutters Choice Extra Fine), and as for cigarettes, American Spirit RYO tobacco dropped the 'Natural' descriptor. Two Golden Virginia brand variants were renamed Bright Sunrise and Bright Midnight when sold in standardised packs.

Breton 2019[22] found that from May 2016 to June 2017 there was a slow but sustained decline in the total number of brands available on the market. The number of brands available in fully-branded packs decreased during the study period. By June 2017 the number of brands available in standardised packs was still lower than the number available in fully-branded packs. The number of brand variants available in fully-branded packs decreased rapidly in the transition period; the study also reported a substantial increase in the number of brand variants available for sale in early 2014. By June 2017 the number of brand variants available in standardised packs was still lower than the number available in fully-branded packs. The number of products available in fully-branded packs only began to decrease during the transition period. The largest difference between standardised packs and fully-branded packs by June 2017 was found for the number of products available.

Critchlow's 2019[23-25] descriptive analysis of monthly trends in EPoS sales reported changes in product sales over the transition period, highlighting some brand rationalisation or delisting within the small retailers sample. By the end of the transition period, standardised variants had been observed for 19 of the 20 fully-branded cigarette and RYO products monitored, with John Player Special Silver 25 gram RYO, a mid-range priced product, delisted without a direct standardised variant. Of the 20 fully-branded tobacco products, by the end of the transition period two had ceased to be sold by all retailers (Rothman's King Size and Superkings Value Blue 18 sticks), although both had only been sold by a small proportion of retailers in the transition period.

(ii) Pack sizes
The legislation sets a minimum pack size of 20 sticks for factory-made cigarettes and 30 grams for rolling tobacco. Two of the studies looked at changes in pack sizes over the transition and implementation periods.

In the Moodie 2018[26] study, some new cigarette pack sizes were observed during the transition period. BAT introduced larger pack sizes for some of its brand variants (23 packs for Pall Mall Double Capsule XL and 24 packs for Rothmans XL). The study did not report any new rolling tobacco packs sizes after the transition period had started.

Breton[22] 2018 analysed the number of products available in different pack sizes, and whether they were fully-branded or standardised packs, each month during the study period. Single packs of 20 cigarettes or more accounted for the greatest number of products in the market from the beginning of 2014 until the end of the study period. The largest difference in availability between standardised pack and fully-branded packs was found for the number of products, and the authors attributed this largely to the disappearance of products in packs of <20 cigarettes. Availability for all fully-branded pack sizes declined steadily during the transition period, with multipacks containing between 11 and 19 cigarettes declining sharply in the final few months. By June 2017 the number of products in fully-branded and standardised packs of ≥20 cigarettes had reached similar numbers, both for single packs and multi-packs.

The Breton 2019[22] study also reported trends in the number of cigarette sticks sold each month for each product (volume of sales) and a subgroup analysis of monthly volume of cigarette sales by pack size. During the transition period until January 2017 (and continuing a trend from July 2014), sales volumes were dominated by packs of between 11 and 19 cigarettes. From the start of the transition period onwards, there was a steep rise in sales of single standardised packs of ≥20 cigarettes.

(iii) Graphical and structural packaging designs
The legislation specifies that cigarettes and rolling tobacco must be manufactured and sold in drab brown-coloured packs. Cigarette packs must be cuboid shaped, although bevelled or rounded edges are permitted. One study monitored changes to graphical and structural packaging designs for cigarettes and tobacco.

Moodie 2018[26] found that one company, JTI, released six limited edition graphic designs for packs for five of its cigarette brands during the transition period, between May and July 2016. All four leading tobacco companies (BAT, Imperial, JTI and Philip Morris) introduced limited edition embossed tins for RYO or cigarettes between April 2016 and January 2017. In terms of structural changes to cigarette packs, PMI introduced a resealable foil ('Pro-Seal') for all Marlboro variants in July 2016.

Moodie 2018[26] observed that the slim packs for Alluvé Lilac, Alluvé Green, Silk Cut Choice, Vogue Bleue and Vogue Original Green cigarettes, which were all on sale in the post-transition period, appeared to be non-compliant because the width of the lateral surfaces of these packs (12 mm) was less than the minimum required (20 mm). It was also observed that the design of resealable RYO tobacco pouches allowed consumers to cut-off the flap displaying the pictorial health warnings so that it only displayed the general text warning on one side of the pack and the information message (upside-down) on the other.

(iv) Product design innovations
One study, Moodie 2018[26], found that although product innovation had been high in the year before transition to standardised packaging with, for example, eight new capsule cigarettes variants and a range of other novel filter designs introduced, no examples of design innovations were noted after the transition period began.

4.3.2 Implementation

Four studies examined implementation of and/or compliance with the legislation (Breton 2019[22], Critchlow 2018[20], Critchlow 2019[25], Purves 2019[28]).

Critchlow 2018[20] conducted a descriptive analysis of weekly trends for sales data for cigarette and rolling tobacco products from an average 2,414 small retailers (SD=18.55) per week, including symbol group-affiliated and independent convenience stores in Great Britain, using EPoS data from a commercial source (The Retail Data Partnership). The study used weekly data from 22 May 2017

biweekly to 30 July 2017, i.e. the first two months post-transition. The aim of the study was to examine independent and convenience (small) retailer compliance with standardised packaging legislation for 10 weeks after standardised packaging was fully implemented. The study measured the percentage of small retailers selling standardised (compliant) products only, fully-branded (non-compliant) products only, or both; the number of different standardised and fully-branded tobacco products sold; and the volume of standardised and fully-branded tobacco products sales. The study was quality appraised as raising no concerns.

In a related study from the same project, Critchlow 2019[23-25] conducted a descriptive analysis of monthly trends for sales data for 40 tobacco products: the top 20 leading fully-branded products (15 factory-made cigarettes (five value-, eight mid-, two premium-priced) and five roll-your-own tobacco (RYO; all mid-priced)) and their standardised equivalents, as sold by 300 small retailers in England, 100 in Scotland and 100 in Wales, including symbol group-affiliated and independent convenience stores. The study monitored monthly Electronic Point of Sale (EPoS) data from a commercial source (The Retail Data Partnership) from May 2016 to October 2017, i.e. throughout the transition period and five months post-transition. The aim of the study was to explore how tobacco products in standardised packaging (compliant) were introduced by tobacco companies into small retailers and how tobacco products in fully-branded packaging (non-compliant) were removed; whether small retailers complied with standardised packaging legislation; what changes occurred in pricing during the introduction of standardised packaging and how did they vary by type and price segment; and how closely did small retailers adhere to Recommended Retail Price (RRP) during the introduction of standardised packaging. The study measured the number of monitored products sold each month by each retailer and the average RRP and sales price for each product in each retailer. The study was quality appraised as raising some minor concerns.

The study by Breton 2019[22] is a descriptive analysis of cigarette sales data from >75,000 megastores, superstores, high street stores and convenience stores in the UK (from a commercial source; Nielsen Scantrack), using line graphs to compare trends and a linear regression model. They used continuous data from March 2013 to June 2017; three years pre- to one month post-transition. The study made 58,190 total valid observations of 1,064 cigarette products; an average of 658 fully-branded products (range = 431-824) and 138 standardised products (range = 8-226) per month. The study's aim was to describe and quantify changes in brand diversity, price segmentation and sales volumes; and to estimate the association between the introduction of standardised cigarette packaging and cigarette pricing. The study analysed monthly plain pack sales volume as a proportion of all cigarette sales. The study was quality appraised as raising some minor concerns.

Purves 2019[28] conducted a thematic analysis, using an inductive approach, of interview data from face-to-face interviews with 24 small independent retailers selling tobacco, conducted in-store during business hours (lasting 20 to 30 minutes). The sample were from four Scottish communities with different levels of urbanisation and social deprivation and comprised retailers from 12 grocery/convenience stores, five confectioners, tobacconists, and newsagent stores, three off-licences, three petrol stations/garage forecourts and one fast food/take-away outlet. The aim of the study was to explore the response of retailers in Scotland to standardised packaging and the TPD shortly after these measures became mandatory. The interviews were conducted between 23 May 2017 and 26 June 2017, in the two months after the end of the transition period, with retailers reflecting on their experiences during the transition period and the lead up to standardised packaging. The interviews examined how retailers set prices and convey pricing information to customers, the implementation of standardised packaging, the level and nature of support provided by tobacco companies and the emergence of new strategies to promote tobacco products. The study was quality appraised as raising some minor concerns.

(i) Transition and implementation periods: sales data
Two studies used commercial sales data to report on changes in the retail environment during the transition and implementation periods. They looked at the range of products and the pack types.

Breton 2019[22] found that cigarettes in standardised packs first appeared for sale in the sampled stores in July 2016. The proportion of standardised packs increased slowly until February 2017, then rapidly to June 2017, to reach 96% of total volume of sales.

Using a descriptive analysis of monthly trends in EPoS sales data, Critchlow's 2019[25] study examined 40 tobacco products sold in 500 small retailers from May 2016 to October 2017. Over the transition period (May 2016 to May 2017) the data showed a significant and strong positive correlation between month of transition period and the average number of standardised cigarette and RYO products sold, r (13) = 0.88, p<0.001. A small number of the standardised cigarette and RYO products first began to be sold in month 6 (n = 1, Amber Leaf Original Rolling Tobacco 30g) and month 8 (n = 3; Golden Virginia Bright Yellow 30g, Lambert & Butler King Size Original Silver 20 sticks, Richmond King Size Real Blue 20 sticks) of the transition period. All four products were in the mid-range price segment. Most standardised tobacco products (n = 15) were first sold in either month 9 or 10 (January and February 2017) of the transition period. Conversely, for fully-branded products sold by small retailers, there was a significant and strong negative correlation between month of transition period and the average number of fully-branded cigarette and RYO products sold by each retailer, r (13) = −0.73, p<0.005. It was not until month 11 of the transition (March 2017), when the average number of standardised cigarette and RYO products sold by each retailer remained above the average number of fully-branded cigarette and RYO products. By the final transition month (May 2017), retailers were selling, on average, 13.59 more of the monitored standardised cigarette and RYO products (M = 15.92, SD = 2.88) than fully-branded cigarette and RYO products (M = 2.33, SD = 1.16). Transition trends for the value, mid-range and premium products were similar to the overall trends reported in the study. The average number of value and premium standardised cigarettes sold by each retailer remained above the average number of fully-branded value and premium cigarette from month 11 (as overall), but this happened a month earlier (month 10) for cigarette and RYO products in the mid-range price segment. Standardised packs first appeared in the mid-range segment first (month 6 onwards), as mentioned earlier.

An indication of changes in the range of cigarette and RYO products available from small retailers during the transition period was demonstrated by trends in the average number of unique cigarette and RYO products sold. If the products differed by, for example, pack size, by multi-pack size, by brand variant, by brand name or whether packs were fully-branded or standardised, or price-marked or not, they were counted separately as a unique product.[25] The data showed a significant and strong negative correlation between month of transition and the average number of unique cigarette and RYO products sold, r (13) = −0.75, p<0.005. The average number of unique cigarette and RYO products sold in the final month of transition in May 2017 (M=82.30, SD=32.06) was approximately one third lower than in May 2016, the first month of transition M=123.60; SD=44.24). During the first 11 months of the transition period, there was only slight variation in the average number of unique cigarette and RYO products sold by each retailer (M range: 118.67-130.68; SD range: 41.09-45.32). The average number of unique cigarette and RYO products sold in the final month was approximately a third lower than during the rest of transition period.

(ii) Implementation and compliance with the legislation: qualitative research
Purves 2019[28] qualitative study found that although one retailer in the sample was still selling fully-branded and other non-compliant stock, most were not prepared to risk being fined and had removed noncompliant stock in advance of the implementation date. Many retailers reported they had been left with fully-branded stock after the legislation, although they had been notified by tobacco company reps that any noncompliant stock left over would be exchanged free of charge for new compliant stock. Some retailers mentioned confusion between products because of standardised packs and also new brand variant names in the run-up to, and shortly after, the end of the transition period. Immediately following the end of the transition period, there were occasions where customers had been given the wrong cigarettes. However, for many retailers there were no problems or mistakes and any issues became less common once the retailers became more familiar with the name changes.

Lack of familiarity regarding name changes was improved by stocking brands in the same gantry position. Because of this, retailers reported that transaction times and the ease of locating products on the gantry were unaffected. Some reported stocking certain packs upside down on the gantry so that brand and variant names were visible to staff. The removal from the market of pack sizes below 20 sticks had made ordering and storage more straightforward and meant the range had reduced significantly, freeing up gantry space. Retailers stated this had led them to cut down on slower selling brands and only replenish their best-sellers, which was positive for their costs. One retailer had repurposed some sections of the tobacco gantry for other products.

(iii) Compliance with the legislation: sales data, first 10 weeks

Critchlow 2018[20] reported the proportions of: retailers selling products in fully-branded packs, standardised packs, or both; volume of sales sold as fully-branded or standardised; and unique products sold as fully-branded or standardised. In the first week of standardised packaging implementation, 74.69% of small retailers sold both fully-branded and standardised packs, 25.27% sold standardised packs only, and 0.04% sold fully-branded packs only. By week 6, the corresponding figures were 54.95% for both, 44.92% for standardised only and 0.13% for fully-branded only. By the final week studied, week 10, 53.26% of small retailers sold both fully-branded and standardised packs, 46.70% sold standardised packs only, and 0.04% sold fully-branded packs only. Over the 10 weeks, there was a reduction in the total volume of sales in fully-branded packs from 2.59% in week 1 to 0.61% in week 6, to 0.50% by the tenth week of mandatory compliance. Finally, over the 10 weeks, the total range of fully-branded tobacco products sold, as a proportion of the total number of tobacco products sold, decreased from 76.95% in week 1, to 52.53 in week 6, to 40.80% in week 10 (at week 10 this accounted for only 0.50% of total sales). The total volume of sales for standardised products was high (99.5%) 10 weeks post-transition, however over half of small retailers (53.30%) were still selling some fully-branded products at this point.

4.3.3 Pricing

Four studies examined how retailers and tobacco companies responded to the legislation in terms of pricing (Critchlow 2019[23,24], Purves 2019[20], Moodie 2018[28], Breton 2019[22]). All four studies were quality appraised as raising some minor concerns.

Critchlow 2019[23,24] conducted a descriptive analysis of monthly trends for sales data for 40 tobacco products: the top 20 leading fully-branded products (15 factory-made cigarettes (five value-, eight mid-, two premium-priced) and five RYO (all mid-priced)) and their standardised equivalents, as sold by 300 small retailers in England, 100 in Scotland and 100 in Wales, including symbol group-affiliated and independent convenience stores. The study monitored monthly Electronic Point of Sale (EPoS) data from a commercial source (The Retail Data Partnership) from May 2016 to October 2017. The aim was to explore how tobacco products in standardised packaging (compliant) were introduced by tobacco companies into small retailers and how tobacco products in fully-branded packaging (non-compliant) were removed; whether small retailers complied with standardised packaging legislation; what changes occurred in pricing during the introduction of standardised packaging and how did they vary by type and price segment; and how closely small retailers adhered to Recommended Retail Price (RRP) during the introduction of standardised packaging. The study measured the number of monitored products sold each month by each retailer and the average RRP and sales price for each product in each retailer.

Purves 2019[28] conducted a thematic analysis, using an inductive approach, of interview data from face-to-face interviews with 24 small independent retailers selling tobacco, conducted in-store during business hours (lasting 20 to 30 minutes). The sample were from four Scottish communities with different levels of urbanisation and social deprivation and comprised retailers from 12 grocery/convenience stores, five confectioners, tobacconists, and newsagent stores, three off-

licences, three petrol stations/garage forecourts and one fast food/take-away outlet. The aim of the study was to explore the response of retailers in Scotland to standardised packaging and the TPD shortly after these measures became mandatory. The interviews were conducted between 23 May 2017 and 26 June 2017, in the two months after the end of the transition period, with retailers reflecting on their experiences during the transition period and the lead up to standardised packaging. The interviews examined how retailers set prices and convey pricing information to customers, the implementation of standardised packaging, the level and nature of support provided by tobacco companies, and the emergence of new strategies to promote tobacco products.

Moodie 2018[26] conducted a content analysis of four business magazines and one website aimed at retailers who sell tobacco products, routine surveillance of four supermarket online shopping websites and monthly visits and informal interviews with a convenience sample of supermarkets, independent retailers, convenience stores, forecourt traders, and off-licences in both urban and suburban areas (sample size not reported). The study was conducted over 24 months, between May 2015 and June 2017, covering a year before transition, the transition year and one month post-transition. The aim was to use routine surveillance of the cigarette and rolling tobacco market in the UK to explore how tobacco companies responded to standardised packaging and the TPD by monitoring pack, brand and product changes pre- and post-implementation. The accumulated data were examined for packaging, brand and product changes, developments and introductions, including: graphical or structural pack designs; pack sizes; brand launches, name changes, brand extensions, brand rationalisation; and product design innovations.

Breton 2019[22] conducted a descriptive analysis of cigarette sales data from >75,000 megastores, superstores, high street stores and convenience stores in the UK (from a commercial source; Nielsen Scantrack) by using line graphs to compare trends and a linear regression model. The study used continuous data from March 2013 to June 2017; three years pre- to one month post-transition. The study made 58,190 total valid observations of 1,064 cigarette products; an average of 658 fully-branded products (range = 431-824) and 138 standardised products (range = 8-226) per month (only the findings from May 2016 onwards are reported here). The aim of the study was to describe and quantify changes in brand diversity, price segmentation and sales volumes, and to estimate the association between the introduction of standardised cigarette packaging and cigarette pricing. The Nielsen data included the average retail price per cigarette, which comprised all available products in all pack sizes, and the average retail price for products sold in packs containing 20 cigarettes (the minimum cigarette pack size post-transition). The Nielsen data also accounted for the prices of fully-branded cigarettes sold as standard priced or discount (promotional) priced.

(i) Retailers' approaches to pricing
The Purves 2019[28] qualitative study explored retailers' approach to pricing. Although the removal of price-marked packs offered greater pricing flexibility, retailers mainly priced their products in line with the RRP. They exercised some flexibility on setting prices for premium brands but generally relied on RRP for most stock to remain competitive. This was particularly true for retailers situated close to larger shops/supermarkets which tended to price at RRP.

While the Moodie 2018[26] study was not specifically concerned with pricing, it was noted that in October 2016 (personal communication with study lead author) that "BAT provided some retailers with posters highlighting the transition of Pall Mall from fully-branded to standardised packs and explaining that while Pall Mall cigarettes would still contain a capsule, the symbol on the filter that identified that it was a capsule cigarette was no longer allowed", and that the posters also show that the standardised (plain) pack contains two more cigarettes for the same price: "as the Pall Mall core range transitions to plain pack size, adult tobacco consumers will find their new 20s KS/SK packs to have the same RRP (recommended retail price) as the current 18 packs they purchase. That's 10% more value for the same price" (p.5).

(ii) Association between standardised packaging and price
Breton 2019[22] used linear regressions to estimate the association between standardised packaging and cigarette price and to estimate the association between standardised packaging and price per single pack of 20 cigarettes. Breton 2019[22] found that standardised packaging was associated with a significant increase in price per cigarette, regardless of pack size. On average cigarettes in standardised packs were 5p (95% CI = 4.8–5.3, p<0.001) more expensive than cigarettes in standard-priced fully-branded packs. There was no statistically significant difference in price per cigarette for products that appeared in standardised packaging with an adapted name (p=0.939). The second regression analysis found that standardised packaging was associated with a significant increase in the price per pack of 20 cigarettes. On average cigarettes in standardised packs of 20 were £1.00 (95% CI = 0.9–1.1, p<0.001) more expensive than cigarettes in standard-priced fully-branded packs. Price increases for packs of 20 cigarettes changing from standard-priced fully-branded to standardised packs were greater for those in the lower price quintiles, ranging from £2.60 (95% CI = 2.4–2.7, p<0.001) per pack in the cheapest quintile to £0.40 (95% CI = 0.3–0.4, p<0.001) per pack in the most expensive quintile. Products that adapted their name after February 2014 had a £2.80 (95% CI = 2.9–2.7, p<0.001) lower price per pack compared to products that did not adapt their name after February 2014. However, the price of those products that appeared in the market in standardised packaging with an adapted name after May 2016 was £1.20 higher (95% CI = 1.1–1.4, <0.001).

(iii) Monthly average price per cigarette
Breton 2019[22] found that the average price per cigarette in fully-branded packs increased steadily, from 34p to 39p for standard-priced products, and from 31p to 37p for promotional priced products, between March 2013 and June 2017. At the start of the transition period (May 2016), both standard-priced products and promotional-priced cigarettes in fully-branded packs had an average price per cigarette greater than 35p. The average price of a cigarette in a standardised pack was consistently higher than the average price, in the same month, of a cigarette in a fully-branded pack, and in June 2017 was 43.5p. In a subgroup analysis of average monthly price per cigarette by pack size (seven categories: fully-branded multi-packs of 11-19 and ≥20 cigarettes; fully-branded single packs of 10, 11-19 and ≥20 cigarettes; standardised multi-packs of ≥20 cigarettes; standardised single packs of ≥20 cigarettes), Breton 2019 showed that the price per cigarette in standardised packs was lower than that of fully-branded packs of 10 cigarettes, but higher than for all other fully-branded products.

(iv) Monthly average price per pack of cigarettes by price segment
Breton 2019[22] analysed the average monthly price per pack by price quintile for single packs of 20 cigarettes, the minimum cigarette pack size post-transition. The difference in price between products in fully-branded and standardised packs of 20 cigarettes was largest in the lowest price quintile (cheapest; an average difference of £2.50/pack in the cheapest quintile) and decreased gradually with increasing quintile average price to a difference of £0.90/pack in price quintile 5 (highest). Lower-priced cigarettes thus became considerably more expensive with the adoption of standardised packs, while the price of the most expensive products remained relatively stable.

(v) RRP and sales price – cigarettes (overall and by price-segment)
Critchlow 2019[23,24] conducted a descriptive analysis of monthly trends in EPoS sales data for 40 tobacco products sold in 500 small retailers from May 2016 to October 2017, i.e. throughout the transition period and 5 month post-transition. The study reported the following trends in average inflation-adjusted RRP-per-cigarette for 20 top selling factory-made-cigarettes sold by small retailers (overall trends, and by value, mid-price and premium price-segments). In months 1 to 5 (May and September 2016) of the transition period, when only fully-branded packs were sold by the retailers in the sample, there was a small net increase in RRP-per-cigarette (+0.67%). Following this, in months 6 to 13 (October 2016 to May 2017) of the transition period, when both fully-branded and standardised packs were sold, there was the largest net increase in average RRP-per-cigarette (+3.51%), with the increases highest for value (+4.45%) and mid-price cigarettes (+2.25%). Finally, in the first five months post-transition (June to October 2017; standardised packs, minimum pack size and no price-marks), there was a net decrease in RRP-per-cigarette (-0.47%). This was driven by declines for mid-priced

cigarettes (-0.45%), given that there were net increases for value cigarettes (+0.22%) and premium cigarettes (+4.79%). By examining data over the whole 18-month study period, between May 2016 and October 2017, Critchlow 2019[23,24] demonstrated that the average inflation-adjusted RRP-per-cigarette for cigarettes increased +3.75%, equivalent to a £0.30 increase for a 20 cigarettes pack. The net increase was highest for premium cigarettes (+6.49%, £0.64 increase per 20 cigarettes), then for value (+5.32%, £0.37 increase per 20 cigarettes) and for mid-price cigarettes (+2.11%, £0.18 increase per 20 cigarettes). In October 2017 (5 months post-transition), the average RRP-per-cigarette for mid-price cigarettes was +14.87% higher than for value cigarettes, which is lower than the corresponding difference in May 2016 (month 1 of the transition), when only fully-branded products could be sold (+18.48%). Conversely, the average RRP-per-cigarette for premium cigarettes in October 2017 (5 months post-transition) was +23.65% higher than mid-price cigarettes, which was greater than the corresponding difference in May 2016 (month 1 of the transition; +18.58%).

Critchlow 2019[23,24] also reported trends in average inflation-adjusted sales price-per-cigarette for the same 20 top selling factory-made cigarettes sold by small retailers (overall trends, and by value, mid-price and premium price-segments). In months 1 to 5 (May to September 2016) of the transition period, when only fully-branded packs were sold by the retailers in the sample, there was a small net increase in sales price-per-cigarette (+0.86%). In months 6 to 13 (October 2016 to May 2017) of the transition period, when both fully-branded and standardised packs were sold, there was the largest net increase in sales price-per-cigarette (+4.70%), with increases highest for value (+5.76%) and mid-price cigarettes (+3.61%). Finally, in the first five months post-transition (June to October 2017), there was an overall net decrease in the average sales price-per-cigarette (-1.14%), with net decreases for mid-priced (-0.64%) and value cigarettes (-0.50%), but a net increase for premium cigarettes (+2.99%). Over the whole 18-month study period, between May 2016 and October 2017 it was found that the average inflation-adjusted sales price-per-cigarette increased +4.64%, equivalent to a £0.38 increase on a 20 pack of cigarettes. The net increase was highest for premium cigarettes (+5.32%, £0.54 increase per 20 cigarettes), followed by value (+6.81%, £0.48 increase per 20 cigarettes) and mid-price cigarettes (+3.30%, £0.28 increase per 20 cigarettes), although value cigarettes had the largest relative (percentage) increase. In October 2017 (5 months post-transition), the average sales price per-cigarette for mid-price cigarettes was +15.00% higher than for value cigarettes, which is lower than the corresponding difference in May 2016 (month 1 of the transition; +18.90%). The average sales price-per-cigarette for premium cigarettes in October 2017 (5 months post-transition) was +23.06% higher than for mid-price cigarettes, which was greater than the corresponding difference in May 2016 (month 1 of the transition; +20.71%).

The Critchlow 2019[23,24] study found that the RRP and sales prices of leading cigarettes sold in small retailers, in all price-segments, increased during the introduction of standardised packaging.

(vi) RRP and sales price – roll-your-own tobacco
Critchlow 2019[23,24] reported the following trends in average inflation-adjusted RRP-per-gram for 20 top selling RYO tobacco products sold by small retailers, all in the mid-price segment. Between months 1 and 5 (May to September 2016) of the transition period, when only fully-branded packs were sold by the retailers in the sample, there was a small net increase in RRP-per-gram of RYO tobacco (+1.10%). Following this, in months 6 to 13 (October 2016 to May 2017) of the transition period, when both fully-branded and standardised packs were sold by the retailers in the sample, there was the largest net increase in average RRP-per-gram of RYO tobacco (+3.07%). Finally, in the first five months post-transition (June to October 2017; standardised packs, minimum pack size and no price-marks), there was a small net decrease in RRP-per-gram of RYO tobacco (-0.89%). Over the whole 18-month study period, between May 2016 and October 2017 the data showed that the average inflation-adjusted RRP-per-gram for RYO products increased +7.07%, equivalent to a £0.77 increase for a 30 gram RYO pack.

The Critchlow 2019[23,24] study also reported trends in average inflation-adjusted sales price-per-gram for 20 top selling RYO tobacco products sold by small retailers, all in the mid-price segment. In the first

five months (May to September 2016) of the transition period, there was a net increase in sales price-per-gram of RYO tobacco (+1.30%). During months 6 to 13 (October 2016 to May 2017) there was the largest net increase in average sales price-per-gram of RYO tobacco (+3.75%). Finally, in the first five months post-transition (June to October 2017), there was a net decrease in sales price-per-gram of RYO tobacco (-0.88%). Over the whole 18-month study period, between May 2016 and October 2017 it was found that the average inflation-adjusted sales price-per-gram for RYO products increased +8.34%, equivalent to £0.91 increase for a 30 gram pack.

Critchlow 2019[23,24] found that the RRP and sales prices of leading RYO tobacco products sold in small retailers increased during the introduction of standardised packaging.

(vii) Trends in RRP and sales price for cigarettes and RYO sold in standardised packaging by small retailers

Critchlow 2019[23,24] examined monthly nominal average RRP and sales price (£), and the difference (%) between the two was calculated across the subsamples of fully-branded and standardised products and by price segment. As reported in Section 4.2.2, in the Critchlow 2019[23,24] study with small retailers, the first standardised cigarette and RYO products were sold in month 6 of the transition period. During months 6 to 8 of the transition period (October and December 2016), the average RRP for standardised cigarette and RYO products ranged from £10.70 to £11.62. During the late transition period, from months 9 to 13 (January to May 2017), the average RRP declined as more products were sold in standardised packs, reaching £9.05 (SD=1.69) by May 2017. In the first five months post-transition (June to October 2017), there was little difference in the average number of standardised cigarette and RYO products sold by each retailer (M range: 16.24–16.45; SD range=2.64–2.95) or the average RRP (M range: £9.05–£9.08; SD range=1.70–1.72). RRP trends within price segments followed the overall trend over the transition period for mid-price products, with average RRPs for standardised cigarette and RYO products decreasing from £11.62 in October 2016 to £9.54 in May 2017. However, for value and premium cigarette products, there was an increase in RRP, the former price segment increasing from £7.05 to £7.42, and the latter increasing from £9.85 to £10.22 at May 2017 (month 13). All three price segments followed the overall trend during months 1 to 5 post-transition, with little difference in average RRP for each price segment for standardised cigarette and RYO products.

The Critchlow 2019[23,24] study using EPoS data further showed that between October 2016 and January 2017, when the first standardised tobacco and RYO products appeared in small retailers, the average difference between sales price and RRP ranged from +0.54% to +0.95% and was comparable with the average for fully-branded tobacco and RYO products for the same period (range: 0.64%–0.97%). In the late transition period, from February 2017 (month 9) on, when most standardised products began to be sold (M=10.21; SD=3.07), the difference between sales price and RRP began to increase. By May 2017 (month 13), the average difference between sales price and RRP had increased to +1.31% (SD=0.36). In the first post-transition month, June 2017, when compliance was mandatory, the average difference between sales price and RRP for standardised cigarette and RYO products rose to +1.35% (SD=0.31), where it remained consistent until October 2017 (month 5) (range: +1.32% to +1.37%).

Critchlow 2019[23,24] analysed sub-group differences between RRP and sales price by the price segments (value, mid-price, premium) of the standardised cigarette and RYO products. When value cigarette products first appeared in standardised packaging in January 2017 (month 9), sales prices were on average +0.37% higher than RRPs (SD=0.16). There was a net increase in the difference as more value cigarette products became available in standardised packaging, reaching +1.31% (SD=0.20) in June 2017 (month 1 of mandatory compliance), after which the difference remained stable. When mid-price cigarette and RYO products first appeared in standardised packaging in October 2016 (month 6), sales prices were on average +0.95% higher than RRPs. There was a net increase in the difference as more mid-price cigarette and RYO products became available in standardised packaging, reaching +1.43% (SD=0.40) by May 2017 (month 13), after which (months 1 to 5 of mandatory compliance) the difference remained stable. When premium cigarette products appeared in standardised packaging in

February 2017 (month 10), average sales prices were +0.91% (SD=0.55) higher than RRPs. There was a small net increase in this difference as standardised packaging became mandatory, reaching +1.10 (SD=0.35) in May 2017 (month 13), after which (months 1 to 5 of mandatory compliance) the difference remained stable.

Critchlow 2019[23,24] also analysed sub-group differences between RRP and sales price by the price segments (value, mid-price, premium) of the standardised cigarette and RYO products over the whole study period; month 1 of transition (May 2016) versus month 5 of mandatory compliance (October 2017). The data showed that the average difference between RRP and sales price for value cigarettes (+1.39%), mid-price cigarettes and RYO products (+1.42%) in October 2017, when only standardised products were sold, was higher than the comparable averages for value cigarettes (+0.02%), mid-price cigarettes and RYO products (+0.21%) in May 2016, when only fully-branded products were sold. For premium cigarette products, however, the average difference between RRP and sales price was higher in May 2016, when only the fully-branded products were sold (+2.18%), than in October 2017 (+1.05%) when only standardised products were sold.

(viii) Trends in small retailers selling fully-branded cigarette and RYO products and nominal average RRP; Trends in the difference between RRP and sales price for fully-branded cigarette and RYO products sold by small retailers

Critchlow 2019[23,24] examined monthly nominal average RRP and sales price (£), and the difference (%) between the two was calculated across the subsamples of fully-branded and standardised products and by price segment. In May 2016, month 1 of the transition period, the average RRP of fully-branded cigarette and RYO products was £7.71 (SD=1.24), and over the first ten months of the transition there was little variation in product availability, although average RRP did increase to £8.13 (SD=1.23) in the same period. Late in the transition period, in the final three months (March to May 2017), the average RRP of fully-branded cigarette and RYO products remained at £8.13 (SD=1.16). After standardised packaging became mandatory, some retailers sold fully-branded cigarette and RYO products in the first five months post-transition (n=67 in June 2017, declining to n= 4 in October 2017). The average number of fully-branded cigarette and RYO products sold by each retailer was low (mean range: 1.00–1.28; SD range: 0.00–0.62). The RRP trends within price segments followed the same overall trend over the transition period, with average RRPs for fully-branded cigarette and RYO products within each segment low. Critchlow's 2018[23,24] study, using EPoS data, further showed that when the transition period began in May 2016, sales prices for fully-branded cigarette and RYO products were, on average, +0.36% higher than RRPs (SD=0.72). Over the next 9 months (months 2 to 10) there was a net increase in this difference, and by February 2017 (month 10) sales prices for fully-branded cigarette and RYO products were, on average, +0.97% higher than RRPs (SD=0.58). Late in the transition period (months 11 to 13), there was a further increase in the average difference, coinciding with a reduction in the availability of fully-branded products, and by the final month (May 2017) sales prices for fully-branded cigarette and RYO products were, on average, +2.45% higher than RRPs (SD=1.23). In the first post-transition month, June 2017, when compliance was mandatory, there was a further increase in the average difference between average sales price and RRP (to +3.53%) and in October 2017 (to +12.51%); however this was based on sales of only a few products from a limited number of retailers.

Critchlow 2019[23,24] analysed sub-group differences between RRP and sales price during the transition period by price-marked versus non-price-marked fully-branded cigarette and RYO products. For price-marked fully-branded cigarette and RYO products, there was no evident difference (%) between average sales prices and RRPs for fully-branded price-marked products in May 2016, the first month of the transition period. There was a net increase across the transition year, and by May 2017 (month 13) the average difference between sales price and RRP for price-marked branded cigarette and RYO products had increased to +1.17% (SD=2.21). For the non-price-marked fully-branded cigarette and RYO products, the difference between sales price and RRP was, on average, +1.68% (SD=0.97), in the first month of the transition period (May 2016). There was a net decrease in the difference across months 1 to 10. By February 2017 (month 10) the average difference between sales price and RRP for non-price-marked fully-branded cigarette and RYO products had decreased to +1.19% (SD=0.53). In

the final months of the transition period, once availability of fully-branded products began to decline sharply, the average difference between sales price and RRP for non-price-marked fully-branded cigarette and RYO products exhibited a corresponding increase, reaching +2.95% (SD=1.25) by May 2017 (month 13).

Critchlow 2019[23,24] also provided an analysis of sub-group differences between RRP and sales price during the transition period for price segments (value, mid-price, premium) for fully-branded cigarette and RYO products. Initially, in May 2016, the average difference between RRP and sales price for fully-branded premium cigarette products (+2.18%) was higher than mid-price cigarette and RYO products (+0.21%) and value cigarette products (+0.02%). This was followed by a net increase in the average difference for all price segments across the transition year, reaching +2.59% for value cigarette products products,+2.14% for mid-price cigarette and RYO products and +3.68% for premium cigarette products in May 2017 (month 13).

5 Contribution to Consortium themes

5.1 Smoking

The UK has a comprehensive tobacco control strategy, with a raft of policies having been introduced within the last two decades in particular, most recently standardised packaging. Nevertheless, while smoking prevalence is in long-term decline, smoking remains the leading cause of premature death.

The project builds on past Consortium work on smoking, particularly the previous systematic review assessing the potential public health impacts of standardised tobacco packaging,[4,5] which formed the basis of the UK Government's public consultation in 2012, and a subsequent update of the evidence[6] which fed into the review conducted by Sir Cyril Chantler. Whereas the previous systematic review and update were limited by being conducted before standardised packaging had been implemented in the UK, the current study examines data collected after standardised packaging was implemented. This is the first review of evidence in the UK on real world responses to standardised packaging, by consumers, tobacco companies and retailers.

5.2 Incentives and regulation

After a lengthy consultation period, underpinned by evidence provided by the Consortium, the 'Standardised Packaging of Tobacco Products Regulations'[7] and 'Tobacco and Related Products Regulations'[8] were phased in between 20 May 2016 and 19 May 2017, making the UK the third country to fully implement this measure, following Australia in December 2012 and France in January 2017. The legislation, which also transposes the Tobacco Products Directive[9] into UK law, requires all cigarettes and rolling tobacco sold in the UK to come in 'drab brown' coloured packs with pictorial health warnings on at least 65% of the principal display areas. Packs are not allowed to feature any other markings or financial incentives (such as price-marks), or information which promotes a product or encourages consumption by creating an erroneous impression about its characteristics (e.g. that it is less harmful than other brands), or any reference to taste, smell or flavour. The legislation also sets a minimum pack size of 20 sticks for factory-made cigarettes and 30 grams for hand-rolling tobacco.

There is considerable interest in the impact of the policy, in the UK and internationally. The review provides evidence not only on consumer response to the legislation, but also on how the legislation was implemented in practice. For example, a key finding is that despite being given 12 months to implement the legislation, tobacco companies generally delayed the introduction of standardised packs onto the market, allowing them to continue selling fully-branded packs for much of the transition period.

In Section 7 we discuss possible regulatory options for strengthening or extending standardised packaging.

5.3 Health inequalities

There continues to be a clear socio-economic gradient in smoking in England, with smoking rates much higher among lower socio-economic groups (Office for National Statistics, 2018). Tobacco control policies such as standardised packaging have the potential to affect this socio-economic patterning and to narrow or widen health inequalities. Where evidence exists on socio-economic and other differences in consumer responses to standardised packaging, this is synthesised in the review. Only two of the consumer studies considered socio-economic variables within the analysis. Bogdanovica et al[19] found that awareness of the legislation was lowest in the lowest socio-economic group compared to the AB, C1, C2 socio-economic groups. Moodie et al[27] found that among smokers currently using standardised packs, in comparison with those who had never used standardised packs, the health warnings were more salient and they were more likely to have thought about quitting because of the

look of the pack, with these associations remaining when adjusted for demographic variables (including social grade) and smoking characteristics (quit attempts in past 12 months, HSI, and currently trying to quit/reduce).

5.4 Translation to policy

Section 21 of the Standardised Packaging of Tobacco Products Regulations requires the Secretary of State to publish a report within five years of the regulations coming into force to assess the extent to which the objectives of standardised packaging are being met and whether those objectives remain appropriate.[7] The findings will inform this Post-Implementation Review.

6 Discussion

6.1 Summary of main findings

A total of ten studies on standardised packaging were included in this review. Five studies explored consumer response to standardised packaging and five the response of tobacco companies and changes in the retail environment.

6.1.1 Consumer responses to standardised packaging

The five consumer studies comprised four online surveys and one eye-tracking study, all conducted during the transition period, when both fully-branded and standardised packs were on sale. All studies were conducted with adults, apart from one online survey with 11-15 year olds.[19] Three studies reported on socio-cognitive and indirect behavioural outcomes,[21,27,29] and three on behavioural outcomes,[19,21,27] included intentions to, or thoughts about, quitting, or anticipated changes in behaviour.

Improving attention to, and thereby effectiveness of, health warnings is a key objective of standardised packaging. There was evidence from three studies (two surveys and an eye-tracking study), which either compared use of standardised packs with non-use of standardised packs, or both standardised packs and fully-branded packs, suggesting that standardised packs increased attention to health warnings.[21,27,29] Encouraging more accurate perceptions of the harms and risks of smoking is another key objective of standardised packaging. The one study which examined this reported that smokers who used standardised packs thought more about the health risks of smoking because of the look of the pack than did smokers who did not use standardised packs.[27] Another objective of standardised packaging is to reduce the appeal and attractiveness of tobacco products and smoking in general, but no study examined this outcome.

None of the studies examined behavioural outcomes relating to uptake of smoking, prevalence of smoking, or actual cessation behaviour, although Moodie et al[27] examined self-reported engagement with stop-smoking websites, and two studies examined quit intentions or thoughts about quitting.[21,27] When comparing smokers by current use of standardised packs, Moodie et al[27] reported that more current users of standardised packs, compared with previous users or never users, reported having visited a stop-smoking website in the last month, but no statistical analysis was conducted given the small sample sizes reporting visiting a stop-smoking website in the last month. The same study found that current users of standardised packs were more likely than previous or never users to indicate that they had thought about quitting because of the look of the pack, suggesting a potential effect of the pack on thoughts about quitting. Poundall et al[21] reported that just under half of smokers thought that their likely response to the legislation would be to quit smoking, and three-fifths thought they would cut down, with infrequent smokers more likely than frequent smokers to report both outcomes. With respect to product switching, Bogdanovica et al[19] reported that just less than a third of smokers reported switching products within the last six months (which was during the transition period), with just over a half of these changing to a cheaper brand, and Poundall et al[21] reported that approximately two-fifths of smokers anticipated that in response to the legislation they might switch to rolling tobacco (41%), a cheaper brand (28%) or e-cigarettes (19%). No study reported any evidence of differential responses to standardised packaging by age, sex or socio-economic variables.

6.1.2 Tobacco companies' responses and changes in the retail environment

The five studies exploring tobacco companies' responses and changes in the retail environment comprised three descriptive analyses of monthly trends for sales data, an interview study, and a content analysis and surveillance of supermarket websites and interviews with retailers.

Three studies examined how tobacco companies responded to standardised packaging by introducing changes to brand variants and names, pack sizes and designs.[22,23-26] There was evidence of multiple brand variant name changes during the transition period, particularly for cigarettes. While the ban on descriptors which may create an erroneous impression about a product's characteristics or make reference to taste, smell or flavour accounted for many of these changes, other changes were made by tobacco companies, presumably to generate attention (e.g. JPS Black became JPS Legendary Black).[26] There was also evidence of brand rationalisation in all three studies,[22,23-26] with Breton et al[22] finding a decline in the total number of brands available on the market from the start of the transition period. Some new cigarette pack sizes (23 and 24 packs) were observed during the transition period[26] – these pack sizes have previously been on the UK market but were not on the market at the time of the study. One study found that from the start of the transition period until January 2017 tobacco companies introduced limited-edition pack designs or tins for a number of cigarette and RYO brands.[26]

Four studies examined implementation of, and/or compliance with, the legislation.[20,22,25,28] Breton et al's[22] analysis of cigarette sales in more than 75,000 stores showed that while standardised cigarette packs first appeared for sale in July 2016 their presence increased slowly until near the end of the transition period (February 2017). Similarly, Critchlow et al's[25] analysis of the 20 leading cigarette and RYO variants in 500 small retailers found that only four of these were sold in standardised packs in the first eight months of the transition period, and that it was not until month 11 (March 2017) that the average number of cigarette and RYO products sold in standardised packaging by each retailer was greater than the average number of fully-branded cigarette and RYO products sold. These findings suggest that tobacco companies took full advantage of the 12 month transition period which, in comparison to other five markets with standardised packaging, was the same as in Norway and Ireland but longer than in Australia (two months), New Zealand (12 weeks) and France (seven and a half months).

Standardised packaging was mandatory for all cigarettes and RYO tobacco from 20 May 2017. In terms of compliance, Breton et al[22] found that standardised packs accounted for 96% of total volume of sales in June 2017, with Critchlow et al[20], using sales data from an average 2,414 small retailers per week, finding that in July 2017 standardised packs accounted for 99.5% of total volume of sales. An interview study conducted in the two months after standardised packaging was fully implemented, while limited to 24 small retailers selling tobacco from four Scottish communities, found that all but one retailer indicated that they had complied with the legislation.[28] Retailers stated that they were not prepared to risk being fined for selling non-compliant stock and had been notified by tobacco company representatives that any remaining non-compliant stock would be exchanged for compliant stock for free.[28] While these studies show compliance to be high, they also show that retailers continued to sell fully-branded packaging after standardised packaging had been fully implemented. Critchlow et al[20] found that ten weeks post-transition over half of small retailers (53%) still sold fully-branded packs, even if these fully-branded packs accounted for only a very small proportion of overall sales. The interview study with small retailers offers some insight into this, with many of the retailers reporting that they had been left with fully-branded stock after the legislation.[28]

Four studies examined how retailers and tobacco companies responded to the legislation in terms of pricing.[22-24,26,28] Purves et al[28] found that, in general, retailers reported pricing their products in line with RRP to stay competitive, particularly retailers situated close to larger shops or supermarkets which priced at RRP. However, retailers did exercise some flexibility on setting prices, particularly for premium brands. Critchlow et al[24], using EPoS data from 500 small retailers, found a small increase in the average difference between RRP and sales price between May 2016, when only fully-branded packs were sold, to October 2017, when standardised packs were mandatory.

Breton et al[22] found that between May 2016 and June 2017, in comparison to standard priced fully-branded packs, standardised packaging was associated with significant increases in price per cigarette (regardless of pack size), and price per pack of 20 cigarettes. They found that lower-priced cigarettes became considerably more expensive with standardised packaging, while the price of the most

expensive products remained relatively stable. Critchlow et al[23] found that for cigarettes the average inflation-adjusted RRP-per-cigarette and the average inflation-adjusted sales price-per-cigarette increased in each price segment (premium, mid-price, value). This increase was greatest for premium cigarettes, but the largest relative percentage increase was for cigarettes in the value segment. For RYO products, the average inflation-adjusted RRP-per-gram and average inflation-adjusted sales price-per-gram also increased between May 2016 and October 2017.[23]

6.2 Strengths and limitations

The main strength of this review is that it synthesised all published research in the UK (until February 2019) exploring how consumers, tobacco companies and retailers responded to standardised packaging. By doing so, rather than focusing solely on consumer response, we provide a more complete picture of what has happened in the UK market since standardised packaging was phased-in from May 2016. We conducted a systematic review and believe that we captured every published study that was eligible for inclusion, i.e. exploring response to standardised packaging in the UK since it has been introduced. We list other on-going research into standardised packaging which will be potentially published in the coming months and years.

The review has a number of limitations. The heterogeneous range of outcomes examined combined with the relatively small number of studies limited the extent to which findings could be synthesised. The review was restricted to studies published as peer reviewed articles and this may have introduced a publication bias by excluding grey literature. That one or more authors of this report were involved in seven (of the eleven) publications introduces a risk of researcher bias, given that the authors would be appraising their own work. However, to minimise this risk, the methodological quality of the included studies was assessed by an external research unit (EPPI-Centre), where two external assessors chose or developed their own assessment tools and independently assessed study quality before agreeing final ratings. The data extraction process was conducted by a single reviewer, which could have introduced errors.

There are also limitations with the studies included. Two of the consumer studies were quality appraised as raising major concerns in their methodology[19,23] with concerns about the soundness of the data (e.g. the response rate was not considered sufficient, the data were not described adequately) and analyses (e.g. the size of the dataset for the analyses conducted[19], the appropriateness of the analyses[23]), see Appendix 6. However, as noted in Section 3.3.2, this does not necessarily mean that the actual results of the analysis are unsound.

All used convenience or probability sampling, and for two of the studies the sample was drawn from only one university,[21,29] and for another the sample was recruited from only two regions of England.[27] All but one of these studies, an eye-tracking study,[29] relied upon self-report. With respect to study design, a previous systematic review of research on standardised packaging, prior to it being introduced in any country, noted that the type of designs that are generally regarded as the most robust, such as longitudinal studies, were not at the time possible.[4] All the consumer studies we identified in this review were cross-sectional, and therefore provide no insight into causality. For instance, for the three cross-sectional studies reporting on behavioural outcomes (e.g. thoughts about quitting or intentions to quit), they do not provide any insight into whether these thoughts or intentions lead to behavioural change.[30]

Another limitation of research included within a previous systematic review,[4] prior to standardised packaging being fully implemented in any country, was that the included studies typically used hypothetical scenarios to assess the potential impacts of this policy and, as such, were unable to gauge how consumers would actually respond if all packs on the market were standardised. This is a criticism of one of the consumer studies,[21] conducted during the early transition period when few standardised packs were on the market, and where smokers were asked to predict what their likely response to the

legislation would be. The study found low awareness of standardised packaging among smokers, which is useful in confirming that tobacco companies had delayed the introduction of standardised packs,[22,25,28] but caution needs to be exercised in interpreting the findings regarding possible behavioural response.

As all the consumer studies were conducted during the transition period, and it is clear from several of the included studies that standardised packs were only widely available at the end of the transition period,[19,22,25,27,28] then for participants in these studies the standardised packs would have been novel. A limitation when comparing new packs with those already on the market is that the new packs often generate a stronger (whether positive or negative) response, which can distort findings.[31] For the Retzler et al[29] eye-tracking study, a neuroscience technique was used which can overcome many of the limitations of methodologies reliant upon subjective and behavioural responses.[32] However, as prior exposure to standardised packaging was not assessed, and the authors suggested that 'prior exposure to post-regulation [*i.e. standardised*] packs was likely to have been low', this may have increased attention to the new (standardised) packs.

The studies exploring the response of tobacco companies to standardised packaging and changes in the retail environment were either assessed as raising some minor concerns, or in one case no concerns.[20] However, they have some limitations in terms of scope. For instance, a study using EPoS data to explore changes in pricing of the 20 top-selling cigarette and rolling tobacco brand variants in small retailers[23-25] does not provide any insight into pricing beyond the brand variants included, sales volume or any changes in larger retailers.

6.3 Gaps in the evidence and future research

All the consumer studies included in the review were conducted during the transition period, at a time when fully-branded packaging, at least for some brand variants, was still available for sale. Research exploring how smokers and non-smokers respond to standardised packaging over time is clearly necessary to be able to understand the impacts of this policy, particularly as the Impact Assessment on standardised packaging calculated the net gain to government over a ten year period post-implementation.[33] Similarly, while research exploring the response of tobacco companies to standardised packaging and changes in the retail environment typically covered the transition period and shortly after standardised packaging became mandatory (up until October 2017 in some cases), medium and longer term research is needed to monitor continuing tobacco company practices and strategies. Such research is important not just in the UK but for countries intending to introduce standardised packaging.

As noted in section 6.2, none of the included consumer studies employed a longitudinal design. Research conducted pre- and post-standardised packaging is needed to explore what impact, if any, it has had on smoking and cessation related behaviours. We also found that no consumer study had employed a qualitative design. Despite the limitations of qualitative research, which typically have small samples and lack generalisability, it can offer insight into how different populations respond to standardised packaging, the reasons behind this, and any unintended consequences.

Reducing appeal is a core aim of standardised packaging, but no study in this review measured appeal. In a previous systematic review all 28 studies assessing the appeal of packs, cigarettes and smoking, found that irrespective of methodology, sample characteristics and location, standardised packaging, in comparison to fully-branded packaging, reduced appeal.[4] Research in the UK is needed to confirm whether this reduction in appeal has occurred with the actual implementation of standardised packaging. Similarly, research exploring the impact, if any, of standardised packaging on smoking uptake, cessation behaviour or relapse prevention would be of significant value. Further research on product switching[19,21] would also be beneficial, particularly if it also includes illicit tobacco use, which

was not assessed in any of the included studies. While standardised packaging is intended to have an impact on all consumers, irrespective of age and smoking status, it is generally thought that this measure may have a greater effect on youth and, as only one study[19] focused on those under the age of 18, further research with youth is needed.

Two studies reported on responses to standardised packaging by socio-economic variables, something often overlooked in the literature. Bogdanovica et al[19] found that awareness of the legislation was lowest in the lowest socio-economic group compared to the AB, C1, C2 socio-economic groups. Moodie et al[27] found that among smokers currently using standardised packs, in comparison with those who had never used standardised packs, the health warnings were more salient and they were more likely to have thought about quitting because of the look of the pack, with these associations remaining when adjusted for demographic variables (including social grade) and smoking characteristics (HSI, quit attempts, current attempts to quit/reduce). No study assessed differences by ethnicity.

7   Future policy options

The aim of the current tobacco control plan for England is 'nothing less than a smokefree generation'.[34] On exiting the EU, the UK Government will have the opportunity to tailor tobacco control policy, if considered appropriate, to provide improved health outcomes.[34] The response of retailers and tobacco companies to standardised packaging, in terms of pricing and pack, brand and product developments, may help inform future policy. We outline a number of possible pack, price and retail related policy options based on the studies reviewed, and consideration of standardised packaging legislation elsewhere (see Table 1).

Table 1: Overview of pack, price and retailer related policy options

	Specification	Reason
Pack related policy options		
Pack feature		
Quantity	Single pack quantity, e.g. 20 cigarettes, 30 grams rolling tobacco	To prevent tobacco companies from using pack size/weight to differentiate their brands or communicate value for money
Shape	Straight-edged packs (for cigarettes only)	Rounded and bevelled-edged packs are intended to increase appeal
Opening	Flip-top packs (for cigarettes only)	Shoulder boxes undermine warning salience
Name	No colour or filter descriptors in brand or variant name	To prevent tobacco companies misleading consumers about product harm
Inserts	Inserts promoting cessation	To supplement on-pack warnings and provide smokers with advice on quitting and how to do so
Cigarette feature		
Geometry	Fixed diameter (e.g. 8 mm) and length (e.g. 82-84 mm)	To prevent slimmer cigarettes and cigarette geometry being used to differentiate brands
Warning	A warning on each cigarette stick	To extend the health message to consumption
Filter	A ban on filter modification	To prevent filter innovation
Price related policy options		
Minimum pricing	Minimum price for cigarettes and rolling tobacco	To prevent tobacco companies from absorbing tax increases
Retail related policy options		
Promotional communication	Ban promotional communication between tobacco companies and retailers	Tobacco companies continue to incentivise retailers for selling or promoting their products
Incentivisation	Incentivise retailers to promote available help or e-cigarettes	To reach smokers at the point of sale, where the purchase decision is often made

7.1   Packaging related policy options

Requiring standardised packaging for all tobacco products

In the UK standardised packaging legislation applies to cigarettes and rolling tobacco. For other tobacco products (e.g. pipe tobacco, cigars, cigarillos) the packaging is only required to display pictorial health warnings, or text warnings in the case of cigars with a unit weight greater than three grams. Other tobacco products are not subject to a minimum pack size and, as a result, some packs of cigars or cigarillos are now much more affordable options than cigarettes and rolling tobacco. For instance, the lowest priced cigarillos in Tesco in February 2019 were £4.29 (10 Royal Dutch Miniature Blue Cigarillos), with the cheapest cigarettes £8.00 (20 Rothmans King Size Blue) and cheapest rolling tobacco £10.50 (30g Holborn Yellow). Research has yet to explore what impact, if any, having full branding or smaller pack sizes or lower price points has had on perceptions or use of these products, but retailers have been encouraged to take advantage of these differences.[35] In several other markets with standardised packaging (Australia, New Zealand, Ireland), the legislation covers all combustible tobacco products, which remains a policy option for the UK Government.

No research has explored the impact of having full branding on the packaging of heated tobacco products, where the tobacco is heated rather than burned. Heated tobacco products are relatively new to the UK, with the first of these (IQOS) appearing on the market in 2016. In 2017 only 9% of adults reported being aware of heat-not-burn products, with less than 2% reporting having tried them,[36] but awareness and use will likely have increased since then. While heated tobacco products are not covered by standardised packaging legislation in the UK, the Scottish Government state that they will gather evidence on heated tobacco products and, if appropriate, require them to be sold in standardised packaging.[37] Heated tobacco products are covered by the standardised packaging regulations in Canada.

Fixed pack quantity

Persoskie et al[38] reviewed tobacco company internal documents to assess their rationale for introducing new pack sizes, expectations about doing so, and influence on behaviour. A key reason for introducing new pack sizes is to influence consumer behaviour. Price is often an important factor with respect to new pack sizes, with larger packs a competitive tool providing better per unit value.[38] According to some documents 25 packs, with five more cigarettes than the standard 20 pack, were considered a possible way to help stabilise industry volume decline. While this may not be the case in all markets, there was high demand for 25 packs in Australia which resulted in a price war and the introduction of even larger pack sizes (30s, 35s, 40s, 50s), helping to maintain volumes in this country even as prevalence fell.[38]

One of the studies we reviewed found that some tobacco companies introduced larger pack sizes, i.e. packs containing more than 20 cigarettes, post-standardised packaging.[26] While these were only 23 and 24 packs, the marketing literature suggests that even small changes in pack size can result in increased sales and profits,[39] with a recent increase in sales of 24 packs observed in some other countries.[40] There is also nothing preventing tobacco companies from introducing the 27 and 30 packs currently sold in Ireland, or even larger pack sizes, which are preferred by what one tobacco industry document terms 'commodity smokers', for whom price is everything.[38] Marketing briefs to tobacco companies in the UK, from the 1990s, discussed the possibility of larger pack sizes, including 50, 100 and 500 packs.[41-43] There are examples of even larger pack sizes for loose tobacco in some European markets, with Figure 2 showing a pack from Belgium that contains enough tobacco for almost 1000 cigarettes; in this example, from 2015, the cost of 20 cigarettes would be approximately one euro (48.20 Euros for up to 960 cigarettes).

Figure 2: Pack in Belgium containing enough loose tobacco for up to 960 cigarettes

A policy option that would prevent tobacco companies from using pack size to create interest, differentiate brands, and communicate value for money, would be one or two fixed pack sizes for cigarettes and RYO. In New Zealand the standardised packaging regulations specify that packs can only contain 20 or 25 cigarettes, and 30 grams or 50 grams of rolling tobacco. In Russia, only 20 packs are permitted for cigarettes, as packs with fewer cigarettes are considered more affordable and packs with more cigarettes better value for money.[44] As retailers interviewed shortly after standardised packaging became mandatory stated that the specification of minimum pack sizes had made ordering and storage easier, because there were fewer pack sizes on offer,[28] stipulating fixed pack quantities may aid retailers' inventory management.

Standardisation of pack shape

Marketers carefully consider how pack design features such as shape can affect consumer perceptions, brand impressions, and purchase and consumption behaviour.[39] Tobacco companies have long recognised the potential impact of cigarette pack shape on brand appeal, risk perceptions and increased sales.[45] In the UK tobacco companies are permitted to have cigarette packs that are slim and have different edge types (straight, rounded or bevelled).[26] Tobacco companies appear to have responded by using signature shapes for some brands, e.g. Marlboro in round edged packs, Pall Mall in straight bevelled edged packs, Camel in curved bevelled edged packs, and Alluvé and Vogue in slim packs (see Figure 3).

Figure 3: Standardised packs with rounded or bevelled edges, or that are slim

It is not clear what impact, if any, these particular shapes have when the packaging is otherwise uniform and unappealing. While some marketers argue that pack shape constitutes tactile branding,[46]

others contend that as products are seen before they are touched, it is their appearance that anchors consumer expectations and has a greater influence on the subsequent experience than how the pack feels when in a consumer's hands.[47] There is very limited research on consumer response to the shape of standardised packs, but an online survey with smokers in Australia found that straight-edged plain packs were perceived as less attractive and lower quality than bevelled-edged plain packs.[48] Similarly, focus group research in Turkey with young adult smokers, shown straight-edged and bevelled-edged standardised packs available in the UK, found that the bevelled-edged packs were viewed as more appealing.[49] The small sample size of both studies limits generalisability, but the findings are consistent with tobacco industry documents,[45] which suggest that bevelled-edged packs help create appeal. Similarly, tobacco companies' annual reports suggest that rounded-edged packs permit a premium feel and help to differentiate brands.[50]

For slimmer packs, research in the UK has found that they can communicate femininity, elegance and slimness, increase pack appeal and lower perceptions of product harm.[51-53] These studies, however, only explored fully-branded packs with a slimmer width (which are referred to as 'lipstick' or 'purse' packs and are now banned) rather than a slimmer depth (Figure 4 shows an example of both). Nevertheless, a focus group study with 12-24 year old females from Scotland explored both slimmer pack formats and found that while the 'lipstick' packs were most appealing, both pack formats were viewed as more appealing, and more discreet, than conventional packs.[54]

Figure 4: Slim pack formats: Lipstick type pack on left that is banned, and slimmer pack format on right that is still sold post-standardised packaging

For the slimmer packs that are still available on the UK market, it has been suggested that these may breach the Tobacco and Related Products Regulations, given that the text warnings on the side of the pack, which must be 'at least 20mm wide', are between 8-12mm wide.[44] To prevent pack shape being used to differentiate brands and potentially increase appeal or mislead consumers about product harm, a regulatory option would be to permit only straight-edged standardised cigarette packs, and specify that the depth of the pack must be at least 20mm. These are requirements in Australia and New Zealand, and no bevelled-edge, rounded-edge, or slimmer standardised packs have been identified in these markets.

Standardisation of method of opening
In the UK cigarette packs are required to be flip-top or shoulder boxes. Both pack formats are also permitted in the other three European countries (France, Norway, Ireland) which have fully implemented standardised packaging; this is as a consequence of Article 14(2) of the TPD, which states that 'A unit packet of cigarettes may consist of carton or soft material and shall not have an opening

that can be reclosed or re-sealed after it is first opened, other than the flip-top lid and shoulder box with a hinged lid'.[9] Shoulder boxes may undermine the salience of the pictorial warning on the pack front by rendering it less visible when the pack is opened (see Figure 5). Although there is no evidence to date that shoulder boxes have been introduced in the UK for cigarettes, post-standardised packaging, a regulatory option would be to permit only flip-top packs, as is the case in the two non-European countries (Australia and New Zealand) with standardised packaging.[44]

Figure 5: Shoulder boxes used for some brand variants in France.

Limiting the impact of brand and variant name

While the display of brand and variant names on standardised packs must meet certain conditions, such as the position on the surface area on which they appear, the font size, style and typeface, text colour, and allowable characters, this does not prevent brand or variant names which may influence product perceptions. One study we reviewed found that variant name change was common in the UK during the transition period, partly in response to the ban on flavour and taste descriptors.[26] Tobacco companies increasingly included a colour descriptor within the variant name, which is often used to connote strength, or additional descriptors[26], e.g. for the John Player Special brand the variants 'Silver', 'Menthol' and 'Black' became 'Silver Stream', 'Green Edge' and 'Legendary Black' respectively. The inclusion of a colour descriptor was also common in Australia following the introduction of standardised packaging[55] and the use of more evocative variant names is a strategy used in other countries with standardised packaging, with new variants such as 'New York Blend' and 'Silver Fine Scent' in Australia, 'Master Blend Blue' and 'Rum & Wine' in New Zealand, 'Black Alaska' in France,[44] and 'Choice Super Line' in Ireland, see Figure 6.

Figure 6: Variant names on plain packs in Australia, France, Ireland, UK and New Zealand

No research has explored the impact, if any, of the new variant names on standardised packs in the UK, but the potential of certain variant names on standardised packs to mislead consumers was identified by a systematic review and Cochrane review of the literature.[4,11] One policy option, which

is included in the standardised packaging regulations in Canada, would be a ban on colour descriptors within brand or variant names. As a much broader range of descriptors on packs (e.g. related to filter, blend, quality) can affect smokers' perceptions of the characteristics of the cigarettes contained within,[56] a second regulatory option would be to ban the use of variant names.[57] A third option, and one proposed by the Turkish Government, would involve a complete ban on brand variant names, with each brand variant instead assigned a number that would be displayed on the pack and communicated to consumers via product lists in-store.[49]

Pack inserts promoting cessation

Tobacco companies used the inside of the cigarette pack to communicate with consumers in the UK for over 125 years, with cigarette cards dating back to the 1880s,[58] and coupons (that could be redeemed for money off the next pack or other goods) from at least the early 1900s.[59] The use of pack inserts is also a longstanding practice. These have been used to communicate information about the pack, brand or product, as the basis of promotions, and to undermine or challenge regulation.[60,61] For instance, prior to the ban on misleading pack descriptors such as 'Light' and 'Mild' in 2003 inserts were used to explain how colour coding would be used thereafter to signify product strength,[4] and in 2013 inserts were included in Marlboro packs to encourage consumers to challenge tobacco regulation.[62] One of the studies we reviewed showed that inserts were used in the run-up to standardised packaging (May 2015-April 2016) to inform of novel filter designs,[26] see Figure 7.

Figure 7: Inserts used to communicate filter innovation

As a result of the Tobacco Advertising and Promotion Act and the standardised packaging regulations, tobacco companies are no longer allowed to use pack inserts to promote their products. A House of Commons Science and Technology Committee report states that the UK Government should review the ban on inserts post-Brexit as it has prevented tobacco companies from using them to make claims about the relative health benefits of switching to e-cigarettes.[63] However, allowing tobacco companies to design inserts aimed at switching to alternative, non-combustible nicotine containing products has been questioned.[64] In Canada, tobacco companies have been required to include health-promoting inserts, designed by Health Canada, in packs since 2000. The first set of 16 inserts encouraged cessation or provided detailed health information to complement the on-pack warnings.[65] In 2012 a second set of eight inserts were introduced, with coloured graphics and messaging highlighting the benefits of quitting or providing tips on how to do so; none of these inserts mention e-cigarettes, but two contain the message 'Nicotine is the drug in tobacco that causes addiction'. Figure 8 shows examples of the first and second set of inserts in Canada. A third set of inserts will be introduced in Canada from 2021.

In a longitudinal study in Canada, smokers who read the inserts introduced in 2012 a 'few times or more' in the previous month were more likely to have made a quit attempt at the subsequent wave

compared to smokers who had not read the inserts.[66] More frequent reading of inserts was also associated with greater self-efficacy to quit, increased quit attempts, and sustained quitting at follow-up.[67] Focus group research in the UK exploring perceptions of the inserts used in Canada found that these were viewed favourably, and were thought to have the potential to encourage quitting among some smokers, particularly younger people and those wanting to quit.[68] An online survey with smokers from across the UK found that three-fifths of the sample indicated that inserts would be a good way to provide information about quitting, and just over half indicated that inserts would make them think more about quitting, help if they decided to quit, are an effective way of encouraging smokers to quit, and supported having them in all packs.[69]

Figure 8: Examples of the first set of inserts (white background with yellow highlight), and second set of inserts (with coloured graphics) used in Canada


Standardisation of cigarette appearance

One of the studies we reviewed found that tobacco companies introduced novel filter designs in the run-up to standardised packaging (May 2015-April 2016), including firmer filters, recessed filters, multi-segment filters, and a cigarette with two flavour-changing capsules in the filter.[26] The success of capsule cigarettes, i.e. cigarettes which have one or more frangible capsules in the filter which can be burst to change the flavour, is testament to the importance of the cigarette and filter innovation. Since being introduced in the UK in 2011, market share of capsule cigarettes has increased every year.[70] By 2017, the UK was the seventh largest market for capsule cigarettes, which had approximately 13% market share.[71] At least five new capsule variants were introduced in 2018,[71] with the capsule segment accounting for 15.4% of sales in this year.[72] So far in 2019, Japan Tobacco International (JTI) has introduced two new capsule variants, one of which is Sterling Dual Triple Green (see Figure 9), the first 'triple menthol' cigarette in the UK market – it is a menthol cigarette with a peppermint (40% menthol) and spearmint (0.5% menthol) capsule.[72] Imperial Brands has launched Rizla Polar Blast, the first RYO filter tip in the UK to contain a capsule.[73] The Head of Sales for JTI anticipates continued growth for the capsule segment in 2019,[72] despite a ban on the open display of tobacco products and standardised packaging.

Flavoured tobacco products, including cigarettes with flavour capsules in the filter, will be banned in the UK and across the EU from May 2020. Non-flavoured capsules, such as the water capsules introduced following a flavour ban in Canada, will still be permitted.[74] However, filter innovation is not restricted to capsule cigarettes. There is also a trend towards novel types of tipping paper on the filter, such as tactile (e.g. supersmooth), natural (e.g. unbleached pulp) and heavy tipping paper, which makes it easier for printing and embossing.[75] As an example of filter innovation, one tobacco company has been granted a patent for an additional layer of detachable tipping paper that can be removed to

allow the smoker a different sensory (e.g. visual, aromatic or tactile) experience,[76] with another company patenting a filter containing a material to reduce the smell of smoke on consumers' hands.[77]

Figure 9: Capsule cigarettes still being introduced post-standardised packaging
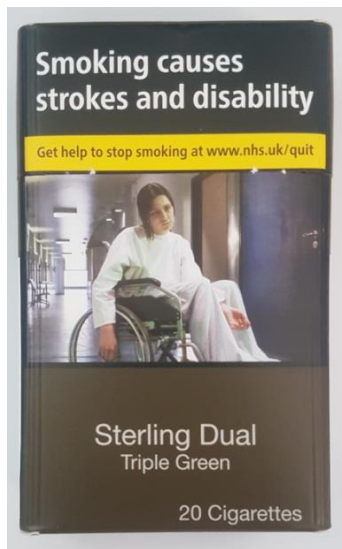
What is clear is that packaging is not, as was thought, the 'last chance marketing saloon',[78] with the cigarette becoming an increasingly important means of brand promotion. There are a number of policy options that could be used to counter this innovation and extend standardised packaging. For instance, one option proposed in the draft Tobacco Products Directive in 2012,[79] would be to specify the diameter of cigarette sticks, thus preventing slimmer cigarettes.[44] Slims and superslims cigarettes, while having very low market share in the UK, are one of the fastest growing sectors of the global cigarette market[80,81] and have been found to increase appeal and confuse consumers about product harm.[82-5] The standardised packaging regulations in New Zealand, by requiring the diameter of cigarette sticks to be between 7 mm and 9 mm, effectively bans slimmer sticks. In Canada, while standardised packaging has yet to be introduced, the regulations will require cigarettes to have a specified diameter (7.65mm-8 mm) and length (71–73 mm for regular-size cigarettes, 83–85 mm for king-size cigarettes),[86] thus not only preventing slimmer cigarettes but also standardising cigarette geometry (length and diameter).

Another possible option would be to require cigarette sticks to be an unappealing colour or to include a printed warning on the body of the stick. Tobacco companies have included printing on the cigarette paper in the UK since at least the 1950s. As standardised packaging stipulates that the cigarette paper must be white, with no markings other than the brand variant name (in a specific font size, type and position), the inclusion of a warning on each stick would appear most feasible (see Figure 10). A warning on each cigarette would extend health messaging from the pack to the cigarette, and therefore to the actual consumption experience.[86,87] While there is a paucity of research on consumer perceptions of warnings on cigarettes, the extant literature suggests that they would be a constant reminder of the associated health risks, and that the warnings would make the cigarettes be viewed as less appealing and more harmful than standard cigarettes, and less likely to encourage product trial (see Moodie et al[61]).

Figure 10: Health warnings on cigarette sticks

Image: Cancer Research UK

A ban on modifications to the filter is a third regulatory option. The standardised packaging regulations specify that the filter must be white or imitation cork, but neither this nor the Tobacco and Related Products Regulation prevents filter innovation. Filter innovation allows tobacco companies to differentiate their products and increase appeal,[88] and given the success of capsule cigarettes in the UK this is extremely likely to continue, even after the flavour ban in May 2020. This is supported by tobacco industry journals, which predict that special filters and filter innovations will be the main driver of growth for traditional cigarettes.[89]

7.2 Price related policy options

Minimum pricing

Tobacco companies in the UK offer products in different price tiers (e.g. premium, mid-priced, value), resulting in a market characterised by price dispersion within and between price tiers.[90] The continued decline of cigarettes in the premium segment,[70] allied to the continued growth of the value segment,[91] suggests that smokers are increasingly price-conscious, and this is supported by the retail press.[92] As two of the studies reviewed found that the price of cigarettes in each price tier increased post-standardised packaging,[22,23] it is likely that the value segment will continue to grow.

While prices have increased in the UK, tobacco companies are known to employ strategies to minimise the impact of this.[93] For instance, between 2013 and 2015 the average real prices for the cheapest cigarettes and rolling tobacco segments remained steady, while volumes grew.[90] Low prices were maintained through reductions in pack size (e.g. packs containing 17, 18 or 19 cigarettes), price-marking, and absorbing taxes.[90] While pack sizes smaller than 20 for cigarettes and 30 grams for RYO are no longer possible, and price-marking is banned, tobacco companies are still able to undershift (absorb) taxes, which is most marked for the cheapest price tiers.[90] As such, any policies that target low price tiers might ameliorate socioeconomic disparities in smoking,[93] a priority for the UK government and devolved administrations.[37,94-96]

One price policy option would be minimum pricing, which is a percent mark-up on the wholesale/retail price of a tobacco product and/or a minimum floor price beneath which a product cannot be sold.[97] While it is suggested that minimum pricing in the UK would have breached EU competition law,[93,98] it may be a viable option when the UK leaves the EU. At least 24 states and the District of Columbia in the US have cigarette minimum price laws,[99] with the presence of these minimum price laws associated with higher cigarette prices.[100] Golden et al[97] recommend that minimum price policies set a floor price, a level below which products could not be sold, set rates above those established by free market, and impose strong penalties and dedicate more resources for enforcement.

Prior to standardised packaging being fully implemented, there were various small pack sizes on offer in the UK for cigarettes (10, 14, 17, 18, 19) and RYO (5g, 8g, 9g, 10g, 11g, 12.5g, 25g), giving consumers a range of affordable options. These smaller pack sizes proved popular. For instance, 90% of packs sold within each RYO segment in 2015 were under 30 grams.[90] Post-standardised packaging, there is a minimum pack size requirement for cigarettes (20) and RYO (30 grams), considerably fewer pack sizes currently on offer for cigarettes (20, 23, 24) and RYO (30g, 40g, 50g, 100g), and only three pack sizes (20 for cigarettes and 30g and 50g for RYO) which account for most sales. A minimum price for the lowest legally permitted pack sizes, or a minimum price per stick or per gram, would likely have a greater impact post-standardised packaging as there are no small pack options available. It would also prevent tobacco companies from absorbing tax increases for products in the value segment to ensure that products are available at a lower price than they would otherwise be.[93] Minimum unit pricing has recently been introduced in Scotland for inexpensively priced alcohol products with high alcohol content, in an attempt to ensure that alcohol is priced sensibly and to reduce potential harms, particularly for hazardous and harmful drinkers.

7.3   Retail related policy options

Banning promotional communication with tobacco companies, and incentivising retailers to promote cessation

In response to comprehensive bans on tobacco advertising, promotion and sponsorship, tobacco companies often increase marketing expenditure in the retail environment.[101,102] Even in countries like the UK, where the open display of tobacco products is banned, and standardised packaging is required, tobacco companies continue to incentivise retailers for stocking and promoting their brands.[28,103] While this may seem paradoxical, given that brands are out of sight and sold in packaging with a uniform appearance, tobacco industry journals suggest that in such markets the retailer becomes the only medium to transport news of innovations.[104] The retail press similarly highlights the importance of the retailer, e.g. "In today's tobacco environment, we rely on retailers to communicate (new product development) NPD to consumers more than ever".[91] That JTI and Imperial Brands, the duopoly that dominate the UK tobacco market, were the most likely of all consumer goods companies to visit small retailers at least four times per year,[105] and Imperial Brands claimed that they would spend £300 million in 2017 bolstering their top brands, including greater spending on deals with retailers,[106] further emphasises the importance of retailers to tobacco companies.

Given the importance of retailers to tobacco companies, particularly in dark markets such as the UK, one option would be to prohibit promotional communication between manufacturers/distributors and retailers, where manufacturers/distributors are not permitted to offer rebates, gratuities or any other benefits related to the sale of tobacco products. Such regulation has been introduced in Quebec.[107] While tobacco sales are an important income source for small retailers in particular, interviews with small retailers in England before standardised packaging was implemented found that most reported low overall profit margins.[108] With margins low, smoking prevalence and consumption in long-term decline in the UK and volume recovery unlikely, another option would be to incentivise retailers to stop selling tobacco[109] or to promote quitting (e.g. via leaflets promoting cessation services and other ways to quit) or switching to non-tobacco containing nicotine products such as e-cigarettes.

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Outputs / Dissemination

The aim of this report was to provide findings to the Department of Health and Social Care in order to help inform their Post-Implementation Review.

Peer-reviewed publications

- We have no peer-reviewed publications from the project. It was our intention to publish an article but as we identified fewer publications than anticipated, particularly with respect to studies exploring consumer responses to standardised packaging, we are not sure that there would be sufficient interest in the review.

Conference papers and presentations

- We have no conference papers or presentations from the project but intend to submit an abstract to the SRNT Europe conference (September 2019, Oslo).

Other dissemination

- We have no other dissemination to report, but the findings will be presented as part of an international seminar 'Co-creating Policy for a Smoke-free Generation' (June 2019, Edinburgh).

Appendices

Appendix 1: Sample search strategy

Medline via Ovid: searched 15th August 2018

Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Daily and Versions(R) 1946 to August 14, 2018

Searches

1   (cigar* or smok* or tobacco).ab,ti,kw.

2   "Smoking Cessation"/ or "Smoking Prevention"/ or Smoking/ or "Tobacco Industry"/ or "Tobacco Products"/ or exp "Tobacco Smoking"/ or "Tobacco Use Cessation"/

3   1 or 2

4   ((brand* or (colo?r adj1 schem*) or descriptor? or design? or graphic? or image? or imagery or logo? or trademark? or trade-mark?) adj3 (ban? or banned or banning or outlaw* or prohibit* or remov* or restrict* or without)).ab,ti,kw.

5   (("drab brown" or "drab green" or dissuasiv* or generic* or homogen?ous or neutral* or "olive green" or plain or standard* or unbranded or uniform*) adj3 (can? or canister? or carton? or container? or hardpack? or pack* or pouch or pouches or softpack? or tin?)).ab,ti,kw.

6   product packaging/ or product labeling/

7   4 or 5 or 6

8   exp United Kingdom/

9   (britain or british or england or english or gb or "G.B." or "GB." or "G.B" or ireland or irish or scotland or scottish or wales or welsh or "united king*" or uk or "U.K." or "UK." or "U.K").ab,gi,in,ti.

10   (nhs or "national health service").ab,gi,in,ti.

11   8 or 9 or 10

12   3 and 7 and 11

13   limit 12 to yr="2016 - 2019"

Fields: ab = abstract, kw = keywords, ti = title, in = institution, gi = grant information (displays information about awarded grants, may contain Grant Number (NO), Grant Acronym (GR), Grant Organization (GO) and Grant Country (GC).)

Medline via Ovid: searched 15th February 2019

Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Daily and Versions(R) 1946 to February 14, 2019

#	Searches
1	(cigar* or smok* or tobacco).ab,ti,kw.
2	"Smoking Cessation"/ or "Smoking Prevention"/ or Smoking/ or "Tobacco Industry"/ or "Tobacco Products"/ or exp "Tobacco Smoking"/ or "Tobacco Use Cessation"/
3	1 or 2
4	((brand* or (colo?r adj1 schem*) or descriptor? or design? or graphic? or image? or imagery or logo? or trademark? or trade-mark?) adj3 (ban? or banned or banning or outlaw* or prohibit* or remov* or restrict* or without)).ab,ti,kw.
5	(("drab brown" or "drab green" or dissuasiv* or generic* or homogen?ous or neutral* or "olive green" or plain or standard* or unbranded or uniform*) adj3 (can? or canister? or carton? or container? or hardpack? or pack* or pouch or pouches or softpack? or tin?)).ab,ti,kw.
6	product packaging/ or product labeling/

7   4 or 5 or 6

8   exp United Kingdom/

9   (britain or british or england or english or gb or "G.B." or "GB." or "G.B" or ireland or irish or scotland or scottish or wales or welsh or "united king*" or uk or "U.K." or "UK." or "U.K").ab,gi,in,ti.

10   (nhs or "national health service").ab,gi,in,ti.

11   8 or 9 or 10

12   3 and 7 and 11

13   limit 12 to yr="2018 -Current"

14   limit 12 to ed=20180801-20191231

15   limit 12 to ep=20180801-20191231

16   limit 12 to dt=20180801-20191231

17   limit 12 to ez=20180801-20191231

18   13 or 14 or 15 or 16 or 17

Fields: ab = abstract, kw = keywords, ti = title, in = institution, gi = grant information (displays information about awarded grants, may contain Grant Number (NO), Grant Acronym (GR), Grant Organization (GO) and Grant Country (GC)), ed = entry date, ep = electronic date of publication, dt = create date [phrase indexed], ez = entry date [phrase indexed], yr = year of publication.

Appendix 2: EPPI-Centre critical appraisal tools

Quantitative studies – Human participants

- Not a quantitative – human participants study [stop]
- AIMS: Was there a clear statement of the aims of the study? [Yes / No]
  Consider:
  - *what the goal of the research was*
  - *why it is important*
  - *its relevance*
- EXPERIMENT (not applicable for all studies)
  - Not applicable (not an experiment)
  - Were participants aware of the study aims before the experiment? [Yes / No / Unclear]
    Check for priming
  - Were there sufficient instances of presentation of the stimulus? [Yes / No / Unclear]
    Were there enough presentations of the two conditions?
  - Does the measurement instrument seem appropriate? [Yes / No / Unclear]
  - Was the presentation of the stimulus materials randomised for each participant? [Yes / No / Unclear]
    To control for learning or fatigue effects
  - Overall, are the concerns about the experiment? [Yes / No]
- DATA
  - Was the sampling method appropriate to the question/inference being made? [Yes / No / Unclear]
  - Did the study report a priori power calculations (where appropriate)? [Yes / No / Unclear]
    Did the researchers consider whether the sample was going to be adequately powered for the analyses?
  - Was the data sample representative of intended population? [Yes / No / Unclear]
  - Was the measurement of the independent variable(s) likely to be reliably assessed and validated? [Yes / No / Unclear]
  - Was the measurement of the dependent variable(s) likely to be reliably assessed and validated? [Yes / No / Unclear]
  - Was the response rate sufficient? [Yes / No / Unclear]
  - Were all variables of interest measured in the dataset? [Yes / No / Unclear]
  - Are the data adequately described? [Yes / No]
  - Overall, are there concerns about the soundness of the data for the purposes of the study? [Yes, concerns / No]
- ANALYSIS
  - Were the analyses appropriate given the stated aims? [Yes / No / Unclear]
    Does the analysis adequately test the hypothesis?
  - Was the size of the dataset sufficient for the analyses being conducted? [Yes / No / Unclear]
    Are there enough data points for the planned analyses?
  - Have the data been analysed appropriately? [Yes / No / Unclear]
    E.g., treating ordinal as continuous; not controlling for reasonable confounders
  - Overall, are there concerns about the analyses? [Yes, concerns / No]
- INFERENCES AND CONCLUSIONS
  - Are the inferences drawn from analyses appropriate given the sample relative to population? [Yes / No / Unclear]
  - Are the inferences drawn appropriate given the analyses and results? [Yes / No / Unclear]

- Is there an over-emphasis on statistical significance rather than magnitude/ direction of effect? [Yes / No / Unclear]
  (e.g. absence of descriptive data and effect sizes in presentation and discussion of results)
- OVERALL, are there concerns about the soundness of the study? [Yes, major concerns / Yes, some minor concerns / No]

Quantitative studies – Structured observation of documents or places

- Not a quantitative – structured observation study [stop]
- AIMS: Was there a clear statement of the aims of the study? [Yes / No]
  Consider:
  – *what the goal of the research was*
  – *why it is important*
  – *its relevance*
- DATA
  - Were the parameters of the documents/websites/other data to be analysed made clear? [Yes / No / Unclear]
  - Were the data extracted/collected using a structured approach? [Yes, evidence of structured template / No structured template provided or described / Unclear or Not Applicable]
    Evidence of structured templates for data collection
  - How were the data collected? [Manual recording and extraction of documents / Structured observation / Web scraping / Other (specify)]
  - Were any validity checks imposed around data collection? [Yes / No / Unclear]
    E.g. two researchers extracting data or attempts to source unavailable products
  - Were measures taken to address any issues in validity? [Yes / No / Unclear]
    E.g. to locate missing documents or records
  - Were there gaps in the data in terms of range of observations? [No obvious gaps / Yes, gaps were obvious but it was taken into account/adjustments were made / Yes, gaps were obvious and unclear how this was addressed / Unclear]
    E.g. In terms of only sections of documents/websites analysed or in terms of only observing some outlets within supermarkets
  - Were there apparent, unintended restrictions in the dataset in terms of tobacco products or data sources? [Yes (specify) / No / Unclear]
    Examples of limitations include:
    – *document sources,*
    – *limited brands,*
    – *limited products,*
    – *limited pack sizes,*
    – *limited types of retailers*
    Must be limitations that are unintended (i.e., not deliberate because of the focus of the study). Deliberate/intended limitations (e.g., if the study has an explicit focus on corner stores and the dataset only sampled corner stores) are acceptable; use 'No' here.
  - Did the study provide an explanation of any sampling strategy imposed? [Yes / No / Unclear]
    Did the authors defend the sample design/ target selection of cases/documents?
    Description of study locations/areas and how and why chosen
    Description of population of interest and how sample selection relates to it (e.g. typical, extreme case, diverse constituencies etc.)
    Rationale for basis of selection of target sample / settings/documents (e.g. characteristics/features of target sample / settings / documents, basis for inclusions and exclusions, discussion of sample size/number of cases/setting selected etc.)
    Discussion of how sample/selections allowed required comparisons to be made

- If sampling method employed, was it appropriate to the question/inference being made? [Yes / No / Unclear]
  E.g. sampling every other month or every six months
  E.g. sampling supermarkets in particular areas
- Was the sample of structured observations representative of intended population? [Yes / No / Unclear]
  E.g., limitations in type of shops visited (in person or by website)
  E.g. limitations in coverage of trade press
- Was the period of data collection appropriate for the aims of the study? [Yes / No / Unclear]
  Were the data collected at a period that the behaviours are expected to occur?
- Were all plausible data of interest extracted and measured in the dataset? [Yes / No / Unclear]
  As a social scientist, do you think something is missing?
- Are the data (measured collected/extracted) adequately described or summarised? [Yes / No]
- Overall, are there concerns about the soundness of the data for the purposes of the study? [Yes, concerns / No]
- ANALYSIS
  - Were the analyses appropriate given the stated aims? [Yes / No / Unclear]
    Does the analysis adequately test the hypothesis?
  - Was the size of the dataset sufficient for the analyses being conducted? [Yes / No / Unclear]
    Are there enough data points for the planned analyses?
  - Have the data been analysed appropriately? [Yes / No / Unclear]
    E.g., treating ordinal as continuous; not controlling for reasonable confounders
  - Overall, are there concerns about the analyses? [Yes / No]
- INFERENCES AND CONCLUSIONS
  - Are the inferences drawn from analyses appropriate given the sample relative to population? [Yes / No / Unclear]
  - Are the inferences drawn appropriate given the analyses and results? [Yes / No / Unclear]
  - Is there an over-emphasis on statistical significance rather than magnitude/ direction of effect? [Yes / No / Unclear]
    E.g. absence of descriptive data and effect sizes in presentation and discussion of results.
- OVERALL, are there concerns about the soundness of the study? [Yes, major concerns / Yes, some minor concerns / No]

Quantitative studies – Sales data
- Not a quantitative – sales data study [stop]
- AIMS: Was there a clear statement of the aims of the study? [Yes / No]
  Consider:
  – *what the goal of the research was*
  – *why it is important*
  – *its relevance*
- DATA
  - Was a commercial data set used? [Yes / No / Unclear]
  - What was the data collection method? [Scanner / Receipts / Other (specify)]
  - Was the dataset complete? [Yes, no gaps obvious / No, gaps were obvious but data company or researchers described modelling / No, gaps were obvious and unclear how this was addressed / Unclear]

- Were there apparent, unintended restrictions in the dataset in terms of tobacco products or sales points? [Yes (specify) / No / Unclear]
  Examples of limitations include:
  - *limited brands,*
  - *limited products,*
  - *limited pack sizes,*
  - *limited types of retailers*
  Must be limitations that are unintended (i.e., not deliberate because of the focus of the study). Deliberate/intended limitations (e.g., if the study has an explicit focus on corner stores and the dataset only sampled corner stores) are acceptable; use 'No' here.
- Was the sampling method appropriate to the question/inference being made? [Yes / No / Unclear]
- Was the data sample representative of intended population? [Yes / No / Unclear]
  E.g., limitations in locations, types of sales points, etc
- Did the study report a priori power calculations (where appropriate)? [Yes / No / Unclear]
  Did the researchers consider whether the sample was going to be adequately powered for the analyses?
- Was the timing of the data collection appropriate for the aims of the study? [Yes / No / Unclear]
  Were the data gathered at a time/s that the behaviours are expected to occur? Consider time of day, day of week
- Duration of study: Were the data collected over a sufficient time period for the intended analysis? [Yes, sufficient / No, not sufficient / Unclear]
  Consider issues such as seasonal variation or longitudinal data analysis plans. E.g., "Study duration was less than one year in most of the reviewed studies, making it impossible to control for seasonal variations in prices and quantity purchased and difficult to examine changes in population consumption patterns over time"
- Were all plausible variables of interest measured in the dataset? [Yes / No / Unclear]
  As a social scientist, do you think something is missing?
- Are the measures/ variables adequately described? [Yes / No]
- Overall, are there concerns about the soundness of the data for the purposes of the study? [Yes, concerns / No]
- ANALYSIS
  - Were the analyses appropriate given the stated aims? [Yes / No / Unclear]
    Does the analysis adequately test the hypothesis?
  - Was the size of the dataset sufficient for the analyses being conducted? [Yes / No / Unclear]
    Are there enough data points for the planned analyses?
  - Have the data been analysed appropriately? [Yes / No / Unclear]
    E.g., treating ordinal as continuous; not controlling for reasonable confounders
  - Overall, are there concerns about the analyses? [Yes / No]
- INFERENCES AND CONCLUSIONS
  - Are the inferences drawn from analyses appropriate given the sample relative to population? [Yes / No / Unclear]
  - Are the inferences drawn appropriate given the analyses and results? [Yes / No / Unclear]
  - Is there an over-emphasis on statistical significance rather than magnitude/ direction of effect? [Yes / No / Unclear]
    E.g. absence of descriptive data and effect sizes in presentation and discussion of results.
  - Is there an appropriate emphasis of the real-world importance of the statistical results? [Yes / No / Unclear]

- OVERALL, are there concerns about the soundness of the study? [Yes, major concerns / Yes, some minor concerns / No]

Qualitative studies

- Not a qualitative study [stop]
- AIMS: Was there a clear statement of the aims of the research? [Yes / No]
  Consider:
  - *what the goal of the research was*
  - *why it is important*
  - *its relevance*
- DATA COLLECTION
  - Was the recruitment strategy appropriate to the aims of the research? [Yes / No / Unclear]
    Consider:
    - *if the researcher has explained how the participants were selected*
    - *if they explained why the participants they selected were the most appropriate to provide access to the type of knowledge sought by the study*
    - *if there are any discussions around recruitment (e.g. why some people chose not to take part).*
  - Were the data collected in a way that addressed the research issue? [Yes / No / Unclear]
    Consider:
    - *if the setting for data collection was justified*
    - *if it is clear how data were collected (e.g. focus group, semi-structured interview etc)*
    - *if the researcher has justified the methods chosen*
    - *if the researcher has made the methods explicit (e.g. for interview method, is there an indication of how interviews were conducted, did they used a topic guide?)*
    - *if methods were modified during the study. If so, has the researcher explained how and why?*
    - *if the form of data is clear (e.g. tape recordings, video material, notes etc.)*
    - *if the researcher has discussed saturation of data*
- ANALYSIS
  - Was the data analysis sufficiently described? (New) [Yes / No / Unclear]
  - Was the data analysis sufficiently rigorous? [Yes / No / Unclear]
    Consider:
    - *if there is an in-depth description of the analysis process*
    - *if thematic analysis is used. If so, is it clear how the categories/themes were derived from the data?*
    - *whether the researcher explains how the data presented were selected from the original sample to demonstrate the analysis process*
    - *if sufficient data are presented to support the findings*
    - *to what extent contradictory data are taken into account*
    - *whether the researcher critically examined their own role, potential bias and influence during analysis and selection of data for presentation*
- CONTRIBUTIONS AND CONCLUSIONS
  - Was the research design appropriate to address the aims of the research? [Yes / No / Unclear]
    Consider if the researcher has justified the research design (e.g. have they discussed how they decided which methods to use?)
  - Has the relationship between researcher and participants been adequately considered? [Yes / No / Unclear]

Consider:

- *whether it is clear if the researcher critically examined their own role, potential bias and influence during:*
  - *formulation of research questions*
  - *data collection, including sample recruitment and choice of location.*
- *how the researcher responded to events during the study and whether they considered the implications of any changes in the research design*

- Have ethical issues been taken into consideration? [Yes / No / Unclear]
  Consider:
  - *if there are sufficient details of how the research was explained to participants for the reader to assess whether ethical standards were maintained*
  - *if the researcher has discussed issues raised by the study (e. g. issues around informed consent or confidentiality or how they have handled the effects of the study on the participants during and after the study)*
  - *if approval has been sought from the ethics committee*
- Is there a clear statement of findings? [Yes / No / Unclear]
  Consider:
  - *if the findings are explicit*
  - *if there is adequate discussion of the evidence both for and against the researcher's arguments*
  - *if the researcher has discussed the credibility of their findings (e.g. triangulation, respondent validation, more than one analyst.)*
  - *if the findings are discussed in relation to the original research questions*
- Are the conclusions appropriate given the analyses and results? (New) [Yes / No / Unclear]
- OVERALL, are there concerns about the soundness of the study? [Yes, major concerns / Yes, some minor concerns / No]

Appendix 3 EPPI-Centre list of studies and the related components critically appraised

The included studies, any associated report(s)/publication(s) and the methodological components therein that were assessed in the critical appraisal process:

Study (n = 10)	Report (publication) title (n = 11)	Methodological component assessed (n = 14)
1. Bogdanovica et al. 2017a[19] – adult sample	I. Awareness of Standardised Tobacco Packaging among Adults and Young People during the Final Phase of Policy Implementation in Great Britain.	i. Survey – Adult sample
2. Bogdanovica et al. 2017b[19] – young people sample		ii. Survey – Young people sample
3. Breton et al. 2019[22]	II. Cigarette brand diversity and price changes during the implementation of plain packaging in the United Kingdom.	iii. Sales data
4. Critchlow et al. 2018[20]	III. Did independent and convenience (small) retailers comply with standardised tobacco packaging in the UK?	iv. Sales data
5. Critchlow et al. 2019[23-25]	IV. Pricing of tobacco products during, and after, the introduction of standardised packaging: an observational study of retail price data from independent and convenience (small) retailers in the United Kingdom.	v. May 2016-Oct 2017: pricing of products sold by small retailers before and after the introduction
	V. Difference between recommended retail price and sales price for tobacco products in independent and convenience (small) retailers before and after the introduction of standardised tobacco packaging in the UK.	vi. May 2016-Oct 2017: small retailer adherence to RRP before and after the introduction
	VI. Introduction of standardised tobacco packaging during a 12-month transition period: Findings from small retailers in the United Kingdom.	vii. May 2016-May 2017: products sold by small retailers during transition period
6. Moodie et al. 2018[26]	VII. How tobacco companies in the United Kingdom prepared for, and responded to, standardised packaging of cigarettes and rolling tobacco.	viii. Analysis of trade press
		ix. Analysis of supermarket websites

				x.	Analysis of supermarket transaction
7.	Moodie et al. 2019[27]	VIII.	How did smokers respond to standardised cigarette packaging with new, larger health warnings in the United Kingdom during the transition period? A cross-sectional online survey.	xi.	Survey
8.	Poundall et al. 2018[21]	IX.	A cross-sectional study of the impact of standardised tobacco packaging legislation on university students	xii.	Survey
9.	Purves et al. 2019[28]	X.	The Response of Retailers in Scotland to the Standardised Packaging of Tobacco Products Regulations and Tobacco Products Directive.	xiii.	Interviews
10.	Retzler et al. 2019[29]	XI.	Eye movement data reveal increased attention to combined health warnings on cigarette packs.	xiv.	Experiment

Appendix 4 Flow diagram depicting the flow of information through the different phases of the systematic review

Note: Numbers in regular font are for the August 2018 searches, numbers in bold font are for the February 2019 searches.)
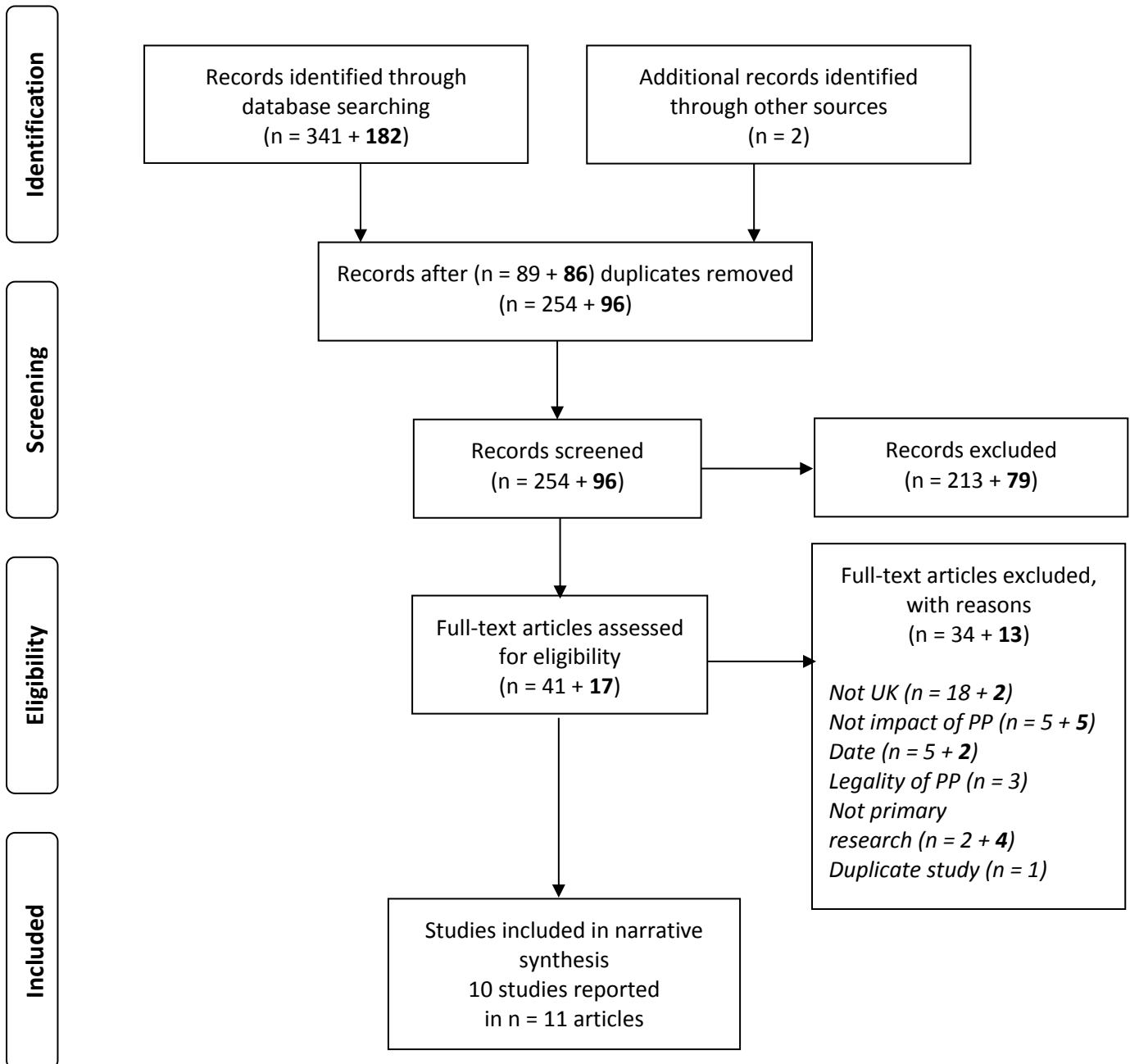
Appendix 5 Characteristics of the included studies

Study Relevance, Overall quality rating, Clear statement of aims Funder, Conflict of interests	Country/ies Study sample	Aim Design & Data collection methods Data collection period	Outcome measures
Bogdanovica 2017a[19] **Relevance:** High **Quality:** Some minor concerns **Aims clearly stated:** Yes **Funder:** Cancer Research UK **COIs:** none	England, Scotland, Wales **Sample size:** 2,033 **Age:** 18–55+ years **Gender:** mixed (52% female) **Social grade:** mixed **Smoking status:** mixed (15.7% current) **Sample type:** national representative sample	To investigate awareness of standardised packaging legislation among adults, when both standardised and branded packs were still widely available. Cross-sectional survey without an experimental design Online questionnaire 17-20 March 2017	**Consumer response** - awareness of the new plain packaging legislation - noticed any changes in tobacco packs in the last six months Current smokers only: - to identify the pack size they use from a list of product sizes currently available on the market[1] - whether they used any of the products that are affected by the implementation of the new legislation (2 categories: legal after full legislation implementation and unavailable after May 2017) - whether participants had changed the product they usually smoke in the last six months (standardised packaging implementation)
Bogdanovica 2017b[19] **Relevance:** High **Quality:** Major concerns	England, Scotland, Wales **Sample size:** 1,041 **Age:** 11–15 years **Gender:** mixed (49% female) **Social grade:** mixed	To investigate awareness of standardised packaging legislation among children and susceptibility to smoking among 11–15-year-olds, when both standardised and branded	**Consumer response** - smoking status - use of electronic cigarettes - whether they had noticed the new plain packaging before taking part in the survey

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[1] 20 or more cigarettes, 17, 18, or 19 cigarettes, 10 or 14 cigarettes, and roll your own in pack sizes of 10 g, 12.5 g, 20 g, 25 g, 30 g, 40 g, 50 g, and other.

Aims clearly stated: Yes **Funder:** Cancer Research UK **COIs:** none	**Smoking status:** mixed (91.1% never smokers, 2.4% current smokers) **Sample type:** national representative sample	packs were still widely available. Cross-sectional survey without an experimental design Online questionnaire 17-20 March 2017	Never smokers only: - level of susceptibility to smoking Current smokers only: - asked about the type of tobacco pack they used, - whether they used any of the packs or products that will be affected by the new legislation[2]
Moodie 2019[27] **Relevance:** High **Quality:** Some minor concerns **Aims clearly stated:** Yes **Funder:** Cancer Research UK **COIs:** One co-author works for Cancer Research UK (the funder)	England (Yorkshire & Humber and West Midlands regions) **Sample size:** 1,865 **Age:** 16–65+ years **Gender:** mixed (50% female) **Social grade:** mixed (43% ABC1, 57% C2DE) **Ethnicity:** 91% British White, 9% Other **Smoking status:** smokers of ≥1 cigarette/week (85% daily, 15% non-daily; 56% currently trying to quit/reduce; mean 2.34 (SD1.49) heaviness of smoking index) **Sample type:** regionally representative sample	To explore the association between use of standardised packs and health warning salience, thoughts about the risks of smoking, and thoughts about quitting. Also to assess awareness of stop-smoking websites, source of awareness, and whether participants had visited a stop-smoking website, given that a stop-smoking website is mandatory on the pictorial health warnings of standardised packs for the first time across all of the UK. Cross-sectional survey without an experimental design Online questionnaire 27 February to 21 April 2017	**Consumer response** *[shown an image of 4 standardised packs: Embassy Number 1 Red, Pall Mall Red Capsule and Lambert & Butler Green cigarettes, and Amber Leaf Original tobacco]* **Standardised packaging use** - Does the pack that you are currently using look like the ones shown in the image - Have you previously used a pack that looks like the ones shown in the image [Current users, Previous users and Never users of standardised packs] **Salience of health warnings** - In the last month how often, if at all, have you <u>noticed</u> the warning labels on packs? - In the last month how often, if at all, have you <u>read or looked closely at</u> the warning labels on packs? **Thoughts about health risks** - To what extent, if at all, does the look of the pack you are currently using make you think about the health risks of smoking? **Thoughts about quitting**

[2] including slim or superslim packs, packs of less than 10 cigarettes, cigarettes with a flavour capsule, or menthol cigarettes

			• To what extent, if at all, does the look of the pack you are currently using make you more likely to think about quitting smoking?
			Awareness of stop-smoking websites In the last month, have you noticed any information or adverts about a stop-smoking website? **Source of awareness of stop-smoking websites** Where did you notice information or adverts about a stop-smoking website?' and to check all that apply for the following response options: ***a) Warnings on packs of cigarettes or rolling tobacco***; b) TV; c) Radio; d) Newspapers or magazines; e) Posters or billboards; f) Brochure, newsletter or flyer; g) At a bus stop or on a bus; h) In the workplace; i) On the internet; j) Social media e.g. Facebook, Twitter; k) GP surgery; l) Other; m) Don't know **Engagement with stop-smoking websites** In the last month, have you visited a stop-smoking website to get advice about quitting?
Poundall 2018[21] **Relevance:** High **Quality:** Major concerns **Aims clearly stated:** Yes **Funder:** none[3] **COIs:** none	England (Nottingham) **Sample size:** 546 **Age:** median age 19 years (IQR 18-21) **Gender:** mixed (58% female) **Status:** undergraduate and postgraduate students **Smoking status:** mixed (31% smokers [includes daily, weekly, monthly and <monthly smokers])	To investigate university students' awareness of and attitudes toward the legislation and sightings of the new packs five to six months into the implementation period, as well as their views on potential changes in smoking behaviour in response to the new legislation. Cross-sectional survey without an experimental design	**Consumer response** *Prompt image of branded Lambert and Butler Original cigarette pack*: • whether they noticed health warnings on branded packs • whether they thought health warning labels would put them off smoking • awareness of standardised packaging legislation *Prompt explanation of the legislation and image of a standardised cigarette pack*: • seen any standardised packs • whether they noticed the health warnings on the standardised packs

[3] Funder and COI details via personal communication with T. Langley (19 August 2019).

	Sample type: convenience sample	Online questionnaire 26 October to 26 November 2016	• whether they thought the health warning labels would put them off smoking • whether they thought the change in packaging was a good idea Smokers only: • how willing they would be to pay current prices for a pack bearing this packaging • would they make behaviour changes such as quitting or switching to a cheaper brand or alternative products as a result of the legislation.
Retzler 2019[29] **Relevance:** High **Quality:** Some minor concerns **Aims clearly stated:** Yes **Funder:** none **COIs:** none	England (Huddersfield) **Sample size:** 47 **Age:** 19–58 years (mean=30.34; SD=10.05) **Gender:** mixed (47% male) **Status:** university staff and students with normal or corrected-to-normal vision **Smoking status:** smokers of ≥1 cigarette/week (average of 11.00 cigarettes per day (SD=6.62, range: 1–30) and 71.93 cigarettes per week (SD=50.64, range: 5–210)) **Sample type:** convenience sample	To directly compare attention (using eye movement data) to branding and warnings between the pre-regulation and post-regulation packs in smokers, and to determine whether this was affected by the amount smoked, to assess the effectiveness of the new policies. Cross-sectional survey (with experimental within subjects design) Tracking of eye fixations within area of interest (health warning or branding using SMI RED 250 eye tracker) on single images of the front of 8 pre-regulation packs and 8 post-regulation cigarette packs (including Sterling, Sovereign, Players,	**Consumer response** • Amount smoked – average number of cigarettes smoked per week (self-reported; average number of cigarettes smoked per day of smoking multiplied by the average number of days smoked per week) • Measure of attention to brandings and health warnings: the total number of fixations within each area of interest (branding versus health warnings) for each cigarette pack (trial) type (pre-regulation versus post-regulation) was recorded. The number was averaged across trial types as a measure of attention. • Measure of attention to health warnings: the total number of first fixations within health warnings area of interest for each cigarette pack (trial) type (pre-regulation versus post-regulation) were analysed post-hoc to further assess whether the effects found could be attributed to greater saliency of health warnings [reported in Supplement 1]

		Richmond and Rothmans) presented in a random order for 10s each. 1st February to 19th May 2017 (all transition "almost entirely in the period between 1st February and 19th May"[4])	
Breton 2019[22] **Relevance:** Medium **Quality:** Some minor concerns **Aims clearly stated:** No **Funder:** Cancer Research UK **COIs:** none	United Kingdom **Sample size:** >75,000 stores **Stores:** megastores, superstores, high street stores and convenience stores in the UK **Products:** 58,190 total valid observations from 1,064 products, average of 658 fully branded (range = 431–824) and 138 plain pack products (range = 8–226) per month **Data:** Nielsen Scantrack cigarette sales data	To describe and quantify changes in brand diversity, price segmentation and sales volumes; and to estimate the association between the introduction of plain cigarette packaging and cigarette pricing in the United Kingdom. Natural experiment: descriptive analysis using line graphs to compare trends and a linear regression model March 2013 to June 2017	**Change in retail environment** • Cigarette products: Product diversification was defined by the number of brands, brand variants and products (combination of brand, brand variants, pack size and multi-pack size) available each month during the study period. • Price: average retail price per cigarette, which included all available products in all pack sizes, and the average retail price for products sold in 20-cigarette pack • Volume of sales: the number of cigarette sticks sold each month for each product • Adapted name: for brand variants whose name changed after February 2014 (adapted name) and products which appeared with an adapted name after May 2016 (plain pack adapted name) • Covariates: world nominal monthly price of tobacco, tax for cigarettes, market share of the product.
Critchlow 2018[20] **Relevance:** High **Quality:** No concerns	England, Scotland and Wales	To examine independent and convenience (small) retailer compliance with standardised packaging legislation in the UK	**Change in the retail environment**

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[4] Personal communication with C. Retzler (7 March 2019). "Our data was collected between the dates you state [20th May 2016 and 19th May 2017], although almost entirely in the period between 1st February and 19th May, rather than at the very start of the period."

Aims clearly stated: Yes **Funder:** Cancer Research UK **COIs:** none	**Sample size:** data from average 2,414 small retailers (SD=18.55) per week **Stores:** small retailers, including symbol group-affiliated and independent convenience stores **Products:** all cigarette and rolling tobacco products sold **Data:** The Retail Data Partnership EPoS data **Sample type:** national representative sample	for 10 weeks after standardised packaging was fully implemented. Natural experiment: observational study to monitor trends in sales data. From 22 May 2017 biweekly to 30 July 2017	Branded Universal Product Code (UPCs/barcode) = non-compliant products: fully branded packaging and/or containing <20 cigarettes or <30 g rolling tobacco. Standardised UPCs = compliant products: standardised packaging and containing ≥20 cigarettes or ≥30 g rolling tobacco. Three compliance measures: % of small retailers selling branded UPCs only, standardised UPCs only or both - Total number of different tobacco products sold, % branded and % standardised UPCs sold - Total volume of UPC sales, % branded and % standardised volume of sales
Critchlow 2019[23-25] **Relevance:** High **Quality:** Some minor concerns [all 3 arms] **Aims clearly stated:** Yes **Funder:** Cancer Research UK **COIs:** none	England, Scotland and Wales **Sample size:** 300 stores in England, 100 in Scotland, 100 in Wales **Stores:** small retailers, including symbol group-affiliated and independent convenience stores **Products:** 20 top selling tobacco products (15 factory-made cigarettes (FMC; 5 value, 8 mid-, 2 premium price) and 5 roll-your-own (RYO; 5 mid-price) tobacco) **Data:** The Retail Data Partnership EPoS data **Sample type:** national representative sample	Arm 1: To explore how tobacco companies introduced new compliant standardised products and withdrew noncompliant products (i.e. fully branded packs and packs containing less than 20 FMC or 30 g RYO) across the 12-month transition period in small retailers in England, Scotland, and Wales.[25] Natural experiment: observational study to monitor trends in sales data Monthly from May 2016 to May 2017	**Change in the retail environment** Number of unique tobacco-related UPCs sold each month by each retailer At the retailer level: - proportion (%) of retailers selling each of the fully branded or standardised tobacco products was calculated for each month of the transition period - average number of monitored fully branded and standardised tobacco products sold was calculated for each month of the transition period, for all 20 fully branded and 20 standardised products and by price segment (value, mid-price, or premium) - average number of unique tobacco-related UPCs sold by each retailer was also calculated for each month of the transition period
		Arm 2: To explore how independent and convenience	**Change in the retail environment**

| | | (small) retailers adhered to, or deviated from, recommended retail price (RRP) before and after standardised packaging was introduced in the UK, and to explore whether there were differences in RRP adherence between fully branded and standardised packs, products which had pricemarking on packs or not, and by price segment (value, mid-price, premium).[24]

Natural experiment: observational study to monitor trends in sales data

Monthly from May 2016 to October 2017 | Number of the monitored products sold each month by each retailer
Monthly average RRP for each retailer, for each tobacco product
Monthly average sales price for each retailer, for each tobacco product

At the retailer level:
• average number of monitored fully branded and standardised products sold calculated for each month (overall and by price segment)
• number of retailers who had sold any fully branded or standardised products, were calculated for each month (overall and by price segment).
At the product level
• monthly nominal average RRP and sales price (£), and the difference (%) between the two, were calculated across the subsamples of fully branded and standardised products, and by price segment.
• For fully branded products, the monthly deviation from RRP (%) was calculated for price-marked and non-price-marked variants separately, and for a combined total.

"Adherence to RRP was measured as the average difference (%) between monthly RRPs and sales prices by pack type (fully branded vs standardised), price-marking on packaging and price segment." |
| | | Arm 3: This study used monthly retail price data from small retailers to: (1) describe changes in the average price-per- cigarette and price-per-gram during, and after, the introduction of standardised packaging; (2) describe price | **Change in the retail environment**

Number of the monitored products sold each month by each retailer
Monthly average RRP for each retailer, for each tobacco product
Monthly average sales price for each retailer, for each tobacco product |

		changes by cigarette price segment (value, mid-price and premium); and (3) examine variation in price change by stage of implementation (start of the transition period, during the transition period when both fully branded and standardised packs were sold and annual duty escalators were implemented, and when standardised packaging became mandatory).[23]
		
		Natural experiment: observational study to monitor trends in sales data
		
		Monthly from May 2016 to October 2017
			At the product level:
			• Price-per-cigarette (FMC) and price-per-gram (RYO), based on monthly average Recommended Retail Price (RRP), adjusted for inflation using the Consumer Pricing Index (CPIH)
			• Price-per-cigarette (FMC) and price-per-gram (RYO), based on monthly average actual sale price, adjusted for inflation using the CPIH
			• Trends in monthly RRP-per-cigarette/gram and actual sales price-per-cigarette/gram were analysed through:
			  ○ Net price changes (£GBP and %) within each period (P1 May to Sep 2016, P2 Oct 2016 to May 2017, P3 Jun to Oct 2017), throughout the transition year (P1 and P2), and throughout the observation period (P1, P2 and P3).
			  ○ Net changes (£GBP, %) analysed by product type (FMC versus RYO)
			  ○ Net changes (£GBP, %) analysed by FMC price segment (value, mid-price, premium)

Moodie 2018[26] **Relevance:** Medium **Quality:** Some minor concerns [all 3 components] **Aims clearly stated:** Yes **Funder:** Cancer Research UK **COIs:** none	United Kingdom (most store visits in Scotland) **Trade press:** 4 retailer magazines and 1 website, all issues for 24 months **Online supermarkets:** 4 supermarket websites, monthly for 24 months **Store visits**: ≥1 per month for 24 months, total NR; supermarkets,	To use routine surveillance of the cigarette and rolling tobacco market in the UK to explore how tobacco companies responded to the Standardised Packaging of Tobacco Products Regulations and the TPD by monitoring pack, brand and product changes pre-implementation and post-implementation	**Change in the retail environment** Packaging, brand and product changes, developments and introductions, including: • graphical or structural pack designs • pack sizes • brand launches, name changes, brand extensions, brand rationalisation • filter and capsule design innovations

	independent retailers, convenience stores, forecourt traders, and off-licences in both urban and suburban areas **Sample type:** convenience sample	Cross-sectional survey without an experimental design Content analysis and informal interviews May 2015 to June 2017	
Purves 2019[28] **Relevance:** High **Quality:** Some minor concerns **Aims clearly stated:** Yes **Funder:** National Institute for Health Research Public Health Research **COIs:** none	Scotland **Sample size:** 24 small independent retailers selling tobacco **Retail category**: 12 grocery/convenience stores, 5 confectioners, tobacconists, and newsagents (CTNs), 3 off-licences, 3 petrol stations/garage forecourts, 1 fast food or take-away outlet **Setting:** 4 Scottish communities with different levels of urbanization and social deprivation **Sample type:** convenience sample	To explore the response of retailers in Scotland to standardised packaging and the Tobacco Products Directive shortly after these measures became mandatory. Thematic analysis of interview data using an inductive approach Interviews (20–30 minute semi-structured interview conducted face-to-face in store during business hours; opportunity to examine marketing materials and incentive offers designed for the retail trade.) 23 May to 26 June 2017	**Change in the retail environment** The interviews examined: • retailers' attitudes toward the display ban • how they set prices and convey pricing information to customers • the implementation of standardised packaging • the level and nature of support provided by tobacco companies • the emergence of new strategies to promote tobacco products. Findings were reported under the following themes: • compliance and transition • storage and sales practices • pricing and profits
KEY: Relevance study's relevance to our review's aims (high or medium), as assessed by the reviewers; **Overall quality rating** "Overall, are there concerns about the soundness of the study?" (Yes, major concerns / Yes, some minor concerns / No); critical appraisal by independent research team; **Clear statement of aims** "Was there a clear statement of the aims of the study?" (Yes / No); critical appraisal by independent research team. **ABBREVIATIONS:** COIs conflict of interests; NR not reported; SD standard deviation; IQR interquartile range; SMI SensoMotoric Instruments; EPoS Electronic Point of Sale; UPC Universal Product Code; FMC factory-made cigarettes; RYO roll-your-own; RRP recommended retail price; CPIH Consumer Prices Index including owner occupiers' housing costs; TPD The Tobacco Products Directive.			

Appendix 6 EPPI-Centre critical appraisal results

Quantitative studies – Human participants

	Bogdanovica 2017a[19]	Bogdanovica 2017b[19] [Arm: Young people]	Moodie 2019[27]	Poundall 2018[21]	Retzler 2019[29]
OVERALL					
AIMS: Was there a clear statement of the aims of the study?	Yes	Yes	Yes	Yes	Yes
OVERALL, are there concerns about the soundness of the study?	Yes, some minor concerns	Yes, major concerns	Yes, some minor concerns	Yes, major concerns	Yes, some minor concerns
DATA					
Was the sampling method appropriate to the question/inference being made?	No	No	Unclear	No	No
Did the study report *a priori* power calculations (where appropriate)?	No	No	No	Yes	No
Was the data sample representative of intended population?	No	No	No	Unclear	Unclear
Was the measurement of the independent variable(s) likely to be reliably assessed and validated?	Unclear	Yes	Yes	No	Yes
Was the measurement of the dependent variable(s) likely to be reliably assessed and validated?	No	No	Yes	No	Yes
Was the response rate sufficient?	Unclear	No	Unclear	No	Unclear
Were all variables of interest measured in the dataset?	Yes	Yes	Yes	Yes	No
Are the data adequately described?	No	No	Yes	No	Yes
Overall, are there concerns about the soundness of the data for the purposes of the study?	Yes, concerns	Yes, concerns	No	Yes, concerns	No
ANALYSIS, INFERENCES AND CONCLUSIONS					
Were the analyses appropriate given the stated aims?	No	Yes	Yes	Yes	Yes
Was the size of the dataset sufficient for the analyses being conducted?	Yes	Yes	Yes	No	Yes
Have the data been analysed appropriately?	Unclear	No	Unclear	Yes	Yes
Overall, are there concerns about the analyses?	Yes, concerns	Yes, concerns	No	Yes, concerns	No

[29]	Bogdanovica 2017a[19]	Bogdanovica 2017b[19] [Arm: Young people]	Moodie 2019[27]	Poundall 2018[21]	Retzler 2019[29]
Are the inferences drawn from analyses appropriate given the sample relative to population?	No	Yes	No	Unclear	No
Are the inferences drawn appropriate given the analyses and results?	Unclear	Unclear	Yes	No	No
Is there an over-emphasis on statistical significance rather than magnitude/ direction of effect?	No	No	No	No	No
EXPERIMENT (IF APPLICABLE)					
Were participants aware of the study aims before the experiment?					No
Were there sufficient instances of presentation of the stimulus?					Yes
Does the measurement instrument seem appropriate?					Yes
Was the presentation of the stimulus materials randomised for each participant?					Yes
Overall, are the concerns about the experiment?					No

Quantitative studies – Structured observation of documents or places

	Moodie 2018[26] [Analysis of Magazines]	Moodie 2018[26] [Analysis of Websites]	Moodie 2018[26] [Analysis of Supermarket Transaction]
OVERALL			
AIMS: Was there a clear statement of the aims of the study?	Yes	Yes	Yes
OVERALL, are there concerns about the soundness of the study?	Yes, some minor concerns	Yes, some minor concerns	Yes, some minor concerns
DATA			
Were the parameters of the documents/websites/other data to be analysed made clear?	Unclear	Yes	No

	Moodie 2018[26] [Analysis of Magazines]	Moodie 2018[26] [Analysis of Websites]	Moodie 2018[26] [Analysis of Supermarket Transaction]
Were the data extracted/collected using a structured approach?	Yes, evidence of structured template	Yes, evidence of structured template	No structured template provided or described
How were the data collected?	Manual recording and extraction of documents	Manual recording and extraction of documents	Other
Were any validity checks imposed around data collection?	Unclear	Yes	Unclear
Were measures taken to address any issues in validity?	Unclear	Unclear	Unclear
Were there gaps in the data in terms of range of observations?	Unclear	Unclear	Yes, gaps were obvious and unclear how this was addressed
Were there apparent, unintended restrictions in the dataset in terms of tobacco products or data sources?	Unclear	Yes	Unclear
Did the study provide an explanation of any sampling strategy imposed?	No	Yes	No
If sampling method employed, was it appropriate to the question/inference being made?	Unclear	Unclear	No
Was the sample of structured observations representative of intended population?	Unclear	Unclear	No
Was the period of data collection appropriate for the aims of the study?	Yes	Yes	Yes
Were all plausible data of interest extracted and measured in the dataset?	Yes	Yes	Unclear
Are the data (measured collected/extracted) adequately described or summarised?	No	No	No
Overall, are there concerns about the soundness of the data for the purposes of the study?	No	No	Yes, concerns
ANALYSES			
Were the analyses appropriate given the stated aims?	Unclear	Unclear	Unclear
Was the size of the dataset sufficient for the analyses being conducted?	Unclear	Unclear	Unclear
Have the data been analysed appropriately?	Unclear	Unclear	Unclear

	Moodie 2018[26] [Analysis of Magazines]	Moodie 2018[26] [Analysis of Websites]	Moodie 2018[26] [Analysis of Supermarket Transaction]
Overall, are there concerns about the analyses?	Yes	Yes	Yes
INFERENCES AND CONCLUSIONS			
Are the inferences drawn from analyses appropriate given the sample relative to population?	Unclear	Unclear	Unclear
Are the inferences drawn appropriate given the analyses and results?	Yes	Yes	Yes
Is there an over-emphasis on statistical significance rather than magnitude/ direction of effect	Unclear	Unclear	Unclear

Quantitative studies – Sales data

	Breton 2019Breton 2019[22]	Critchlow 2018[20]	Critchlow 2019[23]	Critchlow 2019[24] [Arm: Critchlow 2018.pdf (Difference between...)]]	Critchlow 2019[25] [Arm: Critchlow 2018 Introduction of standardised tobacco...]
OVERALL					
AIMS: Was there a clear statement of the aims of the study?	No	Yes	Yes	Yes	Yes
OVERALL, are there concerns about the soundness of the study?	Yes, some minor concerns	No	Yes, some minor concerns	Yes, some minor concerns	Yes, some minor concerns
DATA					
Was a commercial data set used?	Yes	Yes	Yes	Yes	Yes
What was the data collection method?	Scanner	Scanner	Scanner	Scanner	Scanner

	Breton 2019Breton 2019[22]	Critchlow 2018[20]	Critchlow 2019[23]	Critchlow 2019[24] [Arm: Critchlow 2018.pdf (Difference between...)]]	Critchlow 2019[25] [Arm: Critchlow 2018 Introduction of standardised tobacco...]
Was the dataset complete?	No, gaps were obvious and unclear how this was addressed	Yes, no gaps obvious	Unclear	No, gaps were obvious but data company or researchers described modelling	No, gaps were obvious but data company or researchers described modelling
Were there apparent, unintended restrictions in the dataset in terms of tobacco products or sales points?	Unclear	No	Yes	Yes	Yes
Was the sampling method appropriate to the question/inference being made?	Unclear	Unclear	Yes	No	Yes
Was the data sample representative of intended population?	Unclear	Unclear	Unclear	Unclear	Unclear
Did the study report *a priori* power calculations (where appropriate)?	No	No	No	No	No
Was the timing of the data collection appropriate for the aims of the study?	Unclear	Yes	Yes	Yes	Yes
Duration of study: Were the data collected over a sufficient time period for the intended analysis?	No, not sufficient	Unclear	Yes, sufficient	Yes, sufficient	Yes, sufficient
Were all plausible variables of interest measured in the dataset?	No	Yes	Yes	Yes	Yes
Are the measures/ variables adequately described?	Yes	Yes	Yes	Yes	Yes
Overall, are there concerns about the soundness of the data for the purposes of the study?	Yes, concerns	Yes, concerns	No	Yes, concerns	Yes, concerns
ANALYSES					
Were the analyses appropriate given the stated aims?	Yes	Yes	Yes	Yes	No
Was the size of the dataset sufficient for the analyses being conducted?	Yes	Yes	Unclear	Yes	Unclear
Have the data been analysed appropriately?	Yes	Yes	Yes	Yes	No

	Breton 2019Breton 2019[22]	Critchlow 2018[20]	Critchlow 2019[23]	Critchlow 2019[24] [Arm: Critchlow 2018.pdf (Difference between...)]]	Critchlow 2019[25] [Arm: Critchlow 2018 Introduction of standardised tobacco...]
Overall, are there concerns about the analyses?	No	No	No	No	Yes
INFERENCES AND CONCLUSIONS					
Are the inferences drawn from analyses appropriate given the sample relative to population?	Unclear	Unclear	Unclear	No	Unclear
Are the inferences drawn appropriate given the analyses and results?	No	Yes	Yes	Yes	Unclear
Is there an over-emphasis on statistical significance rather than magnitude/ direction of effect?	No	No	No	No	No
Is there an appropriate emphasis of the real-world importance of the statistical results?				No	

Qualitative studies

	Purves 2019[29]
OVERALL	
AIMS: Was there a clear statement of the aims of the research?	Yes
OVERALL, are there concerns about the soundness of the study?	Yes, some minor concerns
DATA COLLECTION	
Was the recruitment strategy appropriate to the aims of the research?	No
Were the data collected in a way that addressed the research issue?	Yes
ANALYSIS	
Was the data analysis sufficiently described?	Yes
Was the data analysis sufficiently rigorous?	Yes
CONTRIBUTIONS AND CONCLUSIONS	
Was the research design appropriate to address the aims of the research?	Yes

	Purves 2019[29]
Has the relationship between researcher and participants been adequately considered?	No
Have ethical issues been taken into consideration?	Yes
Is there a clear statement of findings?	Yes
Are the conclusions appropriate given the analyses and results?	Unclear