


Consumer Response to Standardized Tobacco Packaging in the United Kingdom: A Synthesis of Evidence from Two Systematic Reviews

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Abstract: Standardized packaging of tobacco products has now been fully implemented in 15 countries. However, there is limited evidence, apart from in Australia, on how consumers have responded to the policy. Two systematic reviews explored consumer, tobacco industry and retailer response to standardized packaging in the United Kingdom (UK), which became mandatory for cigarettes (factory-made and hand-rolled) from May 2017, following a twelve-month transition period. In the first review, electronic databases were searched for published primary research from January 2016 to February 2019. The second review used the same methods, with searches conducted between February 2019 and September 2020. The current study conducted a narrative synthesis of the findings exploring consumer response from these two systematic reviews. Eleven studies met the inclusion criteria. Studies examined consumer response to on-pack warnings (n=7 studies), appeal of packs and smoking (n=4), perceptions of harm (n=5), and behavioral responses (n=8). There was consistent evidence that standardized packaging was associated with increased warning salience and effectiveness, and reduced appeal. Findings were mixed with respect to whether standardized packs were associated with increased perceptions of harm. Standardized packaging was generally thought to deter never or occasional smokers. Standardized packaging was associated with increased thoughts of quitting during the transition period, but no study directly explored cessation or relapse prevention. Some smokers switched to cheaper cigarettes. Standardized packaging in the UK seems to be reducing the appeal of packaging and smoking and making warnings more salient, but the behavioral impact is unclear. More consumer research is needed to assess longer-term behavioral response.

Keywords: cigarettes, smoking, marketing, policy, public health, review

Introduction

Standardized packaging for tobacco products, also commonly referred to as plain packaging, was first implemented in Australia in 2012 and then in France and the UK in 2017. While initial uptake was slow, since 2018 twelve additional countries have fully implemented standardized packaging, with Belgium the fifteenth country to do so in January 2021. According to the World Health Organization's (WHO) Framework Convention on Tobacco Control, standardized packaging may reduce the appeal of tobacco products, increase the salience of the on-pack warnings, and reduce the ability of the pack to mislead consumers about the harms of smoking.^{1,2} As a result of these changes, standardized packaging may help discourage smoking uptake, encourage cessation and reduce relapse.^{3,4}

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Multiple reviews of standardized packaging research have been conducted.^{5–16} Most consider how consumers perceive standardized packaging, in terms of warning salience, appeal, harm and behavior,^{5–11,15,16} although some focus on particular populations, such as adolescents,¹⁴ or particular outcomes, such as cessation and initiation.¹³ Some reviews cover the response of not only consumers but also the tobacco industry and retailers.^{15,16} These reviews are important as they help policymakers, whether in countries that have implemented standardized packaging or which are considering doing so, understand the potential or actual impacts of the policy.

In the UK, as a result of the ‘Standardized Packaging of Tobacco Products Regulations’¹⁷ and ‘Tobacco and Related Products Regulations’,¹⁸ tobacco companies have been required to sell cigarettes and rolling tobacco in standardized packs since May 20th 2017. They were given a transition (sell-through) period of 12 months (May 2016–May 2017). The legislation stipulates that packs should be drab brown (Pantone 448C), display pictorial health warnings on at least 65% of the primary display areas (previously text warnings covered 43% of the pack front and pictorial warnings 53% of the pack reverse), and a text-only general warning (Smoking kills – quit now) and information message (Tobacco smoke contains over 70 substances known to cause cancer) on at least 50% of the secondary display areas; any standardized pack that appeared on the market during or after the transition period had to meet these requirements. Cigarette packs must contain at least 20 sticks and be sold in a “shoulder” box (a pack with the lid flush with the base and held in place by a shoulder on the base) or a cuboid-shaped flip-top pack, with beveled or rounded edges permitted. Rolling tobacco packs must contain at least 30 grams and be sold in a shoulder box, cuboid pack, cylindrical pack or pouch. A brand variant name can be displayed on packs, but the location, text color, font size, style and typeface are prescribed (see [Figure 1](#)).

Despite standardized packaging now being mandatory in 15 countries, relatively little is known about the real-world impacts on consumers in countries other than Australia; most previous reviews focus completely or mostly on research that explores the hypothetical response of consumers. Understanding how consumers react when the policy is actually implemented, as opposed to hypothetically, is important for policymakers seeking to review whether it has produced the desired impacts, as well as for countries considering introducing the policy in future.

The data from two systematic reviews,^{15,16} reported to Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) standards,¹⁹ are the source data analyzed in this review. The source reviews had a wider remit to also examine how the tobacco industry reacted, such as changes to products, and how the retail environment changed in response to the policy (eg, Evans-Reeves et al,²⁰ Hiscock et al²¹). This paper focuses on how consumers (smokers and non-smokers) in the UK responded to standardized packaging, in terms of the impact of on warning salience, appeal and harm perceptions, and behavior.

Methods

In this paper, the data extracted and appraised from the consumer response studies included in the two source reviews are synthesized together.

Source Reviews

For inclusion in the two original reviews, studies had to report outcomes exploring consumer, retailer or tobacco industry responses to the implementation of standardized packaging in the UK and be published or accepted for publication in an academic journal (including conference abstracts).^{15,16} All primary study designs were eligible for inclusion and there was no language restriction. Studies were excluded if their data collection ended before the start of the transition period (May 20, 2016), or if they focused exclusively on legal aspects of standardized packaging. Both original reviews used the same search strategy. The databases Business Source Complete, Cochrane Library, Medline, PsycINFO, SocINDEX, Web of Science Core Collection, and World Advertising Research Center were searched for records published since the start of 2016¹⁵ and 2018¹⁶ using combinations of terms for packaging, tobacco and the UK (see [Supplementary File](#) for an example). The Bielefeld Academic Search Engine (BASE) and the 2018–20 Society for Research on Nicotine and Tobacco (SRNT) conference programs were searched with a selection of these terms. A Web of Science Citation Search was made for publications citing previous reviews of standardized packaging^{9,12–14} or the 11 articles included in the earlier review.¹⁵ The search strategy for both reviews was run twice, at the start and near-end of both projects (searches were run on August 15, 2018 and February 15, 2019 for the first review,¹⁵ and on May 28, 2020 and September 28,



Figure 1 Examples of flip-top cigarette packs and rolling tobacco pouches pre-standardized packaging (top row) and post-standardized packaging (bottom row).

2020 for the second¹⁶). Academic topic experts were also contacted.

Study titles and abstracts were screened by one reviewer against the inclusion criteria. Potentially relevant full-text studies were obtained and screened for relevance by one reviewer. A second reviewer checked the inclusion/exclusion decisions at both stages. Data were extracted from included studies by one reviewer into a standard form for general information, study design, sample characteristics, setting, theoretical basis, outcome measures and results.

For both reviews, each study was appraised for methodological soundness by external appraisers from the Evidence for Policy and Practice Information and Co-ordinating Centre (the EPPI-Centre, University College London) to avoid potential biases resulting from the review team having co-authored some included studies. The same two external experts independently appraised all studies and met frequently to reconcile appraisals as “no”, “minor” or “major” concerns for methodological soundness. Full details of their tools and methods are reported elsewhere.¹⁵

Current Review

For this paper, only consumer response studies from the source reviews were eligible for inclusion. The overall level of concern on methodological soundness rating was not an inclusion criterion; all studies were included and the ratings are reported in the results. However, outcome measures for awareness of, and attitudes to, standardized packs or the legislation, were excluded from this review post hoc. While awareness helps to understand when standardized packs appeared on the market, and attitudes how it is perceived, they provide no insight into the impacts of standardized packaging. Figure 2 shows the combined flow of information through the phases of the systematic reviews. The extracted data and appraisals for the eleven studies that met the inclusion criteria were examined as a whole dataset. No study appeared to contradict another. Neither a quantitative meta-analysis nor qualitative meta-ethnography was feasible given the heterogeneity of study designs and diversity of outcome measures.^{15,16} A narrative synthesis combines the findings from both reviews, structured by related outcome measures and the directions of effect.⁹

Results

Based on the inclusion criteria, eleven studies provided evidence for how consumers in the UK have reacted to standardized packaging. Results are reported by the appeal of packs, perceptions of harm, response to the on-pack health warnings, and self-reported behavioral responses.

Appeal

Four studies, two quantitative^{22,23} and two qualitative,^{24,25} examined appeal. Participants were asked about different facets of appeal (eg, quality, prestige, coolness, popularity), either using no visual prompts or shown images of, or actual, standardized packs. All four studies raised minor methodological concerns. Table 1 summarizes the direction of effect and/or key findings for the results of the studies.

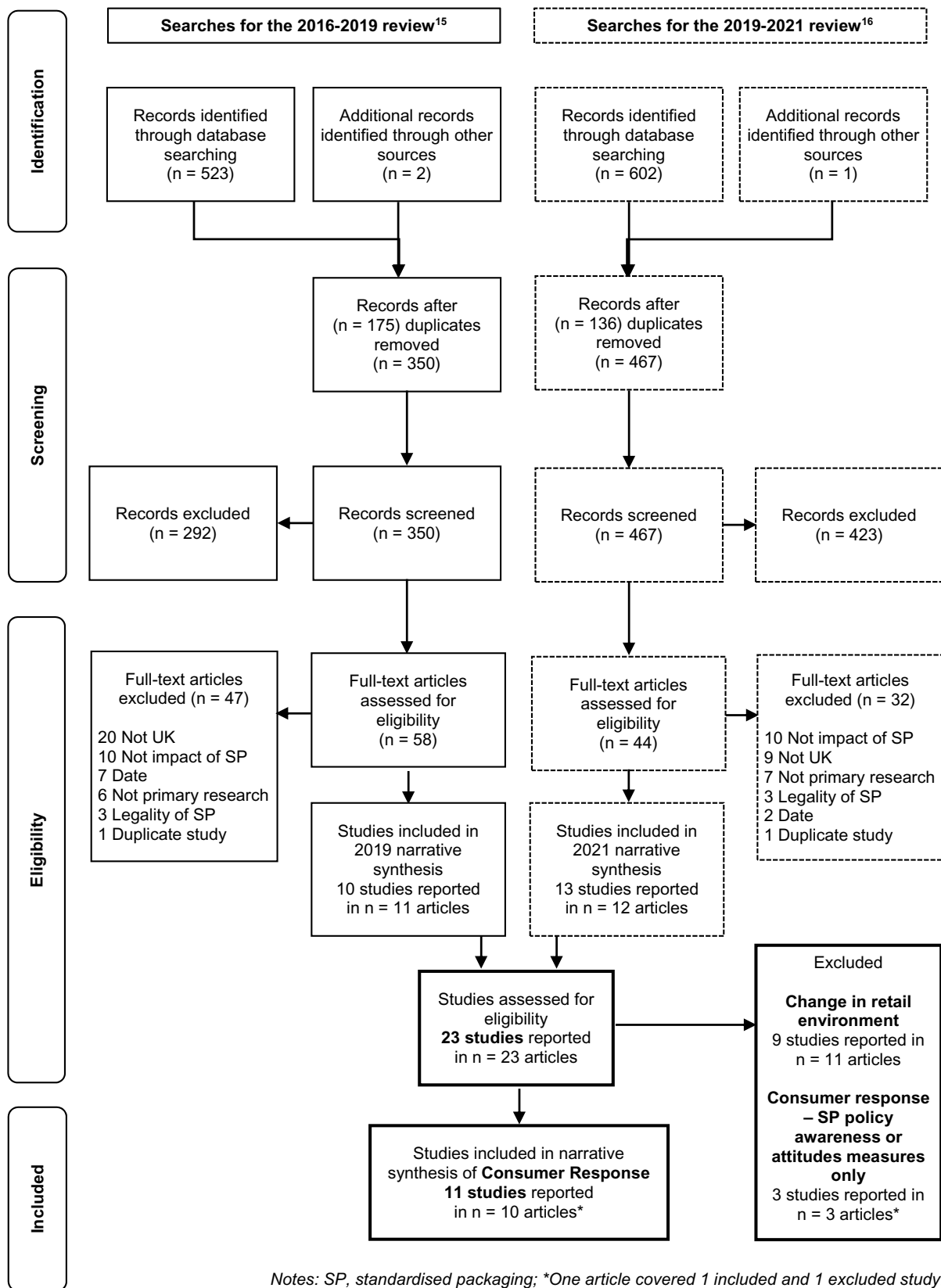
A longitudinal study involving seven European countries,²² with Wave 1 data collected early in the standardized packaging transition period in the UK and Wave 2 data collected 9–14 months after the end of the transition period, reported a 41% increase in the percentage of participants from England who did “not at all” like the look of their cigarette pack (Wave 1: 13.9% vs Wave 2: 54.9%, $p < 0.001$). There were increases in three other countries in

the percentage of participants who did “not at all” like the look of their cigarette packs, but the change between waves was significantly greater in England than in each of the six countries which did not have standardized packaging at the time ($p < 0.05$). Among participants in England, there was a decrease in reporting that brands differed in prestige ($p < 0.01$) between waves but an increase in reporting that the quality of their cigarettes was high/very high ($p = 0.013$). In Mitchell's²³ cross-sectional survey of 12- to 17-year-old never smokers in Scotland, which examined response to standardized packs with different pack structures, participants had consistently negative ratings (ie, unattractive, uncool, cheap, unfashionable, unpopular and boring) of all packs. However, a standardized pack with a “shoulder” box design was less negatively rated on several measures than other pack structures. Sub-group analysis, controlling for demographics and family and peer smoking, found no association between appeal ratings for any of the packs and smoking susceptibility.

The two qualitative studies found that standardized packs were generally unappealing to school-age young people. In MacGregor et al's²⁴ focus groups with 13- to 16-year-old school pupils, standardized packs were described as “really ugly”. The removal of key elements of branding was perceived to have reduced brand distinctiveness, reduced pack appeal and reduced the ability of a brand to promote or project a positive image or “smoker identity”. Similarly, in the Mitchell et al²⁵ focus groups with 16- to 17-year-old school pupils, packs were viewed as disgusting and off-putting, evoking feelings of embarrassment or discomfort. However, standardized packs with different structures from the regular straight-edged packs were less unappealing: shoulder packs were considered weird, cool, different and more expensive; slim packs were regarded as nicer and potentially making them feel better about smoking; and a rounded edge Marlboro pack was described by some as a “fashion statement”. Different pack structures appeared to provide ways to create appeal and differentiation between packs. Some brand variant names were found to be appealing, particularly among males, and several participants noted that the brand and variant name was the only thing left on the pack to create appeal.

Perceptions of Harm

Five studies, comprising three quantitative studies^{22,23,26} and two qualitative studies,^{24,25} examined whether



Notes: SP, standardised packaging; *One article covered 1 included and 1 excluded study.

Figure 2 Flow of information through the phases of the source and current reviews.

Table 1 Direction of Effect and/or Key Findings: Appeal and Perceptions of Harm

Study	Study Design and Data Collection	Population	Type of Comparison/Issues Explored	Direction of Effect (Measures Used) and/or Key Findings
Aleyan et al ²²	Longitudinal online survey Wave 1: Jul-Sep 2016 (early in transition period) Wave 2: Feb-Jul 2018 (nine-14 months after end of transition period)	Adult smokers 18+ years England, Germany, Greece, Hungary, Poland, Romania, Spain Wave 1: n=9547 Wave 2: n=9724	Smokers in England (Tobacco Products Directive new warnings and UK standardized packs) vs smokers in six other European countries (Tobacco Products Directive new warnings only) Perceptions of pack and brand appeal; perceptions of relative harm	Appeal: Significantly greater increase in participants in England who did not like the look of their pack post-standardized packaging in the UK. Perceptions of harm: No significant change in harm perceptions among participants in England post-standardized packaging in the UK.
MacGregor et al ²⁴	Focus groups Feb-Mar 2017, towards end of transition period	Young people 13–16 years Mix of current smokers, never smokers, and tried smoking Scotland 16 groups, n=82	Awareness of standardized packs, perceptions of their appeal, and potential impact on smoking attitudes and behavior	Appeal: Standardized packs were seen as ugly, and ability to differentiate between brands was reduced. Perceptions of harm: Removal of 'clean', 'fresh' colors perceived as reflecting harmfulness.
Mitchell et al ²⁵	Focus groups Between Nov 2017 (6 months after end of transition period) and Nov 2018 (18 months after end of transition period)	Young people 16–17 years Mix of ever and never smokers Scotland 8 groups, n=41	Awareness and perceptions of standardized packs, reactions to different standardized pack structures	Appeal: Standardized packs were seen as off-putting and embarrassing, but some pack structures were regarded less negatively than others. Perceptions of harm: Pack color thought to reflect harmfulness of cigarettes.
Mitchell et al ²³	Cross-sectional survey in schools Between Nov 2017 (6 months after end of transition period) and Nov 2018 (18 months after end of transition period)	Young people 12–17 years Never smokers Scotland n=507	Reactions to standardized cigarette packaging; whether permitted variations in pack structure (eg, slim packs or beveled-edged packs) influenced reactions. Perceptions of harm to health	Appeal: Standardized packs were consistently rated negatively on different appeal measures, but some pack structures were regarded less negatively than others. Perceptions of harm: Standardized packs consistently rated as harmful, with no significant differences between standardized packs with different structures.
Moodie et al ²⁶	Cross-sectional online survey Feb-Apr 2017, towards end of transition period	Current smokers 16–65+ years England n=1865	Smokers who currently used standardized packs vs smokers who had never used standardized packs (conducted Feb-Apr 2017 when both standardized and fully branded packs still on sale). Whether pack made respondents think about health risks of smoking	Perceptions of harm: Users of standardized packs were more likely than never users of standardized packs to indicate that pack made them think about health risks of smoking.

standardized packaging affected perceptions of the harm associated with smoking or cigarettes. Participants were asked about harm either using no visual prompts or shown images of, or actual, standardized packs. All five studies raised minor methodological concerns. Table 1 summarizes the direction of effect and/or key findings for the results of the studies.

The Moodie et al²⁶ cross-sectional survey, conducted at a time when both standardized and fully branded packs were available, reported that respondents who were current users of standardized packs were more likely than never users of standardized packs to indicate that their pack made them think about the health risks of smoking (Odds Ratio (OR)=2.16, 95% Confidence Interval (CI): 1.57–2.99, $p<0.001$). The association remained when adjusted for demographic (age, gender, social grade) and smoking characteristics (quit attempts in past 12 months, Heaviness of Smoking Index (HSI), and currently trying to quit/reduce) (adjusted OR=1.92, 95% CI: 1.38–2.68, $p<0.001$). Previous users of standardized packs were more likely than never users of standardized packs to say that they had thought about the health risks of smoking, although the differences were not statistically significant. Mitchell et al's²³ cross-sectional survey of 12- to 17-year-old never smokers found that all of the different standardized packs shown were consistently rated as harmful, with no significant differences in ratings between standardized packs with different structures. Sub-group analysis, controlling for demographics and family and peer smoking, showed no association between harm ratings and smoking susceptibility. In a seven-country longitudinal survey,²² there was no significant change between Wave 1 (transition period) to Wave 2 (post-standardized packaging) in the percentage of participants in England who reported that their own brand was no different in harmfulness compared to other brands (78.1% W1, 78.6% W2) or that their own brand was no smoother or harsher compared to other brands (30.4% W1, 32.6% W2).

The two qualitative studies with school pupils provided some additional insights into harm perceptions. The color of standardized packs was thought, by some, to reflect the harm caused by smoking; it was also suggested that the cigarettes inside the slim standardized pack might be less harmful, due to the thinness of the pack.²⁵ In MacGregor et al's²⁴ focus groups, with 13- to 16-year-old school pupils, it was suggested that the removal of “clean” and “fresh” colors may indicate a change in perceived harmfulness of certain brands.

Health Warnings

Seven studies, comprising five quantitative studies^{22,26–29} and two qualitative studies,^{24,25} examined whether standardized packaging increased attention to health warnings or how people responded to the warnings. Five of the studies raised minor methodological concerns^{22,24–26,29} and two major methodological concerns.^{27,28} Table 2 summarizes the direction of effect and/or key findings for the results of the studies.

The quantitative studies raising only minor methodological concerns consistently found that standardized packaging was associated with increased warning salience. A seven-country longitudinal study,²² with data collected early in the UK standardized packaging transition period and 9–14 months after the end of the transition period, reported a 27.6% increase in the percentage of participants from England who said that the health warning was the first thing they noticed on looking at a cigarette pack (18.3% v 45.9%, $p<0.001$). While the percentage of participants who noticed the warning first also increased in two other countries, the change between waves in England was significantly greater ($p<0.05$). In a within-subjects experimental study which used eye-tracking to measure participants' eye movements when shown different packs,²⁹ participants attended more to warnings on standardized packs than to those on fully branded packs. Bonferroni-adjusted post hoc pairwise comparisons showed there were more eye fixations for the warnings on standardized packs ($M=12.77$, Standard Deviation (SD)=4.72) than on fully branded packs ($M=5.49$, $SD=3.44$; $p<0.001$). In addition, Bonferroni-adjusted post hoc pairwise comparisons showed more “first fixations” to warning areas on standardized packs (mean number of first fixations for standardized packs ($M=6.48$, $SD=2.03$), mean number of first fixations for fully branded packs ($M=1.35$, $SD=1.61$)), with these fixations to warnings on standardized packs being for a longer duration (mean dwell-time for standardized packs ($M=262.03$, $SD=158.51$), mean dwell-time for fully branded packs ($M=35.62$, $SD=51.21$); p -values not reported).

In Moodie et al's²⁶ cross-sectional survey with smokers, conducted in the late transition period when standardized and fully branded packs were concurrently on sale, current users of standardized packs had higher levels of noticing warnings than never users of standardized packs (OR=2.86, 95% CI: 2.19–3.74, $p<0.001$). The association remained when adjusted for demographic (age, gender,

Table 2 Direction of Effect and/or Key Findings: Response to Health Warnings

Study	Study Design and Data Collection	Population	Type of Comparison/ Issues Explored	Direction of Effect (Measures Used) and/or Key Findings
Aleyan et al ²²	Longitudinal online survey Wave 1: Jul-Sep 2016 (early in transition period) Wave 2: Feb-Jul 2018 (nine-14 months after end of transition period)	Adult smokers 18+ years England, Germany, Greece, Hungary, Poland, Romania, Spain Wave 1: n=9547 Wave 2: n=9724	Smokers in England (Tobacco Products Directive new warnings and UK standardized packs) vs smokers in six other European countries (Tobacco Products Directive new warnings only)	Favors UK standardized packs (what participants report first noticing on packs). Warning salience increased significantly at Wave 2 in England. Increase in warning salience at Wave 2 was greater in England than in other six countries.
Drovandi et al ²⁷	Cross-sectional online survey Jun 2018 (approx. one year after end of transition period)	Smokers 19–74 years UK, Australia, Canada, USA n=155 UK n=532 other countries	Smokers in UK (UK standardized packs) vs smokers in Australia, Canada, USA (each countries' own packs)	Favors UK standardized packs (perceived effectiveness of warnings in prompting smokers to quit). Perceived effectiveness of warnings higher in the UK; UK smokers less negative about effect of warnings on quitting.
MacGregor et al ²⁴	Focus groups Feb-Mar 2017, towards end of transition period	Young people 13–16 years Mix of current smokers, never smokers, and tried smoking Scotland 16 groups, n=82	Awareness of standardized packs, perceptions as to their appeal, and potential impact on smoking attitudes and behavior	Perceptions of warnings very negative.
Mitchell et al ²⁵	Focus groups Nov 2017 (6 months after end of transition period) and Nov 2018 (18 months after end of transition period)	Young people 16–17 years Mix of ever and never smokers Scotland 8 groups, n=41	Awareness and perceptions of standardized packs, reactions to pack structures	Warnings were perceived as clear, noticeable, believable and off-putting.
Moodie et al ²⁶	Cross-sectional online survey Feb-Apr 2017, towards end of transition period	Current smokers 16–65+ years England n=1865	Smokers who currently used standardized packs vs smokers who had never used standardized packs (conducted Feb-Apr 2017 when both standardized and fully branded packs still on sale)	Favors standardized packs (noticing, reading or looking closely at warning). Current users more likely to notice warnings and to read or look closely at them.
Poundall et al ²⁸	Cross-sectional survey Oct-Nov 2016 (early transition period)	University students England n=546	Fully branded packs vs standardized packs (conducted Oct-Nov 2016 when standardized packs not widely available)	Favors standardized packs (noticing warnings, whether warnings would put them off or make them want to quit).
Retzler et al ²⁹	Eye-tracking experimental study, within-subjects design Feb-May 2017 (late transition period)	Smokers 19–58 years England n=47	Fully branded packs vs standardized packs	Favors standardized packs (eye fixations on warnings). Participants attended more to warnings on standardized packs, in terms of looking at warnings first and for longer duration.

social grade) and smoking characteristics (quit attempts in past 12 months, HSI, and currently trying to quit/reduce) (adjusted OR=2.76, 95% CI: 2.10–3.63, $p<0.001$). The same study reported that 26.8% of the respondents said they had often or very often read or looked closely at the warnings on packs, with current users of standardized packs more likely than never users to have read or looked closely at the warnings on packs (OR=2.43, 95% CI: 1.70–3.46, $p<0.001$). 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: 1.51–3.10, $p<0.001$).

Evidence from the quantitative studies raising more major methodological concerns was in a similar direction. Drovandi et al²⁷ found that UK smokers were more likely than smokers in Australia, Canada and the USA to perceive that warnings were effective in prompting them to quit, but there were concerns about the sample, unclear reporting and interpretation. Poundall et al²⁸ found that smokers and non-smokers were more likely to report noticing warnings on standardized packs than on fully branded packs and that smokers were more likely to report that warnings on standardized packs made them want to quit compared with fully branded pack warnings. The latter study,²⁸ however, raised some major methodological concerns related to its sampling method, response rate and the inferences made from its results.

The two qualitative studies found that young people noticed warnings on standardized packs and felt that they were off-putting. In the Mitchell et al²⁵ focus group study with 16- to 17-year-olds, warnings were considered clear, noticeable and believable, and thought to reduce the appeal of smoking and put them off smoking. In MacGregor et al's²⁴ focus group study with 13- to 16-year-olds, warnings were described very negatively, with some evoking visceral reactions. Never or occasional smokers were thought to be more susceptible to the warnings than regular smokers.

Behavioral Responses

Eight studies, six quantitative studies^{23,26,28,30,31} and two qualitative studies,^{24,25} examined behavioral outcomes relating to standardized packaging in the UK. Participants were asked for anticipated smoking behavior changes in some studies and for self-reported actual behavioral outcomes in others. None of the studies reported on smoking uptake, cessation or relapse prevention. One

study raised some major methodological concerns,²⁸ five studies raised minor methodological concerns,^{23–26,31} and two were appraised as raising no concerns.³⁰ Table 3 summarizes the direction of effect and/or key findings for the results of the studies.

Anticipated Behaviors

Two related studies with teenagers in Scotland, both conducted 6 to 18 months after the transition period ended, examined the effects of differently shaped standardized packs on views of smoking behavior.^{23,25} Using cross-sectional data, Mitchell et al's²³ study with 12- to 17-year-old never smokers found that images of all four standardized cigarette packs with different pack structures (regular, beveled-edge, slim, shoulder box) were considered off-putting, with the vast majority (87%) indicating that they would select none of the packs if offered. Sub-group analysis, controlling for demographics and family and peer smoking, found that those who were susceptible to smoking, however, were significantly more likely to think that the packs would not put them off smoking and to select one of the packs if offered, than those who were not susceptible (25% vs 7%, $\chi^2(1)=29.70$, $p<0.001$). For all four pack structures, not finding them off-putting was associated with susceptibility to smoking (AOR=2.73–3.69), although this sub-group was relatively small. When given standardized packs of five different shapes to handle and examine in Mitchell et al's²⁵ focus groups study with 16- to 17-year-old never smokers and ever smokers, participants considered the slimmer pack and shoulder box, and to a lesser extent the beveled-edged and rounded-edged packs, less of a deterrent on smoking behaviors than the regular standardized pack shape.

Two cross-sectional studies during the transition period examined smokers' thoughts and intentions relating to quitting or cutting down.^{26,28} Moodie et al²⁶ surveyed smokers in England aged 16 and older towards the end of the transition period and found that the look of the pack they were currently using made 25% of them more likely to think “somewhat” or “a lot” about quitting smoking. A sub-group analysis by standardized packaging use found that previous users (OR=2.05, 95% CI: 1.26–3.33 $p=0.004$; adjusted OR=1.90, 95% CI: 1.30–2.77, $p<0.001$) and current users (OR=2.22, 95% CI: 1.55–3.20, $p<0.001$) were more likely to indicate that they had thought about quitting than never users of standardized packs. A survey in the middle of the transition period of university students in England,²⁸ gauging their own likely response to the

Table 3 Direction of Effect and/or Key Findings: Behaviors

Study	Study Design and Data Collection	Population	Type of Comparison/ Issues Explored	Direction of Effect (Measures Used) and/or Key Findings
MacGregor et al ²⁴	Focus groups Feb-Mar 2017, towards end of transition period	Young people 13–16 years Mix of current smokers, never smokers, and tried smoking Scotland 16 groups, n=82	The probable impact of standardized packs on smoking behavior among young people	Anticipated behaviors: Packs would affect never or occasional smokers, but established smokers would continue to smoke.
Mitchell et al ²⁵	Focus groups Between Nov 2017 (6 months after end of transition period) and Nov 2018 (18 months after end of transition period)	Young people 16–17 years Mix of ever and never smokers Scotland 8 groups, n=41	Reactions to different standardized cigarette pack structures and perceived impact on smoking behavior	Anticipated behaviors: Packs would put off people considering starting but not addicted smokers. Standardized slim pack and shoulder box would be less of a deterrent than regular packs.
Mitchell et al ²³	Cross-sectional survey in schools Between Nov 2017 (6 months after end of transition period) and Nov 2018 (18 months after end of transition period)	Young people 12–17 years Never smokers Scotland n=507	Reactions to standardized cigarette packaging; whether permitted variations in pack structure (eg, slim packs or beveled-edged packs) influenced reactions	Anticipated behaviors: Favors standardized packs (all packs would put them off smoking. Most would not select a pack when asked to pick one.) Elaborate pack structures were preferred over regular pack structures.
Poundall et al ²⁸	Cross-sectional survey Oct-Nov 2016 (early transition period)	University students England n=546	Would smokers make behavior changes such as quitting or switching to a cheaper brand or alternative products as a result of the legislation	Anticipated behaviors: Some smokers reported they were likely to switch products (to RYO, cheaper brands or e-cigarettes) in response to the legislation.
Breton et al ³⁰	Longitudinal panel survey Mar 2011-Dec 2017 (pre-legislation to 7 months after end of transition period)	Households who had purchased tobacco, e-cigarettes and Nicotine Replacement Therapy England, Scotland & Wales n=11,695 (average n=1741, range 1332 to 2186)	Comparing trends in household tobacco and non-tobacco nicotine product purchases before, during and after the introduction of plain packaging for consumers' switching behaviors	Behaviors: Tobacco or non-tobacco nicotine products purchasing households more likely to leave the panel post-standardized packaging.
Breton et al ³⁰	Cross-sectional survey Mar-May 2018 (10–12 months after end of transition period)	Smokers who had changed tobacco product past month England, Scotland & Wales n=1061	Consumer's choices after changes in product availability associated with implementation of standardized packaging	Behaviors: Among recent tobacco purchasers, most reported buying the same brand.
Bogdanovica et al ³¹	Cross-sectional survey Mar 2017 (towards end of transition period)	Current smokers 18–55+ years England, Scotland & Wales n=2033	If smokers had changed the product they usually smoked in the last 6 months	Behaviors: Some smokers reported they had switched products (to cheaper brands, larger packs or e-cigarettes) in the last 6 months.

(Continued)

Table 3 (Continued).

Study	Study Design and Data Collection	Population	Type of Comparison/ Issues Explored	Direction of Effect (Measures Used) and/or Key Findings
Moodie et al ²⁶	Cross-sectional online survey Feb-Apr 2017 (towards end of transition period)	Current smokers 16–65+ years England n=1865	Whether smokers had visited a stop-smoking website in the past month by use of standardized packs (a stop-smoking website is mandatory on standardized packs)	Behaviors: Favors standardized packs (more current and previous users of standardized packs had visited a stop-smoking website than non-users of standardized packs).

legislation found that among the smokers, 46.2% would be likely to quit and three-fifths (60.8%) would be likely to cut down on smoking. The survey also examined switching behaviors, with two-fifths (41.5%) of smokers reporting that they would be likely to switch to rolling tobacco, under a third (28.7%) to a cheaper brand and around a fifth (19.3%) to e-cigarettes.²⁸ However, the study raised major methodological concerns in relation to the sampling method, response rate and inferences drawn from the results.

The qualitative studies probed young people's views about the likely behavioral impact of standardized packs. MacGregor et al's²⁴ focus group study with 13- to 16-year-olds towards the end of the transition period found divergent views. The most commonly expressed view was that established smokers, including some study participants, would continue to smoke as the health effects of smoking were widely known, changing the pack would not discourage addicted smokers and packs could be hidden. Never or occasional smokers were thought to be more susceptible to the standardized packs' negative image and therefore less likely to want to try smoking or become an established smoker. Several participants suggested the behavioral impact may be slight, as packs were only visible post-purchase due to point-of-sale display legislation. The Mitchell et al²⁵ focus group study with 16- to 17-year-olds, conducted 6 to 18 months after the transition period, found similar views on the likely behavioral impact. Several participants suggested that the packs would be off-putting for people thinking about taking up smoking, in particular young people, but not for established, addicted smokers. Some males said they would engage in avoidant behaviors by concealing packs.

Actual Behaviors

Moodie et al²⁶ surveyed smokers in England aged 16 and older towards the end of the transition period and found

that 3.9% of the smokers overall reported having visited a stop-smoking website in the last month to get advice about quitting. Examining sub-groups by standardized packaging use, current users (4.6%), previous users (2.3%) and never users (1.0%) had visited a stop-smoking website in the previous month; only frequencies were reported.

In Bogdanovica et al's³¹ cross-sectional survey of adults, conducted in the late transition period in England, Scotland and Wales, 31.4% of the smokers (95% CI: 26.-2–37.1%) reported that they had switched to a different product in the previous 6 months. 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).

In Breton et al's³⁰ longitudinal panel survey, household purchases of packs of 20 cigarettes increased from 17% in May 2016 to 93% in May 2017 (when 20 packs became the minimum pack size), with purchases of roll-your-own (RYO) tobacco in packs of at least 30 grams increasing from 70% in May 2016 to 99% in May 2017 (when 30 gram packs became the minimum pack size). Household purchases of cigarettes in the cheapest quartiles (Q1 and Q2) increased throughout the study while those in the most expensive quartiles (Q3 and Q4) decreased. Differences in average real price paid for cigarettes in each price quartile remained relatively constant until May 2017, when the cheapest prices (Q1 and Q2) converged and Q4 prices significantly increased. Household purchases of RYO in the cheapest quartile (Q1) decreased until February 2017 and then increased. Purchases in the second cheapest (Q2) and second most expensive quartiles (Q3) increased throughout the study. Differences in average real price paid per gram between the cheapest (Q1 and Q2) and most expensive (Q3 and Q4) quartiles increased over time.

From March 2011 to December 2017, the number of households purchasing only cigarettes fell from 875 to

459, as the number of households purchasing only RYO increased from 396 to 512. The number of households purchasing e-cigarettes went from zero in March 2013 to 149 in December 2017. Among households starting as cigarette-only, or RYO-only purchasers, most remained with this initial product. For households starting as cigarette-only purchasers, the odds of switching to a non-tobacco nicotine product increased significantly ($p=0.005$) during the first six months of the transition period (OR=1.74, 95% CI: 1.18–2.57) but not thereafter. The likelihood of switching out of the dataset increased during the last six months of the transition period (OR=1.30, 95% CI: 0.08–1.58, $p=0.007$) and doubled after May 2017 (OR=2.44, 95% CI: 2.05–2.89, $p<0.001$). For households starting as RYO-only purchasers, switching to other tobacco products became significantly ($p=0.044$) less likely after the end of the transition period (OR=0.64, 95% CI: 0.41–0.99). The likelihood of switching out of the dataset almost doubled after the end of the transition period (OR=1.96, 95% CI: 1.64–2.36, $p<0.001$). Overall, there was a marked increase in the number of households purchasing tobacco or non-tobacco nicotine products each month leaving the panel in the final months of the study.

In a related cross-sectional survey,³⁰ conducted 10–12 months after the transition period, the participants who had recently purchased tobacco (350 of 1061) were asked what they would do if the product they usually bought was unavailable. Most ($n=191$) reported that they continued to use the same product, with 46 reporting switching to an alternative tobacco brand and 29 switching to a variant of the same brand.

Discussion

Eleven studies explored consumer response to standardized packaging in the UK. All were rated as having minor methodological concerns, except two which were rated as having major concerns.^{27,28} The findings consistently showed that standardized packaging increased warning salience and reduced the appeal of the packaging and smoking. There were mixed findings on harm perceptions. Studies reporting on anticipated or actual behavioral changes suggest that standardized packs may help deter youth from starting or continuing to smoke and increase cessation-related behaviors among smokers, although no study directly explored uptake, cessation or prevention relapse.

The findings on warning salience and appeal are consistent with earlier reviews^{7,8} and research in Australia and

France. For instance, in Australia, cross-sectional and longitudinal surveys with smokers have typically found an increase in warning salience post-implementation,^{32–35} and where this was not the case research has found an increase in cognitive responses and forgoing cigarettes due to the warnings post-implementation.³⁶ Longer-term research would be of value given that the studies in this synthesis review (and from Australia) explore response to warnings within two years of standardized packaging being implemented; the one study that has explored longer-term response to warnings, repeat cross-sectional school surveys in Australia, found that reading, attending to, and talking or thinking about warnings did not change between 2011 and 2017 (almost five years post-standardized packaging).³⁷ In terms of appeal, research in Australia and France found that smokers were more likely to dislike standardized packs than fully branded packs,^{32,33,38} viewing them as less attractive, lower quality, less satisfying and embarrassing.^{33,38–40} School surveys in Australia similarly found a reduction in positive brand ratings, an increase in negative pack ratings and a decrease in positive pack ratings post-standardized packaging.⁴¹ As standardized packaging was introduced alongside new larger warnings in the UK (as in Australia and France), this needs to be taken into account when interpreting the findings. While it makes it more challenging to try to determine the role of each on warning salience and appeal, the Aleyan et al²² multi-country European survey suggests that simultaneously introducing revised warnings and removing full branding has a greater impact than just changing the warnings.

The studies included in this review showed mixed findings on harm perceptions, echoing research in Australia and France. For instance, repeat cross-sectional surveys with adolescent and adult smokers and non-smokers in France found an increase in the perceived dangers of smoking and fear of the consequences of smoking post-standardized packaging,^{42,43} with smokers in Australia interviewed post-standardized packaging more likely than those interviewed pre-standardized packaging to believe that brands do not differ in harmfulness.³³ Other findings from Australia however show no change among smokers in perceived exaggeration of harms, frequency of thoughts about harm, or the belief that brand variants do not differ in perceived harmfulness compared with a year before,^{33,39} with school surveys finding a decrease in the proportion of young people disagreeing that some cigarette brands contain more harmful substances than others post-

standardized packaging.⁴¹ Further research is needed to attempt to understand this inconsistency.

With respect to behavioral response, studies in this review suggest that standardized packaging may help to deter youth from smoking or continuing to smoke, due to the warnings, pack appearance, and negative image created by the packs. The findings, limited to qualitative research and a cross-sectional school survey, are similar to those in a Cochrane review, where standardized packs were generally less likely to motivate smoking initiation than fully branded packs,¹² and research in France and Australia. Repeat cross-sectional surveys found that following the introduction of standardized packaging, in France the proportion of non-smokers who had tried smoking decreased⁴³ and in Australia never smokers were less likely to indicate that they would try smoking, and experimenters and ex-smokers less likely to indicate that they would smoke again.⁴⁰

For smokers in the UK, standardized packaging was associated with increased thoughts of quitting during the transition period. Research in Australia has found standardized packaging to be associated with greater cessation-related behaviors. Smokers using standardized packs during the transition period were more likely than those using fully branded packs to have thought about quitting at least once a day in the past week and rate quitting as a higher priority.³⁹ A cross-sectional tracking survey, where smokers were interviewed and followed up approximately one month later, found that compared to smokers who completed their follow-up survey prior to standardized packaging, those followed-up in the early transition period showed significantly greater increases in rates of stopping themselves from smoking and higher quit attempt rates, those followed-up in the late transition period showed greater increases in intentions to quit, and those followed-up post-standardized packaging showed more premature stubbing out of cigarettes and higher quit attempt rates.⁴⁴ Additional analysis found that several baseline measures suggesting improved warning effectiveness and reduced appeal, increased the likelihood of quitting-related outcomes,⁴⁵ for example, smokers attributing much more motivation to quit to warnings at baseline were more likely to have attempted to quit at follow-up.⁴⁵ Other research found an increase in calls to a quitline shortly after the introduction of standardized packaging.⁴⁶

Strengths and Limitations

In terms of strengths, a systematic approach was used in the two reviews that we synthesized, with extensive searches carried out to identify relevant studies. The studies that were included were checked for methodological rigor. As the authors were authors on four included studies, as can arise in systematic reviews conducted in specialized research areas, to minimize the risk of researcher bias study quality was assessed externally, by the EPPI-Centre.

The review also has a number of limitations. We intentionally restricted inclusion to peer-reviewed publications, but excluding the grey literature may have introduced a publication bias. As the data extraction process was conducted by a single reviewer, this could have introduced errors. There are also limitations with the studies included. Two were appraised as raising major concerns about the soundness of the data (eg, the sample and data collection were not described adequately) and analyses (eg, the appropriateness and reporting of the analyses).^{27,28} The qualitative studies lack representativeness and generalizability. The studies relied on self-report, with convenience sampling used in most studies. One study was conducted during the early transition period, when few standardized packs were on sale, and three more studies during the late transition period, when the novelty of products may have influenced responses. None of the longitudinal surveys directly explored behavioral responses. For all included studies, the findings should be considered in light of the fact that standardized packs were introduced at the same time as novel larger pictorial warnings, and an increased minimum pack size for cigarettes and rolling tobacco.

Future Research

While we purposefully focused on research within the UK, it is critical that standardized packaging is evaluated elsewhere, particularly as published research on warning salience, appeal, harm or behavior seems to be restricted to the three early adopters of this policy (Australia, France and the UK). Research in the middle-income countries in Asia and South America that have implemented this policy, and low- and middle-income countries that will implement this policy, is crucial. It is also important to consider the unintended consequences of plain packaging.¹¹ No studies exploring illicit tobacco were included in the synthesis review, but recent research, using Euromonitor data, suggests that there was no

increase in smokers being offered illicit cigarettes in the UK or France.⁴⁷ Research assessing the actual use of illicit tobacco, as has been explored in Australia,^{48,49} is needed however.⁵⁰ Standardized packaging is only required for cigarettes and rolling tobacco in the UK, whereas in other countries it covers all tobacco products. Research exploring perceptions of other tobacco products in markets with standardized packaging, irrespective of whether these products are included within standardized packaging regulations, would be of value. Most countries have only recently introduced standardized packaging, and as such research exploring the longer-term response is not yet possible, but such research is particularly important, with only one study, in Australia, having considered longer-term response.³⁷

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The authors report no conflicts of interest in this work.

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