

Do larger pictorial health warnings diminish the need for plain packaging of cigarettes?

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ABSTRACT

Aims To assess the effects on brand appeal of plain packaging and size of pictorial health warnings (PHWs). **Design** Three (30%, 70% and 100% size front-of-pack PHWs) by two (branded versus plain) between-subjects online experiment. **Setting** Australia. **Participants** A total of 1203 adult smokers. **Measurements** Rating of cigarette brands, smoking attitudes and intentions, purchase intent. **Findings** Compared to branded packs, plain packs reduced smokers' ratings of 'positive pack characteristics' ($P < 0.001$), 'positive smoker characteristics' ($P < 0.001$) and 'positive taste characteristics' ($P = 0.039$). Plain packs were rated as being smoked by people who were more 'boring' than those who smoked branded packs ($P = 0.001$). By contrast, increasing size of PHW above 30% only reduced ratings of 'positive pack characteristics' ($P = 0.001$), but also decreased ratings of smokers as being 'boring' ($P = 0.027$). Plainness and size of PHW interacted in predicting ratings of 'positive pack characteristics' ($P = 0.008$), so that when packs were plain, increasing the size of PHW above 30% did not further reduce ratings. Presentation of only plain packs increased the likelihood that smokers would not choose to purchase any pack (20.3%) compared to presentation of only branded packs (15.3%) (odds ratio = 1.4; $P = 0.026$), while size of PHWs had no influence upon purchase choice. **Conclusions** Plain packaging probably plays a superior role in undermining brand appeal and purchase intent to increasing health warning size. Policymakers should not rely solely upon large health warnings, which are designed primarily to inform consumers about smoking harms, to also reduce brand appeal: both strategies are likely to be required.

Keywords Adult, experimental study, health warning, labelling, marketing, smoking.

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Submitted 9 September 2011; initial review completed 19 October 2011; final version accepted 12 December 2011

INTRODUCTION

Based on current global smoking patterns, annual tobacco deaths will rise to 10 million by 2030, but many millions of premature deaths could be avoided if effective tobacco control interventions were applied [1]. Implementing comprehensive restrictions on tobacco advertising and promotion [2] and adding pictorial health warnings (PHWs) on tobacco packages [3] are two strategies recommended in Articles 11 and 13 of the Framework Convention on Tobacco Control [4].

With increased restrictions on conventional forms of tobacco marketing, cigarette packaging has become a cornerstone of marketing strategy [2,5–7]. Through the

use of colour, fonts, images and trademarks, cigarette packs have become the primary vehicle used to communicate brand image [8–10]. Tobacco companies have designed packs to appeal to women and young people, and to reassure consumers about cigarette harms [5,11–14]. Cigarette pack design not only reflects the brand's 'personality' to the consumer, but also allows smokers to project these attributes to others on the many occasions they handle and display the pack in public. Appealingly branded cigarette packs are the subject of many thousands to millions of incidental brand encounters by other people, and are a potent influence on purchasing patterns in ways in which consumers are unaware [15,16].

One way to reduce branding appeal would be to mandate plain packaging, which would require all cigarettes to be contained in packs of the same unappealing colour and would remove branding elements, leaving only the brand name and variant in a standard font and location [17]. Australia is the first country internationally to require plain packaging, with all cigarettes to be sold in packs with a standard olive brown colour from December 2012 [18,19]. Experimental studies show that, compared with branded packs, plain packaging reduces brand appeal [14,20–22] and reduces misconceptions about smoking harms [11,23]. Plain packaging reduces the ability of the pack to communicate brand information in social settings, limiting its capacity to serve as a ‘silent salesman’ [24,25].

Cigarette packs have become an important medium for communicating the harms of tobacco use, with areas of the pack appropriated for health warning messages. The impact of health warnings increases with their size and design, with prominent PHWs increasing health knowledge, perceptions of risk from smoking and promoting smoking cessation [3]. Larger health warnings covering more of the front of the pack are more effective in communicating risk than smaller warnings [3], and successfully communicating risk translates into increased quitting activity [26]. Because their primary purpose is to communicate risk information, few studies have examined the impact of health warnings on brand appeal. Kees *et al.* [27] found the addition of PHWs to reduce adult smokers’ ratings of cigarette pack attractiveness, while Sabbane *et al.* [28] found that text and PHWs reduced attitudes towards cigarette brands compared with text-only or no warnings.

While past research has demonstrated that health warnings are more noticeable when presented on a plain cigarette pack [29–32] and considered more serious [33], there have been few studies that examine specifically the combined impact of plain packaging and PHWs on measures of brand appeal. It might be that the presence of very large PHWs on branded packs would be as effective in disrupting brand imagery as a more modest-sized PHW on a plain pack. Alternatively, it could be that even though branding information may be limited to a relatively small area, it still overshadows or minimizes the effects of a large PHW. Germain and colleagues [21] found the addition of a larger PHW further reduced the appeal of plain packaging among adolescents, while two recent studies of adults produced somewhat mixed results [34,35]. The primary aim of our study was to test the relative impact on adult consumer perceptions of increasing size of PHWs presented on plain versus branded packs. We were also interested to examine the pattern of relationships by age group, given that branding is important for younger people [2].

METHODS

Design

A three (size of PHW) × two (plain versus branded) between-subjects experimental design.

Procedure

A sampling frame of adults aged 18 years and over was sourced from a national online panel (<http://www.iview.com.au>). Panel members had participated previously in surveys, after which they had given permission to be contacted by e-mail to participate in future research.

Panel members who were smokers aged 18 or older were e-mailed an invitation to participate in a study about their opinions of a brand with which they might be familiar. Respondents were given a chance to win one of 10 AU\$100 shopping vouchers as an incentive. If there was no response, two follow-up reminders were sent 5 days apart. Upon accessing the survey website, respondents were asked their age and whether they were daily or weekly smokers of factory-made cigarettes. Those who smoked less than weekly or not at all were excluded.

Experimental conditions

Respondents were allocated randomly to view one of six pack conditions that varied by size (30%, 70% or 100%) of front-of-pack PHW and presence/absence of branding. After random assignment to one of these pack conditions, participants consecutively viewed and rated six cigarette brands within their pack condition. Plain packs featured a brown colour used in past studies of plain packaging [20,21]. Three current Australian graphic health warnings that had evaluated strongly in a government evaluation [36] were included: ‘Smoking causes peripheral vascular disease’; ‘Smoking causes throat and mouth cancer’; and ‘Smoking harms unborn babies’. These warnings were assigned randomly to each pack viewed by respondents to balance out their effects across conditions. Within their assigned pack condition, each respondent was exposed to six different brands to improve generalizability of results. These brands were the two most popular ‘mainstream’ Australian brands (Peter Jackson Rich and Winfield Blue), the two most popular ‘value’ brands (Horizon Blue and Longbeach Rich), the most popular ‘premium’ brand (Benson & Hedges Smooth) and the largest-selling international brand (Marlboro Red).

In total, 216 separate digital images of packs were created in Adobe Photoshop, manipulating branding/plainness, PHW size and specific warning message, presented across six different brands. When completing ratings, respondents viewed each brand separately and



Figure 1 Example stimuli for each pack condition for the Marlboro brand. Some pack images inadvertently omitted the small text words 'gangrene' or 'mouth cancer' from within the respective pictorial health warnings (PHWs). Additional statistical analysis showed that the presence or absence of this text word did not influence the pattern of results

with the pack displayed in two side-by-side views: (i) front view of the pack standing up; and (ii) side view of the pack lying flat (Fig. 1).

Questionnaire

When viewing each brand, respondents were asked to rate it on visual analogue scales from 0 ('not at all well') to 10 ('extremely well') on a number of attributes. Participants were first asked to indicate 'how well do you think the following phrases relate to the cigarette pack shown?'. The phrases were 'This pack is . . .': 'popular among smokers'; 'attractive'; 'sophisticated'; and 'a brand you might try/smoke'. These items were combined to form the outcome 'positive pack characteristics' ($\alpha = 0.88$). Respondents were then asked to indicate 'how well do you think the following characteristics describe a typical smoker of the pack of cigarettes shown?', with the phrases being 'a typical smoker of this pack of cigarettes is . . .': 'trendy'; 'successful' (combined as 'positive smoker characteristics': $\alpha = 0.90$); and 'boring' (negative smoker characteristic). Finally, respondents were asked to think about how the cigarettes shown might taste, making four ratings: two items 'I would expect the cigarettes in this pack to be': 'enjoyable to smoke'; and

'satisfying in taste' were combined to form 'positive taste characteristics' ($\alpha = 0.97$) and the final two, 'high in tar' and 'harmful to your health', were combined to form the outcome 'negative harm characteristics' ($\alpha = 0.80$). Within each of the questions, attributes were presented randomly to avoid order effects.

Following brand ratings, respondents were asked on a scale of (0—not at all) to (10—extremely) 'how much do you feel like having a cigarette right now?' and 'how much do you feel like quitting today?'. Respondents were also asked 'how long ago did you finish your last cigarette?' and 'how likely are you to be smoking cigarettes a year from now?'. Next, respondents were asked to indicate how much they agree or disagree (strongly disagree; disagree; neither; agree; strongly agree) with a number of attitudinal questions including: 'I regret having started smoking'; 'the health effects of smoking are exaggerated'; 'I get a lot of pleasure out of smoking'; and 'smoking is a disgusting habit'.

Then, respondents were presented with images of all six cigarette brands they had rated within their pack condition on a single screen and asked: 'If you ran out of cigarettes and only the packs below were available in the store you went to, which pack would you be most tempted to buy?'. Respondents could either choose one of the

packs they had seen, or select the option: 'I would not choose any of these packs'.

Finally, information was collected on sex and residential postcode. Postcode was used to determine respondent's socio-economic status (SES) using the measure of socio-economic index for postcode areas [37]. Respondents were then thanked for their participation and told they had been entered into the draw for the shopping vouchers.

Statistical analysis

Analyses were conducted using SPSS version 14.0. Analysis of variance (ANOVA) and χ^2 tests checked that random assignment yielded equivalent groups.

As would be expected, there were significant differences by brand in the five rating outcome measures (all $P < 0.001$). However, there were no systematic interactions between brands by plainness or size of PHW across the five rating outcome measures. Responses to each of the six brands were therefore aggregated for each participant for statistical analysis. To assess effects on these rating outcomes, two-way ANOVAs examined the main effects of pack plainness and size of PHW, and interactions between plainness and size of PHW. Main effects of age group (18–29 years versus 30+ years) on pack ratings were also assessed using ANOVAs, including interactions between age and plainness of pack, age and PHW size, and a three-way interaction between age, plainness of pack and PHW size. Main and interaction effects of plainness of pack and PHW size on purchase intent, attitudes toward smoking and smoking intentions were investigated by logistic regression analysis. Where multiple pairwise comparisons were conducted, Bonferroni adjustments were made.

RESULTS

Sample characteristics and group assignment

A total of 1203 smokers completed the study, of whom 91% smoked daily and 63% smoked more than 10 cigarettes each day. Table 1 shows that just over half of participants were female (55%) and lived in areas of high SES (55%). Thirty-eight per cent of the sample were younger (18–29 years) adults. Table 1 shows no significant differences in smokers' demographic characteristics or smoking behaviour across the packaging conditions. An average of 200 participants (min = 178; max = 219) were allocated randomly to each packaging condition, with an equal distribution of health warnings seen.

Effect of pack condition on ratings

Table 2 shows that there was a main effect of plainness of pack on ratings on four of the five rating outcome measures. Compared to branded packs, plain packs were rated

lower on 'positive pack characteristics' (mean 3.5 versus 4.3: $F_{(1,1201)} = 60.3, P < 0.001$), 'positive smoker characteristics' (3.4 versus 4.1: $F_{(1,1201)} = 40.2, P < 0.001$) and 'positive taste characteristics' (4.7 versus 4.9: $F_{(1,1201)} = 4.3, P = 0.039$), while plain packs were rated as being smoked by people who were more 'boring' than those who smoked branded packs (4.6 versus 4.2: $F_{(1,1201)} = 12.0, P = 0.001$). There was no effect for harm-related characteristics.

There were also main effects for increasing size of PHW in reducing ratings of 'positive pack characteristics' ($F_{(2,1200)} = 6.9, P = 0.001$) and reducing ratings of 'boring' ($F_{(2,1200)} = 3.6, P = 0.027$), but no differences for the other three rating outcomes. *Post-hoc* comparisons revealed that packs with 70% or 100% warnings received lower ratings on 'positive pack characteristics' (both 3.8) than the current 30% health warnings (mean 4.2) ($P < 0.01$). Contrary to expectations, typical smokers of packs with a 100% health warning were rated as less 'boring' (mean = 4.2) than smokers of packs with 30% warnings (mean = 4.6) ($P = 0.008$).

There was a significant interaction between pack plainness and size of PHW in predicting ratings of 'positive pack characteristics' ($F_{(2,1200)} = 4.8, P = 0.008$). Figure 2 shows that increasing the size of PHW on branded packs from 30–70% reduced ratings of 'positive pack characteristics' significantly ($P < 0.001$), but increasing it to 100% did not reduce ratings further. When packs were plain, increasing the size of PHW did not influence these ratings ($P > 0.05$). A *post-hoc* comparison found that for packs with 100% PHW, positive pack ratings were significantly lower for plain (mean = 3.4) than branded (mean = 4.1) packs ($P = 0.001$). There were no significant interactions for other rating measures.

There was a significant main effect for age group on ratings of 'positive pack characteristics' ($F_{(1,1201)} = 13.1, P < 0.001$) and 'positive smoker characteristics' ($F_{(1,1201)} = 16.4, P < 0.001$), with younger smokers rating all packs more positively on these two dimensions (mean = 4.1 and 4.1, respectively) than older smokers (mean = 3.8 and 3.6, respectively). Figure 3 shows there was a significant interaction between age group and size of PHW in predicting ratings of 'positive pack characteristics' ($F_{(2,1200)} = 3.1, P = 0.048$), with older respondents' ratings becoming less positive as PHWs increased in size, while younger respondents' ratings did not significantly differ by size of PHW ($P > 0.05$).

There were no other age-related interactions relating to plainness or size of PHW for the other outcomes.

Attitudes

Controlling for time since respondent last had a cigarette, analyses indicated no main or interaction effect of

Table 1 Demographic and smoking differences across experimental conditions.

	Condition						χ^2 P
	Branded			Plain			
	Total	30% PHW	70% PHW	100% PHW	30% PHW	70% PHW	
(n = 1203) %	(n = 219) %	(n = 192) %	(n = 202) %	(n = 178) %	(n = 207) %	(n = 205) %	
Age group (years)							
18–29	37.6	39.7	38.0	40.6	33.1	35.7	37.6
30–49	40.1	37.4	40.6	43.1	43.3	38.6	38.0
50+	22.4	22.8	21.4	16.3	23.6	25.6	24.4
Sex							0.594
Males	44.7	43.4	44.3	44.6	44.4	43.0	48.8
Females	55.3	56.6	55.7	55.4	55.6	57.0	51.2
SES							
SEIFA 1 (high disadvantage)	21.5	21.8	25.3	19.5	13.0	24.6	23.8
SEIFA 2	24.1	23.6	22.6	25.5	29.9	22.2	21.3
SEIFA 3	27.1	25.9	27.9	26.5	28.8	26.6	27.2
SEIFA 4 (low disadvantage)	27.4	28.7	24.2	28.5	28.2	26.6	27.7
Smoking frequency							
Daily	90.9	92.2	89.1	92.1	91.0	90.3	90.2
Weekly	9.1	7.8	10.9	7.9	9.0	9.7	9.8
Time since last cigarette							
Smoking now	7.6	9.1	6.3	8.9	6.7	8.2	6.3
60 minutes or less	65.5	63.0	66.7	63.9	64.6	68.6	66.3
More than an hour	26.8	27.9	27.1	27.2	28.7	23.2	27.3
Consumption							
1–10/day	37.4	40.2	38.5	36.1	37.6	34.3	37.6
11–20/day	44.6	43.8	43.2	47.5	46.1	44.0	42.9
More than 20/day	18.0	16.0	18.2	16.3	16.3	21.7	19.5
Smoked one of the brands displayed (% yes)	65.9	67.1	63.0	68.3	61.2	69.6	65.4

PHW: pictorial health warnings; SES: socio-economic status; SEIFA: Socio-economic Index for Areas.

plainness of pack or PHW size on respondents ratings of 'feel like a cigarette right now' or 'feel like quitting today' when assessed after all packs had been viewed. Similarly, there was no main or interaction effect of plainness of pack or PHW size on smokers' rated likelihood of being a smoker '1 year from now'.

Respondents' attitudes toward smoking and perceived health effects of smoking did not differ by plainness of pack or size of PHW, nor did an interaction between plainness and PHW exist. The pattern of these relationships generally did not vary by age group.

Purchase intention

Respondents were asked to choose which pack, if any, they would prefer to purchase, of the six packs they had viewed (which therefore varied only by brand). Overall, 82% of respondents chose one of the packs they had rated. Respondents who saw plain cigarette packs were

more likely to indicate that they would not buy any of the packs they had seen (20.3%), compared with those who had seen branded packs (15.3%) [odds ratio (OR) = 1.4, 95% confidence interval (CI): 1.04–1.89, $P = 0.026$]. The size of PHWs did not influence whether respondents opted not to select any of these packs. There was no interaction between plainness and size of PHW in predicting pack choice. While older respondents were more likely to indicate they would not buy any of the packs they had seen (20.4%) than younger respondents (13.5%) (OR = 0.6, 95% CI: 0.44–0.85, $P = 0.003$), there were no interactions between age group and either pack plainness or size of PHW.

DISCUSSION

Our study found that plain packaging reduced elements of brand appeal far more than increasing the size of

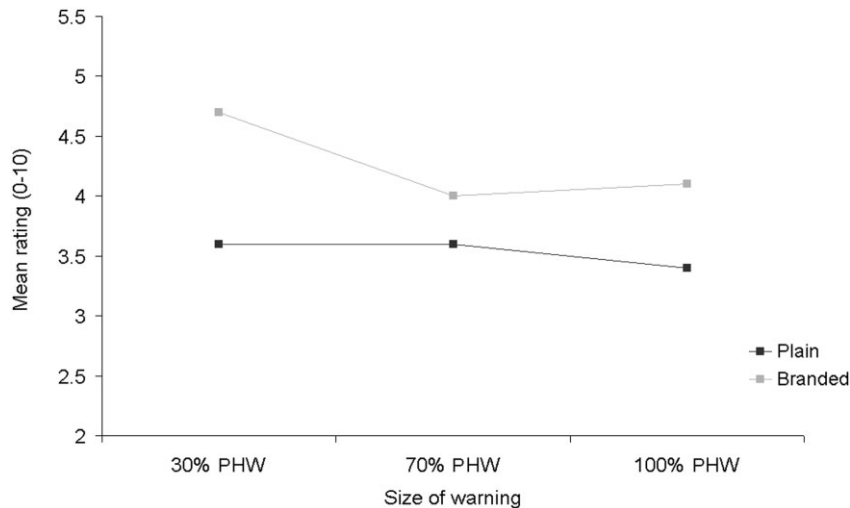


Figure 2 Mean rating of 'positive pack characteristics' by plainness and size of pictorial health warnings (PHW)

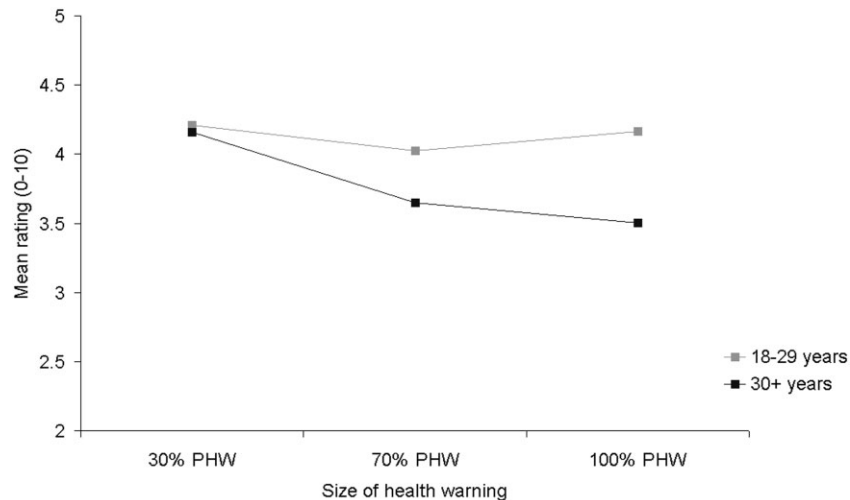


Figure 3 Mean ratings of 'positive pack characteristics' by size of pictorial health warnings (PHW), for age groups

emotional response to products, eliciting positive affect [39,40]. Such emotional responses can subtly tip judgments in a desired direction, even though consumers are largely unaware of these involuntary processes [41,42].

Our results show a stronger effect for plain packaging, while two other recently published studies found PHWs to be more influential. We think that the differences are due to different characteristics of the packs and different types of comparisons. The first was an experiment with New Zealand young adult smokers that investigated which cigarette pack they would be most and least likely to choose when presented with arrays of four packs with different levels of branding and PHW size combinations [35]. This study found that on both branded and plain packs, larger PHWs are relatively equally less preferred, suggesting that larger PHWs have a somewhat greater impact than plain packaging, whereas we found plain

packaging to be more influential than size of PHW on most of our outcome measures. This difference may be attributable to the New Zealand study's use of a novel graphic warning, potentially increasing the PHW effect as it is known that warnings lose some of their potency over time [43], their use of a single front-of-pack view while our study displayed the front and two sides of each pack so that more branding or plainness was visible, and their use of a white plain pack, a colour that many find attractive as it denotes purity [44], rather than the brown version used in our study.

The relative contributions of health warning and plain packaging were assessed in a second recent study using an experimental auction method with more than 400 adult US smokers [34]. While varied placement of text warnings on branded cigarette packs did not reduce the price that smokers would pay for them, packs with a

novel 50% front-of-pack PHW would do so significantly. In addition, PHWs on 'plain' packs would further reduce significantly the price smokers would pay, compared to the branded pack with PHW, suggesting that both PHW and plain packaging have additive effects in reducing demand. Interestingly, while the plain pack in this study eliminated most branding elements the usual font of the brand name was retained, and our past research suggests that standardizing the font would have rendered the plain pack even less appealing [20].

While our study suggests that increasing the size of PHW on branded packs would be desirable in terms of reducing brand appeal, we found that packs with the 100% PHW were perceived to be smoked by people who were less boring than the current 30% PHW, although packs with 70% warnings were rated no differently than those with 30%. The notion that packs with extremely large warnings might make smokers seem more interesting could be a cause for concern, although very large warnings are novel, and novelty would be expected to fade with repeated exposure. It is important to recognize that larger health warnings might influence other outcomes not measured here, such as new learning about the health harms of smoking, thinking about the warning messages or even cessation-related responses, which are more pertinent to the primary objectives of health warnings [35].

Our findings suggest that plain packaging is likely to have desirable effects on both younger and older smokers. In particular, while younger smokers in the purchase intention task were generally less likely to decide to forgo a purchase than older smokers, plain packaging acted to similarly increase the decision not to purchase any brand for both younger and older smokers. Thrasher and colleagues [34] also found similar effects of plain packaging across all age groups in reducing the price paid for a pack. In our study, irrespective of whether packs were plain or branded, increasing the size of PHWs reduced ratings of positive pack characteristics for older but not for younger smokers. This may be because the majority of PHWs are more personally relevant for older smokers, among whom the health effects are more imminent.

Because plain packaging is not yet implemented in any country, our study was necessarily experimental in design. Given its online nature, participants had only a two-dimensional exposure to the pack conditions and were unable to handle packs, so this may have led to some underestimation of effects. We used an internet panel which over-represented female and younger smokers and was skewed towards higher SES smokers, by comparison with a recent national survey [45], but our purpose in this study was to determine the relative effects of different packaging configurations rather than to provide population estimates. A strength of the study was that it

included six different brands, increasing the likelihood that observed effects would be applicable across the many different brands on the market. Also, we selected three different PHWs in a balanced design across pack conditions and brands to provide variation in the nature of health warnings viewed and increase generalizability of results across health warnings. None the less, the optimal test of plain packaging would be its implementation and evaluation in a population-based setting.

Overall, given an objective to reduce the brand appeal of cigarette packaging, our findings suggest that increasing the size of front-of-pack PHWs is not likely to be an adequate substitute for plain packaging. Our study suggests that plain packaging offers unique advantages in reducing brand appeal and purchase intention among Australian smokers. Given that PHWs are designed primarily to increase awareness of and concern about tobacco-related health harms, both these strategies are likely to be needed as elements of tobacco packaging policies.

Declarations of interest

There are no conflicts of interest.

Acknowledgements

This study was funded by project grant no. 623203 from the Australian National Health and Medical Research Council (NHMRC). Melanie Wakefield was funded by an NHMRC Principal Research Fellowship. David Hammond was funded by a Canadian Institutes for Health Research New Investigator Award (Hammond) and a Canadian Cancer Society Research Institute Junior Investigator Research Award (Hammond).

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