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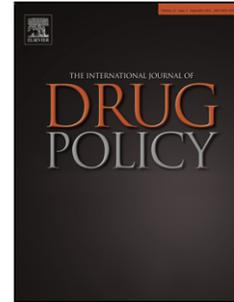
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Policy Analysis

Tobacco Plain Packaging: Evidence Based Policy
or Public Health Advocacy?

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ABSTRACT

In December 2012, Australia became the first country to require all tobacco products be sold solely in standardised or 'plain' packaging, bereft of the manufacturers' trademarked branding and colours, although retaining large graphic and text health warnings. Following the publication of Sir Cyril Chantler's review of the evidence on the effects of plain tobacco packaging, the Ministers of the United Kingdom Parliament voted in March 2015 to implement similar legislation. Support for plain packaging derives from the belief that tobacco products sold in plain packs have reduced appeal and so are more likely to deter young people and non-smokers from starting tobacco use, and more likely to motivate smokers to quit and stay quit. This article considers why support for the plain packaging policy has grown among tobacco control researchers, public health advocates and government ministers, and reviews Australian survey data that speak to the possible introductory effect of plain packaging on smoking prevalence within Australia. The article concludes by emphasising the need for more detailed research to be undertaken before judging the capacity of the plain packaging policy to deliver the multitude of positive effects that have been claimed by its most ardent supporters.

Introduction

Advocates for tobacco control have been lobbying governments around the world to implement legislation that would require all tobacco products to be sold in uniformly drab cartons, bereft of company logos and bright colours, although retaining large graphic and text health warnings. Support for standardised tobacco packaging, a term used interchangeable with 'plain packaging', stems largely from the belief that tobacco products sold in plain packs will, by reducing the appeal of smoking, increasing the salience of health warnings, and correcting misperceptions about the harms associated with tobacco use, decrease the number of young people starting smoking and increase the number of people who quit smoking and stay quit.

In 2012, the Australian Government became the first to legislate that all tobacco products to be sold in plain packs. Despite this limited application, support for plain packaging has been ubiquitous and unwavering among academics, public health practitioners, and global health leaders. In 2013, several of the UK's most influential tobacco control researchers authored an article in the *British Medical Journal* titled: "UK government's delay on plain tobacco packaging: how much evidence is enough?" (Moodie et al., 2012). Similarly, in a recently published article, Pechey et al. (2013) asked 33 "internationally renowned" tobacco control experts (from the UK, Australasia and North America) to provide their estimate of the likely size of the impact of plain packaging on the prevalence of smoking amongst adults and children. According to Pechey et al.:

In the absence of direct evidence for the impact of plain packaging of tobacco products, this sample of tobacco control experts believe such a policy is likely to lead to a decline in smoking prevalence, and in particular, to a decline in the number of children trying smoking, two years after the introduction of plain packaging. No experts felt that the most likely outcome would be an increase in rates for either adults or children...indicating a strong consensus that plain packaging would not increase consumption, assuming all else stayed equal. (Pechey et al 2013: 5)

In 2012, the Director General of the World Health Organisation (WHO), Dr Margaret Chan, signalled her support for the plain packaging policy in a press release from the WHO: “We must make plain packaging a big success so that it becomes the success of the world” (WHO, 2012). The phrasing here is interesting in expressing the commitment on the part of the WHO to ensuring that the health policy is made to work, rather than simply observing the extent to which it works. In its submission to the UK government’s independent review of plain packaging (Chantler, 2013), Public Health England reported the findings of a survey that demonstrated the level of support for plain packaging amongst local directors of public health:

94% of directors agreed that standardised packaging would have a positive impact on reducing health inequalities, particularly in relation to children and young people, those from deprived communities, people with health

needs, such as mental health and long-term conditions, respiratory illness.

(Public Health England, 2014:4)

The claimed benefits of plain packaging were reported by Public Health England without any supporting evidence to show that the directors' beliefs were well founded. Moreover, the claimed consensus of support for plain packaging was actually based on a survey that achieved only a 50% response rate; in other words, support for plain packaging was expressed to Public Health England by 94% of 50% of all local directors, not 94% of 100% of directors as was suggested by the submission.

In 2013, the UK government instituted a review of the evidence on the impact of plain packaging (Chantler, 2013) with a view to considering whether the UK should implement a similar policy. On concluding the review, Sir Cyril Chantler wrote to the UK Secretary of State for Health setting out his recommendations:

Having reviewed the evidence it is in my view highly likely that standardised packaging would serve to reduce the rate of children taking up smoking and implausible that it would increase the consumption of tobacco. I am persuaded that branded packaging plays an important role in encouraging young people to smoke and in consolidating the habit irrespective of the intentions of the industry. Although I have not seen evidence that allows me to quantify the size of the likely impact of standardised packaging, I am satisfied that the body of evidence shows that standardised packaging, in conjunction with the current tobacco control

regime, is very likely to lead to a modest but important reduction over time on the uptake and prevalence of smoking and thus have a positive impact on public health. (Chantler, 2014:6)

On 11th March 2015, the UK Parliament voted in favour of implementing plain packaging legislation, with implementation scheduled for May 2016. Just weeks before the UK Parliament vote, the parliament of the Republic of Ireland also voted to implement a plain packaging policy.

While support for plain packaging has gathered pace in recent years, the proposal to limit the marketing of tobacco products in this way has been advocated for decades:

In 1992, Health Canada commissioned an expert panel to examine plain and generic packaging of tobacco products and the role it plays in marketing, consumer choice, and uptake or cessation of smoking. The panel found that “plain and generic packaging of tobacco products...through its impact on image formation and retention, recall and recognition, knowledge, and consumer attitudes and perceived utilities, would likely depress the incidence of smoking uptake by non-smoking teens, and increase the incidence of smoking cessation by teens and adult smokers” (WHO 2015:4)

Given the emphasis that has been placed on ensuring that public policy is based on the best available evidence, it is important to consider the strength of the evidence in support of the plain packaging policy.

Plain Packaging Research

A systematic review published by researchers at the University of Stirling in 2012 identified 37 individual studies of the effects of plain packaging; 15/37 were published in 2011 and 8/37 were unpublished manuscripts at the time of their inclusion in the review (Moodie et al., 2012a). The execution and reporting of the study search were excellent in terms of its exhaustive search, specification of terms, and screening procedure. The authors searched 21 electronic databases of journal articles, book chapters, and government reports on plain packaging from the fields of health, public health, social science and social care, and included articles initially on the basis of five criteria: primary research on tobacco and plain packaging in human populations published between 1980 to 31st August, 2011.

Of the 37 studies included in the final sample, 16 assessed attitudes towards plain packaging or perceptions of whether plain packaging would prevent initiation or aid cessation (e.g. prioritizing quitting, thinking more about quitting, planning to quit). These 16 studies near unanimously found that plain packs are negatively associated with feelings about smoking, and that plain packs are perceived as more likely to deter uptake of smoking and reduce consumption among existing smokers (although the impact was not great in some studies). The authors concluded that:

The review found that there is strong evidence to support the propositions set out in the Framework Convention on Tobacco Control relating to the role of plain packaging in helping to reduce smoking rates: that is, that plain packaging would reduce the attractiveness and appeal of tobacco products, it would increase the noticeability and effectiveness of health warnings and messages, and it would reduce the use of design techniques that may mislead consumers about the harmfulness of tobacco products. In addition, the studies in this review show that plain packaging is perceived by both smokers and non-smokers to reduce initiation among non-smokers and cessation-related behaviours among smokers. (Moodie et al 2012: v)

However, no study out of 37 reviewed studies measured the volume of tobacco consumed by participants before and after exposure to plain packaging, or the number of smokers who quit smoking post-exposure, or the number of non-smokers who started smoking post-exposure. Indeed, only two of 37 studies reported statistical effect sizes for plain packaging versus branded packaging, mainly because most studies reported descriptive data (usually frequencies) or described findings using only text descriptions, neither of which alone can be used to calculate a statistical effect size.

A further 17 published studies were added to the review in 2013 (Moodie et al., 2013), 15 of which were conducted in Australia, New Zealand or the UK. Eight assessed perceptions of whether plain packaging would prevent initiation or aid cessation; five used quantitative measures and three used qualitative measures.

Of these five quantitative studies, only one (Moodie & MacKintosh, 2013) assessed self-reported change in cigarette consumption within a two-week, within-groups, naturalistic, randomized trial of branded versus plain packaging. The remaining four quantitative studies assessed how plain packaging influenced participants' intentions to start/quit smoking, without assessing whether these intentions were predictive of future smoking behaviour. Therefore, at the point of publication of this update to the Stirling team's evidence review, only one (Moodie & MacKintosh, 2013) of 54 available studies of plain packaging had assessed actual levels of cigarette consumption associated with plain and branded packs. As of 2013 then, empirical evidence that plain packaging reduces smoking prevalence was very weak, indeed almost non-existent.

Despite this acknowledged absence of empirical evidence, two authors of the Stirling reviews later claimed, without the addition of substantial new evidence on the behavioural impact of plain packaging to that cited in their 2013 review, that the policy is likely to have "a deterrent effect on smoking, with younger people, non-smokers and less heavy smokers more likely to think that plain packs would discourage smoking initiation, encourage cessation or reduce consumption" (Moodie and Bauld, 2015). More difficult to justify were the supportive conclusions of a recently published "evidence review" from the WHO Regional Office for Europe, which stated, without actually citing any supporting evidence, that plain tobacco packaging encourages fewer people to start smoking and more people to quit smoking (World Health Organisation, 2015).

Salience of Health Warnings: Plain and Branded Packs Compared

One of the most widely studied questions has related to whether the branding and livery on tobacco products reduces the salience of the pack's warnings about the risks of smoking. This is an important question because the health warnings appearing on tobacco products are seen as an essential means of informing individuals of the dangers of smoking. It has been estimated, for example, that these warnings are viewed in excess of 7000 times per year by smokers (Fong, 2001).

Beede and colleagues (1990) examined the capacity to recall health warnings in research that involved providing young people with a range of branded and plain cigarette packs and subsequently asking them to recall as much detail as possible about the packs they had been shown. In this study, individuals' recall of the health warnings was greater when the warnings appeared on plain compared to branded packs. A similar study by Rootman et al. (1995) involved young people being asked to recall the details on plain and branded packs; this study similarly showed that health warnings were more noticeable, and more memorable, when they appeared on plain compared to branded packs. More recently, Maynard et al. (2013) used eye-tracking equipment to examine visual attention to health warnings on plain and branded cigarette packs. In their study, adolescent never smokers, experimenters, weekly smokers, and daily smokers were provided with identical images of plain and branded cigarette packs bearing the same pictorial health warnings. The authors concluded:

Compared with branded packaging, plain packaging increased the time spent attending the warnings compared with the branding among experimenters and weekly smokers but not daily smokers who made equal number of eye movements to the warnings on branded and plain packs. (Maynard et al 2013:417)

The findings that some groups of smokers (experimenters and weekly smokers but not daily smokers) paid greater attention to health warnings on plain compared to branded packs confirmed the findings of earlier research from the same team (Munafo et al., 2011). In their earlier eye-tracking study, non-smokers, weekly smokers, and daily smokers were shown photographs of plain and branded packs bearing health warnings (the same warnings were on plain and branded packs). The researchers summarised the findings from this earlier study in the following way:

Our results are the first to show an effect of plain cigarette packaging on objective measures of behaviour. Importantly, these suggest that among non-smokers and weekly (i.e. light, non-established) cigarette smokers, plain packaging increases visual attention towards health warning information and away from brand information. This effect is not observed among daily (i.e. established) cigarette smokers (Munafo et al., 2011).

While these findings from eye-tracking studies have been framed and consequently interpreted as demonstrating the potential for plain packs to

reduce smoking prevalence via increased attention to the health warnings, no study, including these two, has demonstrated that saccades toward health warnings made under experimental conditions are reliably predictive, let alone at all predictive, of these individuals' future smoking behaviour or behaviour change. It would be rather misleading for any person to suggest that the individuals who make more saccades towards health warnings on mocked-up photographs of plain cigarette packs are those most likely to cease smoking or not start smoking. There is no evidence to suggest this is true; for as long as this remains the case we must be mindful that eye-tracking data have no proven utility for predicting who will start/quit smoking and who won't.

Given such limitations in the evidence, an erroneous assumption has been made that an individual's eye movements reveal something about the quality of the individual's "reading" of the health messages. This assumption states that the more frequently a person views a health warning, or the longer a person spends time attending to a health warning, the more likely that person will be to internalise the risks of smoking and thus show behaviours that are consistent with avoiding smoking-related harm (i.e. quitting). Such a causal pathway, however, is purely hypothetical. It is, of course, also entirely possible that individual may make the same judgements about the serious adverse effects of smoking irrespective of the length of time spent viewing a pack's warnings. Measurements of eye tracking may then be a poor proxy measure of the credence smokers invest in the existing health warnings, and, on that basis, saccades towards health warnings may be only weakly related to individuals' intentions with regard to smoking in the future. In summary, the results of these

eye-tracking studies do not show that plain tobacco packaging will result in smokers giving greater weight to the health warnings in future decision making about smoking, or that those who spend greater time attending to health warnings are less likely to start smoking and more likely to quit.

Packaging and the Assessments of Health Harm

Considerable research has studied the relative capacities of plain and branded tobacco packaging to influence individuals' perceptions of the health risks associated with different tobacco products. There is a degree to which tobacco companies themselves have sought to use this phenomenon in their own marketing through use of terms such as 'menthol', 'mild' and 'light', which have been found to suggest to consumers a lower risk of using certain tobacco products. Consequently, the use of these terms on branding has been prohibited in many countries since 2003.

Research on tobacco packaging has shown that smokers and non-smokers interpret the use of colours on tobacco products as communicating information about the level of harm associated with the packaged product. For example, cigarettes packaged in predominantly white boxes tend to be interpreted by adult smokers as being less harmful than cigarettes packaged in darker coloured boxes (Hammond et al., 2009). Moodie et al. (2012), too, provided young people with a range of pictorial images of cigarettes packs that differed in colour. The researchers found that young people perceived packs that were predominantly red as likely to contain higher strength cigarettes, whereas packs that were

predominantly light blue were perceived to be likely to contain weaker strength cigarettes.

Although this study seems to provide convincing evidence that the use of different colours on cigarette packaging may result in consumers erroneously interpreting some tobacco products as being less harmful than others, readers should be aware that Moodie et al.'s (2012) methodology used a patently leading question format to elicit the key data on perceptions of pack colour. Participants were required to look at four coloured boxes (figure 1), and asked which pack they thought would have: a) the strongest tasting cigarettes, b) the weakest tasting cigarettes, c) the most harmful cigarettes, and d) the least harmful cigarettes. Response options included 'red', 'blue', 'green', 'white', 'they're all the same', and 'don't know'.



Figure 1. Array of coloured unbranded cigarette packs shown to participants in Moodie et al.'s (2012) study.

Note that participants were asked to make a connection between four pack colours and four effects of the cigarettes in those packs. It is very conceivable

that this 4-to-4 format encouraged respondents to view this question as a type of sorting task, and led participants to think that one of these four packs did actually contain the strongest tasting cigarettes, that another pack colour contained the weakest tasting cigarettes, that another contained the most harmful cigarettes, and that their task was to sort correct pairs of colours (red, blue, green, white) with letters (a, b, c, d). The less biased format for assessing the perceived association between pack colour and strength and harm would have been to show packs of different colour (or shape) one by one to participants and ask them to rate, on a Likert scale centring on 50/50, how strong/weak they thought the cigarettes in the pack would taste and how much harm they thought the cigarettes would cause. It is unclear why the authors did not use this simple format. By inviting participants to link specific words with specific packs, the researchers were, in effect, suggesting the very link that they viewed their analysis as having demonstrated.

Attitudes Towards Smoking: Plain and Branded Packs Compared

There has been extensive research on the impact of tobacco packaging on attitudes towards smoking, and perceptions of the smoking experience. An online survey in Australia by Wakefield et al. (2008) found that non-branded packs were consistently rated as less attractive than branded packs. Similarly, White and Hammond (2011) found that respondents' ratings of the appeal of cigarette packs steadily reduced as the researchers removed elements of the branding from the packs they were rating. Moodie and Mackintosh (2013) reported that respondents using plain packaged cigarettes were more likely to

describe their smoking experiences more negatively than those who had been smoking cigarettes from branded packs.

Doxey and Hammond (2011) examined the appeal of cigarette packaging for women in particular. The researchers conducted an online survey of 512 women, aged 18 to 25 years, in Canada. Participants were provided with images of a range of cigarette packs varying from those that were fully branded through to those that had various branding elements removed. The researchers found that certain cigarette packs appealed particularly to young women; 67% of their respondents, for example, rated 'Capri Cherry' as the most appealing cigarette pack. Importantly, Doxey and Hammond found that the proportion of respondents who rated 'Capri Cherry' most highly fell from 67% to 17% with the removal of the word 'Cherry' from the pack design. The researchers also identified a close association between pack design and women's beliefs regarding weight control and appetite:

Young women who viewed the plain packs were significantly less likely to believe that smoking helps people to control their appetite and helped them stay slim compared to women who viewed the same packs with colour and brand descriptors (Doxey and Hammond 2011:359)

In summing up their findings Doxey and Hammond note that:

This study adds to the evidence that packaging may promote smoking. The current study provides experiential evidence that viewing female packs, even for a brief period of time, can increase a potent predictor of smoking among girls- beliefs about weight control (Doxey and Hammond 2011:360)

What we see here is an apparently seamless progression from reporting on subjects' preferences with regard to pack design, to the contention that pack design exerts its cessation influence on smoking behaviour through the mediating variable of women's beliefs about smoking and weight gain. A direct effect of pack design on smoking behaviour is therefore inferred merely from evidence of the effect of pack design on beliefs about smoking and weight gain. There is nothing within this study which actually shows that women select brands on the basis of their belief that some brands are better than others in assisting in weight control, or that tobacco companies have sought to manipulate their pack design to exploit such beliefs on the part of female smokers. But critically, no evidence is presented showing that smoking behaviour varies as a function of the pack design or as a function of beliefs about smoking and weight gain; the authors only present evidence that smokers' beliefs about smoking and weight gain vary as a function of the pack design. There is no evidence here, therefore, to support the belief that modifying pack design would represent an effective means for reducing women's smoking.

Smoking Behaviour: Plain and Branded Packs Compared

One of the most significant questions relating to the policy of tobacco plain packaging concerns whether it will significantly reduce smoking prevalence and/or the volume of tobacco consumed by a population. The fact that plain packaging has been implemented only in Australia so far means there are very few opportunities to assess whether the policy is yielding the targeted effects. One UK naturalistic study that sought to address this question (Moodie and Mackintosh, 2013) asked a sample of young smokers to decant their branded packaged cigarettes into plain packs (provided to them) and to use the plain packs for one week and their branded packaged cigarettes for one week (two consecutive weeks). Participants reported a range of negative feelings about using the plain packs; they felt embarrassed at using the packs in the company of others; they felt plain packs made smoking look uncool and unappealing; and they didn't enjoy the smoking experience as much when using the plain packs compared to branded packs. Interestingly, little difference was observed in participants' attention to the health warnings on the branded versus plain packs. Crucially, however, the researchers reported that participants smoked fewer cigarettes when they were packaged in plain form than when they were packaged in branded form. While seeming to provide evidence that plain packaging might indeed be associated with a reduction in the number of cigarettes smoked, in fact the size of the reduction in cigarettes smoked per day by these participants was very small, indeed very close to zero. During mid-week, participants smoked an average of 14.9 cigarettes per day from the plain pack compared to 15.5 from the branded packs (0.6 of a cigarette difference). At the weekend, participants smoked on average 15.7 cigarettes per day from the plain pack compared to 16.7 from the branded pack (one cigarette difference). In

effect, plain packaging in this study was associated with an average reduction of 1.6 cigarettes smoked per person per week.

The findings of the Australian National Drug Strategy Household Survey (AIHW, 2013), released in late 2014, appear to show that smoking prevalence in Australia has significantly reduced since 2010, and possibly since plain packaging was implemented in 2012. Professor Simon Chapman, a leading tobacco control researcher from Australia, described the publication of the results of this survey in the following way:

17th July 2014 is unlikely to be a date that the global tobacco industry will ever forget. At 1am Canberra Time, an embargo was lifted on a set of numbers that drove a stake deep into the heart of Big Tobacco's continuing best efforts to deny plain packaging had made any impact on Australian's smoking. The AIHW released the results of its latest national survey of drug alcohol and tobacco use, involving 23855 people. These surveys have been conducted every three years since 1991, when 24.3% of Australian's aged over 14 smoked on a daily basis. In November 2013, that figure had almost halved to 12.8% (Chapman and Freeman 2015:173).

Other commentators have been equally enthusiastic in reporting the results of this survey. Matthew Myers, president of the US-based Campaign for Tobacco-Free Kids told the Financial Times (REFERENCE): "Australia's dramatic results should spur action by other countries considering plain packaging, including the U.K., Ireland and New Zealand". Professor Mike Daube, a health policy academic

and president of the Australian Council on Smoking and Health has stated, “They are the best results on smoking that I have seen. The decline in smoking is really dramatic and exceptionally encouraging – even speeding up” (Smyth 2014).

Within the NDSHS, changes in smoking prevalence are presented for the period between 2010 and 2013; plain packaging had only been in effect for 6-12 months at the point at which the 2013 survey data were collected. As a result, it is impossible to know to what extent any changes in smoking prevalence were due to the plain packaging policy implemented in 2012, as distinct from changes attributable to other factors that were exerting their influence in the two years between the 2010 survey and the introduction of plain packaging on December 1st, 2012. That is, attributions of the reductions in smoking prevalence in 2013 to plain packaging are prevented by the fact that plain packaging was introduced two-thirds of the way into the most recent assessment period.

The series of national household surveys that have been carried out within Australia show that the prevalence of daily smoking among Australians aged 14 years and older significantly reduced between 2010 (15.1%) and 2013 (12.8%). While this size of reduction may initially seem to indicate a substantial public health benefit of the first two years of plain packaging in Australia, this conclusion is only valid to the extent that similar sized declines in daily smoking prevalence did not occur in the years before the introduction of the legislation. In fact, previous NDSHS surveys show a significant reduction in daily smoking prevalence over a longer period. There was a statistically significant reduction of 1.5% in daily smoking prevalence reported between 2007 and 2010 (from

16.6% to 15.1%); a statistically significant reduction of 0.9% between 2004 and 2007 (from 17.5% to 16.6%); a 1.9% reduction in prevalence between 2001 and 2004 (from 19.4% to 17.5%) and a 2.4% reduction between 1998 and 2001 (from 21.8% to 19.4%). In effect, the prevalence of daily smoking in Australia had been significantly reducing every three years for the last 17 years before plain packaging was introduced.

The evidence of a continuing reduction in smoking prevalence within Australia does not, of course, mean that plain packaging has not significantly contributed to the most recent reduction in prevalence. However, viewing the 2013 reduction in prevalence within this historical context does increase the salience of an alternative interpretation of the data, namely that the most recent 2.3% reduction in daily smoking prevalence between 2010 and 2013 is entirely consistent with the 20-year trend in reducing daily smoking prevalence. As a result, it would be premature to explain the most recent reduction in prevalence in terms of the impact of the plain packaging policy.

With regard to adolescent smoking, the 2013 national household survey identified a surprising finding that the prevalence of daily smoking among 12-17 year olds appears to have increased from 2.5% in 2010 to 3.4% in 2013, the highest rate of adolescent daily smoking in Australia in 10 years. This magnitude of increase in adolescent daily smoking post-plain packaging is all the more surprising given that the prevalence of adolescent daily smoking had actually reduced from 3.2% in 2007 to 2.5% in 2010. Even more surprising is the finding in the survey that 12-17 year olds and those aged 70< years were the only two

age groups not to reduce prevalence of daily smoking between 2010 and 2013. It is unclear why the prevalence of adolescent daily smoking would fall before the introduction of plain packaging and then rise so substantially after its introduction. However, the mere fact of the increase should introduce an element of caution before citing the 2013 survey as providing conclusive evidence for the efficacy of the plain packaging policy.

A further important finding from the Australian survey is that young people appear to be delaying smoking initiation – the age at which 14–24-year-olds smoked their first full cigarette increased from 15.4 years in 2010 to 15.9 years in 2013. However, this was the same size of increase in age of initiation observed across the three years immediately prior to plain packaging: age of initiation increased from 14.9 years in 2007 to 15.4 years in 2010. In effect, plain packaging does not appear to delay smoking initiation for any greater time than was being achieved in Australia before plain packaging was introduced, although again, direct causal testing of this hypothesis is required. Lastly, contrary to hopes that the introduction of plain packaging may boost quit rates, the magnitude of increase in the prevalence of never-smokers observed between 2010 (57.8%) and 2013 (60.1%) was almost identical to the magnitude of increase in the prevalence of never-smokers observed between 2007 (55.4%) and 2010 (57.8%), and between 2004 (52.9%) and 2007 (55.4%), and between 2001 (50.6%) and 2004 (52.9%).

Inspection of all data tables available online for the last nine NSDHSs in Australia show that the magnitudes of per cent difference in smoking variables in all sub-

groups of age, gender and SES between 2010 and 2013 (the three years post-plain packaging) are roughly equivalent to the magnitudes of per cent difference on almost all variables in all sub-groups between 2007 and 2010 (the three years preceding plain packaging) and further back to 1995. The 2013 NDSHS findings suggest that the progress that has been made in smoking prevention in Australia in the past 20 years was continued between 2010 and 2013 at approximately the same pace. On that basis, one would have to conclude that the claim that the latest household survey results provide confirmatory evidence of the impact of tobacco plain packaging is at best premature and may in fact be misleading.

Smoking Prevalence Data Collected by Australian State Governments

While the findings from the NDSHS have drawn worldwide attention, much less attention has been paid to the findings from a series of surveys undertaken by or on behalf of the governments of Australian states. In Queensland, data have been collected on patterns of smoking and smoking prevalence annually by Queensland Health through its Self Reported Health Status Survey. In New South Wales, smoking prevalence data have been collected by the Ministry of Health since 1997 through its Adult Population Health Survey. In Western Australia, smoking prevalence data have been collected by the Department of Health as part of the Health and Wellbeing of Adults in Western Australia Survey. And in South Australia, the annual South Australian Health Omnibus Survey (HOS) of a representative sample of South Australian residents has been carried out undertaken since January 2011 by the Population Research and Outcomes Studies Unit (PROSU) of The University of Adelaide. These four states comprise 70.26% of the total Australian population. Table one (below) summarises these

surveys' estimates of the smoking prevalence in these four states between 2011 and 2014.

INSERT TABLE 1 ABOUT HERE

Because the population health impact of smoking prevalence/consumption rates is cumulative rather than discrete, estimation of the change in smoking rates since the implementation of plain packaging must take account of smoking rates observed between 2012 and 2014. Similarly, when multi-year average smoking rates are calculable for the period post-plain packaging, it is also important to try to establish a multi-year average smoking rate for a time pre-plain packaging. The appropriate calculation for estimating the size of change in smoking rates across the 17 months between the implementation of plain packaging (December 2012) and the end of the SRS 2014 administration period (June 2014) is therefore: $((\text{rate}^{2013} + \text{rate}^{2014}) / 2) - ((\text{rate}^{2011} + \text{rate}^{2012}) / 2)$.

The data reported by Queensland Health show the prevalence of daily smokers in Queensland increased by 1.5% between 2012 (14.3%) and 2013 (15.8%), then fell by 1.8% in 2014 (14.0%). Using the above formula, these figures indicate the average rate of daily smoking in Queensland across 2013-2014 (14.9%) was 0.35% higher than the average daily smoking rate observed across 2011-2012 (14.55%). In the case of Western Australia the prevalence of daily smoking among individuals aged 16-44 years increased by 1.1% and the rate of ex-smokers rate decreased by 0.1%. The rate of experimental smoking increased by 1.3% and the rate of never smoking decreased by 1.2%. In other words, a

greater proportion of individuals aged 15-44 years had tried smoking in the year after the implementation of plain packaging than had tried smoking, on average, in the two years before plain packaging. Other notable unwanted changes observed between 2012 and 2013 include a 1.1% increase in the prevalence of smoking among adults living in metropolitan areas, and a 0.5% increase in the proportion of individuals aged 15-44 years who smoke in their home 'frequently'.

In South Australia, the South Australian Health Omnibus Survey (HOS) 2013 data show the rate of daily smoking among all South Australian adults (aged 15+ years) reduced by 0.8% between 2011 (15.2%) and 2012 (14.4%) and then increased by 1.8% in 2013 (16.2%). These figures indicate a 1.4% increase in the rate of daily smoking among all adults between 2011-2012 and 2013. Additionally, the rate of 'all smoking' decreased by 0.9% between 2011 (17.6%) and 2012 (16.7%), but then increased by 2.7% in 2013 (19.4%), which equates to a 2.25% increase in the rate of 'all smoking' among all adults between 2011-2012 and 2013. The increase observed in 2013 was the first observed since 2009. Lastly, and of particular concern, data show the rate of 'all smoking' among individuals aged 15-29 years increased by 0.6% between 2011 (17.6%) and 2012 (18.2%) and by a further 1.3% in 2013 (19.5%), which equates to a 1.6% increase in the rate of 'all smoking' among individuals aged 15-29 years since plain packaging was implemented.

Arguably the most worrying data reported by the HOS 2013, however, were those showing that over half (52.5%) of all individuals with a severe mental

illness in 2013 (respondents who reported they were currently receiving the disability pension for a psychological or psychiatric illness) identified as a smoker, a figure near double that reported 12 months previously (23.9%). Just as disconcerting was the 8.5% increase in smoking prevalence among individuals with a general mental illness (respondents who reported they were currently receiving treatment for anxiety, depression or another mental health problem). Lastly, with the exception of quintile 3, the smoking rate increased in all socioeconomic groups; increases of 2%, 5.1%, 4.3% and 2% were observed among the most disadvantaged, quintile 2, quintile 4, and the most advantaged individuals, respectively.

In New South Wales (NSW), data on smoking prevalence from the 2014 Adult Population Health Survey are not yet available. Therefore, the size of change in smoking rates between 2011-2012 and 2013 were estimated using the formula: $((\text{rate}^{2013} / 2) - ((\text{rate}^{2011} + \text{rate}^{2012}) / 2))$. Compared to the period of 2011-2012, figures indicated the average rate of daily smokers in NSW increased by 0.25% in 2013. The average rate of occasional smoking increased by 0.15%, although the rate of experimental smoking reduced by 1.85%. The rate of never smoking increased by 1.8%. Taking these figures together, the average rate of current smoking in all NSW adults (aged 18+ years) decreased by 0.5% between 2011-2012 (15.9%) and 2013 (16.4%). The increase in rate of current smoking was larger, however, among individuals aged 16-24 years (1.25%) and largest among individuals aged 25-34 years (2.2%); that is, the proportion of the NSW population aged 16-34 years who smoke increased between 2011-2012 and 2013.

It is important to stress that these individual state surveys do not stand as evidence that the policy of plain packaging has failed, nor do they constitute evidence that the reported increases in smoking prevalence are attributable to the plain packaging policy. What these data do show, however, is that the overwhelming confidence on the part of tobacco control researchers, and others, that plain packaging would rapidly result in a reduction in smoking prevalence is by no means being borne out by the data being reported by the government of these major Australian states.

What these data also show is a disparity between the popular rhetoric around plain packaging – what it will achieve and how quickly – and the reality of what is actually happening in the one country so far to have implemented the policy. Moreover, as plain packaging has matured within Australia, there has been a notable shift on the part of some of the policy's most ardent supporters in terms of how the policy should now be judged and evaluated. For example, in 2014, Professor Simon Chapman characterised plain packaging as “like finding a vaccine that works very well against lung cancer” (Alexander, 2014). However, in 2015, Chapman and Freeman characterised plain packaging as likely to have a slow burning distal impact:

Plain packaging might well function as a slow burn, distal negative factor against smoking, rather than a precipitating proximal factor...Plain packaging removes a major positive influence on smoking: the ability of smokers to handle and display a richly semiotic connotative badge

designed to reinforce a chosen sense of self or to be an accoutrement of personal style...The Australian government appropriately did not forecast any precise effect of plain packaging, but instead emphasised a longer term focus (especially in relation to preventing uptake of smoking by children (Chapman and Freeman, 2015:160).

Studies monitoring the impact of plain packaging, Chapman advises, may be better focusing not on the ultimate goal of reducing smoking rates, but on a much softer range of intermediate measures including whether plain packaging fosters negative attitudes towards smoking, smokers' knowledge about the harms of smoking, and the effectiveness of pack health warnings. Whilst each of these domains are likely to be important in forming an overall assessment of the impact of plain packaging, it would be quite wrong to so easily set aside the question of whether plain packaging has in fact resulted in a reduction in smoking prevalence. This remains an important question, indeed, perhaps the most important question that may require a longer time to be answered. What we have here, though, is a policy which, however moderated the language of some proponents has become, has been advocated almost as a cause celebre of tobacco control.

Tobacco Control Research: Evidence or Advocacy

According to Mair and Kierans (2007), tobacco control research is a distinctive area of empirical enquiry in the tendency of tobacco control researchers to see themselves as engaged in a fight against the tobacco industry:

For those who are actively involved in tobacco control.... tobacco research has come to represent as much a moral activity as an investigative one, a weapon used by the “researcher-activist” in the “fight against tobacco” (Mair and Kierans, 2007:104).

Bell (2013) has similarly written about how the public health perspective, and the commitment to reduce smoking prevalence on the part of tobacco control researchers, has resulted in a narrowing of the field of enquiry for smoking research:

This is not to suggest that there is no place for research that takes an explicit public health and tobacco control stance...however if this framework becomes prescriptive of how we should conduct research, it seems to me that much of what is valuable about the social sciences – especially their important role in cultural critique – will be lost. There has to be a place for research that prioritizes smokers’ own perspectives on smoking, even if those perspectives happen to value the sensuous body over the healthy body. There must also be a place for research that challenges taken for granted perspectives embedded in tobacco control (and not just so that tobacco control can operate more effectively) (Bell, 2013:39).

Whilst Bell’s plea here is for tobacco research to be allowed to develop a more nuanced understanding of the place of smoking within individuals’ lives, the danger of the public health perspective becoming so dominant within tobacco

control research may have to do with more than a contraction in the focus of smoking studies. It may also have resulted in tobacco control policies being passionately advocated by supporters in the face of relatively weak evidence as to their beneficial impact on changing individual behaviour and reducing smoking prevalence because those policies are congruent with the political commitment to tackle Big Tobacco. The argument for requiring tobacco products to be sold in plain or standardised form may well be a case where the collective support for a policy has developed well beyond the available evidence.

Tobacco control is by no means unique as an area where policy is developing in ways that are only partially influenced by the available evidence. Macleod and Hickman (2010), for example, have shown that the criminal justice emphasis in much of the UK's policy in relation to cannabis is also being shaped more by advocacy than evidence:

The only important possible benefit of prohibition is prevention of cannabis use. There is little or no evidence that it effectively achieves this benefit. Patterns of cannabis use in the population appear to be independent of the policy surrounding use, and criminalizing individual cannabis users does not appear to modify their use in a healthy way (Macleod and Hickman, 2010: 1329).

In both of these areas (tobacco plain packaging and cannabis) government policy is in danger of being shaped not so much by the evidence of the effectiveness of

different interventions as the dominant perspective of tobacco control (in relation to plain packaging) and drugs prohibition (in relation to cannabis legislation).

Conclusions

In the face of what seems likely to be the further extension of the plain packaging policy beyond Australia, Ireland, and the United Kingdom, there has always been the necessity to ensure that high quality research is being planned and conducted to evaluate the effectiveness of plain packaging in reducing smoking prevalence in a given population set against any unintended health, social and economic consequences. Although seemingly obvious to state, we must be mindful that evidence of changes in smoking prevalence do not permit conclusions about the causes of such changes, and that only research that has been designed to quantify the causal role of various factors can inform conclusions about the role of plain packaging. We must be mindful that no such research of this kind has yet been reported, and so no person has an evidence base from which to contend that plain packaging has reduced or increased smoking in any jurisdiction.

As a final consideration, one might hypothesise a route by which plain packaging functions as a mechanism to increase rather than decrease smoking prevalence. Plain packaging requires the removal of brand imagery. Branding, of course, is one way in which consumers express their preferences for and loyalty to a specific product. It is also, by extension, a means for identifying the products or alternative brands of the same products that the consumer has no interest in

purchasing or being associated with. By removing manufacturers' trademarked distinctive branding, health campaigners have succeeded in removing part of the visual appeal of a particular brand for a particular consumer, but in doing so they have also removed the very means by which a consumer can determine that they will not purchase this or that brand, thereby possibly making each cigarette more like each other cigarette and inadvertently expanding, not contracting, the range of brands any individual consumers may be willing to purchase. Such an explanation, however, is entirely hypothetical at this point, although the negative public health impact of this hypothesis receiving support should compel more detailed study of why smoking rates appear to have increased slightly in several Australian states since plain packaging was implemented.

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References

Al-Hamadani, M. (2013) The Effect of Cigarette Plain Packaging on Individuals Health Warning Recall. *Healthcare Policy* 8, 3 68-77

Alexander, H. (2014). Plunge in smoking attributed to plain packaging. *Sydney Morning Herald*. Accessed 20th February 2015 at: <http://www.smh.com.au/federal-politics/political-news/plunge-in-smoking-attributed-to-plain-packaging-20140716-ztqht.html>

Australian Bureau of Statistics (2015). 3235.0 – Population by age and sex, regions of Australia, 2013. Accessed 26th February 2015 at: <http://www.abs.gov.au/AUSSTATS/abs@.nsf/second+level+view?ReadForm&prodno=3235.0&viewtitle=Population%20by%20Age%20and%20Sex,%20Regions%20of%20Australia~2013~Latest~28/08/2014&&tabname=Past%20Future%20Issues&prodno=3235.0&issue=2013&num=&view=&>

Australian Government Department of Health (2014) Tobacco Key Facts and Figures 2013 National Drug Strategy Household Survey- Key Findings available at: <http://www.health.gov.au/internet/main/publishing.nsf/Content/tobacco-kff>

Australian Institute of Health and Welfare (2014). National Drug Strategy Household Survey detailed report 2013. Drug statistics series no. 28. Cat. no. PHE 183. Canberra: AIHW. Accessed 25th February 2015 at: <http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=60129549848>

Beede P, Lawson R, Shepherd M (1990). The Promotional Impact of Cigarette Packaging: A Study of Adolescent Responses to Cigarette Plain-Packs. Dunedin.

Bell, K. (2013) Wither Tobacco Studies. *Sociology Compass* 7/1 34-44

Bell, K., Dennis, S. (2013) Towards a Critical Anthropology of Smoking Exploring the Consequences of Tobacco Control Contemporary Drug Problems 40/ Spring pp3-19

Borland R., Savvas, S (2013) The Effects of Variant Descriptions on the Potential Effectiveness of Plain Packaging Tobacco Control doi:10.1136/tobaccocontrol-2012

Borland, R., Savvas, S., Sharkie, F., Moore, K. (2013) The Impact of Structural Packaging Design on Young Adult Smokers perceptions of Tobacco Products Tobacco Control 22 2 97-102

Centre for Epidemiology and Evidence (2013). Current smoking in adults by age and sex, NSW 2013, Health Statistics New South Wales. Sydney, NSW: Ministry of Health. Accessed 25th February 2015 at: <http://www.healthstats.nsw.gov.au>

Chantler, C. (2014) Standardised packaging of tobacco. Report of the independent review undertaken by Sir Cyril Chantler.

Chapman, S. and Freeman, B. (2014). Removing the emperor's clothes: Australia and tobacco plain packaging. Australia: Sydney University Press.

Currow, D. C. (2014). Why plain packaging is reducing the number of smokers in Australia. The Sydney Morning Herald. Accessed 23rd January 2015 at: <http://www.smh.com.au/comment/why-plain-packaging-is-reducing-the-number-of-smokers-in-australia-20140624-zsjt9.html>

Dono, J. and Miller, C. (2014). Key smoking statistics for SA – 2013. Adelaide, Australia: South Australian Health and Medical Institute. Australia. Accessed 25th February 2015 at: https://www.sahmri.com/user_assets/c23dc77e9e0f242c8a59442c3bc21e1c56cbdbe5/key_smoking_statistics_for_sa_2013_-30_april_2014.pdf

Doxey, J., Hammond, D, Deadly in pink: the impact of cigarette packaging among young women Tobacco Control, 8 April 2011

Ellison, J. (2014) Oral statement to Parliament. Chantler report on standardised packaging of tobacco products. Available at: <https://www.gov.uk/government/speeches/chantler-report-on-standardised-packaging-of-tobacco-products>

- Environics Research Group (2008) Consumer Research on the Size of Health Warning Messages quantitative Study of Canadian Adult Smokers Prepared for Health Canada
- Fong, G. (2001) A review of the research on tobacco warning labels, with particular emphasis on the new Canadian warning labels. Referred to in "The introduction of picture warnings on tobacco packs Final Regulatory Impact Assessment UK Department of Health (2007).
- Ford, A., MacKintosh, A., Moodie, C., Richardson, S., Hastings, G. (2013) Cigarette Pack Design and Adolescent Smoking Susceptibility: A Cross Sectional Survey *BMJ Open* 3 e003282
- Ford, A., Moodie, C., MacKintosh, A., Hastings, G. (2013) How Adolescents Perceive Cigarette Packaging and Possible Benefits of Plain Packaging *Education and Health* 31 2 83-88.
- Fowler, R. (2014). Re: Australia sees large fall in smoking after introduction of standardised packs. *BMJ*; 349; g4689. Accessed 25th February 2015 at: <http://www.bmj.com/content/349/bmj.g4689/rr/761573>
- Germain, D., Wakefield, M., Durkin, S. (2010) Adolescents Perceptions of Cigarette Brand Image Does Plain Packaging Make a Difference *Journal of Adolescent Health* 46 4 385-392
- Goldberg, M., Liefeld, J., Kindra, G., Madhill-Marshall, J., Madill-Marshall, J., Lefebvre, J., Martohardjono, N., Vredenberg, H. (1995) When Packages Can't Speak: Possible Impacts of Plain and Generic Packaging of Tobacco Products. Report of the Expert Panel to Health Canada. Avail at: <http://legacy.library.ucsf.edu/tid/rce50d00>
- Hammond, D., Parkinson, C. (2009) The Impact of Cigarette Package Design on

Perceptions of Risk Journal of Public health 3 345-353

Harrison Health Research (2012). The Health Omnibus Survey, Spring 2012. Adelaide: Harrison Health Research. Accessed 25th February 2015 at: http://health.adelaide.edu.au/pros/docs/reports/hos_prospectus_spring_2012.pdf

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/270768/Independent_review_into_standardised_packaging_of_tobacco_PHE_response.pdf

Macleod, J., Hickman, M. (2010) How ideology shapes the evidence and the policy: what do we know about cannabis use and what should we do? *Addiction*, 105, 1326–1330

Mair, M. Kierans, C. (2007) Critical reflections on the field of tobacco research: The role of tobacco control in defining the tobacco research agenda. *Critical Public Health* Vol17 No2 103-112.

Maynard, O.M., Munafao, M., Leonards U. (2013) Visual attention to health warnings on plain tobacco packaging in adolescent smokers and non-smokers. *Addiction*. 2013 Feb;108(2):413-9. doi: 10.1111/j.1360-0443.2012.04028.x. Epub 2012 Oct 18.

Moodie, C., Bauld, L. (2015) Evidence Supports Plain Tobacco Packaging to Improve Public Health. *Pharmaceutical Journal* 8 Jan.

Moodie, C., Bauld, L. (2015) Evidence Supports Plain Tobacco Packaging to Improve Public Health. *Pharmaceutical Journal*, 294(7843/4) online URI: 200675058. Accessed 25th February 2015 at: <http://www.pharmaceutical-journal.com/opinion/comment/evidence-supports-plain-tobacco-packaging-to-improve-public-health/20067505.article>

Moodie, C., Bauld, L., Stead, M. (2013) UK government's delay on plain tobacco packaging: how much evidence is enough? *British Medical Journal* 2013;347:f4786

Moodie, C., Mackintosh, A. (2013) Young Adult Women Smokers Response to Using Plain Cigarette packaging: A Naturalistic Study *BMJ Open* 2013;3:e002402.

Moodie, C., Stead, M., Bauld, L., McNeill, A., Angus, K., Hinds, K., Kwan, I., Thomas, J., Hastings, G., and O'Mara-Eves, A. (2012a). Plain tobacco packaging: A systematic review. Report prepared for the Department of Health. Stirling: Centre for Tobacco Control Research, University of Stirling.

Moodie, C., Angus, K., Stead, M., and Bauld, L. (2013). Plain Tobacco Packaging Research: An Update. Report prepared for the Department of Health. Stirling: Centre for Tobacco Control Research, University of Stirling.

Munafao, M., Roberts, N., Bauld, L., Ute, L. (2011) Plain Packaging Increases Visual Attention to health Warnings on Cigarette Packs in Non Smokers and weekly Smokers but Not Daily Smokers *Addiction* 106 8 1505-1510

Pechey, R., Spiegelhalter, D., Marteau, T. (2013) Impact of Plain Packaging of Tobacco Products on Smoking in Adults and Children: An Elicitation of International Experts Estimates. *BMC Public Health* 13, 18

Rootman, I., Fay, B., Phil, D. (1995) A Study of Youth Smoking Plain Packaging Health Warnings Event Marketing and Price Reduction. Univ of Toronto.

Public Health England (2014), 'Submission to the Independent Review into Standardised Packaging of Tobacco'. Available at:

Queensland Health (2011). Self Reported Health Status 2011. Preventive health indicators, Queensland. Queensland Health: Brisbane. Accessed 25th

February 2015 at:
<http://www.health.qld.gov.au/epidemiology/documents/srhs11-summary.pdf>

Queensland Health (2012). Self Reported Health Status 2012. Preventive health indicators, Queensland. Queensland Health: Brisbane. Accessed 25th February 2015 at:
<http://www.health.qld.gov.au/epidemiology/documents/cd-brf-cho2012.pdf>

Queensland Health (2013). Self Reported Health Status 2013. Preventive health indicators, Queensland. Queensland Health: Brisbane Accessed 25th February 2015 at:
<http://www.health.qld.gov.au/epidemiology/documents/srhs-qld-2013.pdf>

Queensland Health (2014). Self Reported Health Status 2014. Preventive health indicators, Queensland. Queensland Health: Brisbane Accessed 25th February 2015 at:
<http://www.health.qld.gov.au/epidemiology/documents/srhs-qld-2014.pdf>

Radomiljac, A. and Joyce, S. (2014). Health and Wellbeing of Adults in Western Australia 2013, Overview and Trends. East Perth: Department of Health, Western Australia. Accessed 25th February 2015 at:
<http://www.health.wa.gov.au/publications/documents/HWSS Adult Overview and Trends 2013.pdf>

Ramunno, S., Mandeville, K., Yarrow, K. (2013) The Effect of Plain Packaging on Attention to health Warnings The Lancet 380 November Supplement S5 .

Smyth, J. (2014) Smoking Rates Tumble After Plain Packaging Shift. Financial times July17 available at <http://www.ft.com/cms/s/0/c4016952-0d4a->

[11e4-bcb2-00144feabdc0.html#axzz3PThLOCac](http://www.health.wa.gov.au/publications/documents/HWSS_Adult_Overview_and_Trends_2012.pdf)

Stephens, W.E., Calder, A., and Newton, J. (2005). Source and health implications of high toxic metal levels in Illicit tobacco products. *Environmental Science Technology*, 39, 479-488.

Tomlin, S. and Joyce, S. (2013). Health and Wellbeing of Adults in Western Australia 2012, Overview and Trends. East Perth: Department of Health, Western Australia. Accessed 25th February 2015 at: http://www.health.wa.gov.au/publications/documents/HWSS_Adult_Overview_and_Trends_2012.pdf

Tomlin, S., Joyce, S., and Patterson, C. (2012). Health and Wellbeing of Adults in Western Australia 2011, Overview and Trends. Department of Health, Western Australia. Accessed 25th February 2015 at: http://www.health.wa.gov.au/publications/documents/Health_and_Wellbeing_Adults_WA2011_Overview_Trends.pdf

Wakefield. M., Germain, D., Durkin, S. (2008) How Does Increasingly Plain Cigarette Packaging Influence Adult Smokers Perceptions about Brand Image? An Experimental Study *Tobacco Control* 17 6 416-421

White C, Hammond D (2011). The impact of cigarette package design & plain packaging on female youth in Brazil: brand appeal & health-related perceptions. In: *Public Health in Canada: Innovative Partnerships for Action*, Canadian Public Health Association (CPHA) 2011 Conference, Palais des congrès de Montréal, Montreal, QC, June 19-22, 2011. http://resources.cpha.ca/CPHA/Conf/Code/Co-authors_2011.php?ID=A11-615&l=E&y=2011&r=0

World Health Organization (2012). Chan to world: stand with Australia: WHO's Director-General applauds Australia's determination in fighting tobacco

industry intimidation. Accessed 25th February 2015 at:
http://www.who.int/mediacentre/news/releases/2012/tobacco_20120322/en/

World Health Organization (2015). Evidence brief. Plain packaging of tobacco products: measures to decrease smoking initiation and increase cessation. Copenhagen, Denmark: WHO Regional Office for Europe. Accessed 24th January at:
http://www.euro.who.int/data/assets/pdf_file/0011/268796/Plain-packaging-of-tobacco-products.-Evidence-Brief-Eng.pdf?ua=1

Table 1. Change in Smoking Rates in Four Australian States.

State [Source]	Smoking Category	2011	2012	2013	2014	Incremental Rate Change*
Queensland [Queensland Health, 2011, 2012, 2013, 2014]	Daily smoker (age 18+)	14.8 ^s	14.3	15.8	14.0	+0.35
	Ex-smoker (age 18+)	-	28.3	28.1	28.3	-0.1
	Never-smoker (age 18+)	-	54.5	52.6	55.2	-0.6
New South Wales [Centre for Epidemiology & Evidence, 2013]	Daily smoker (age 16+)	11.0	12.5	12.0	-	+0.25
	Ex-smoker (age 16+)	24.1	24.1	24.1	-	0.0
	Never-smoker (age 16+)	49.9	48.6	50.6	-	+1.8
South Australia [Dono & Miller, 2014]	All smoking (age 15-29)	17.6	18.2	19.5	-	+1.6
	Daily smoker (age 15-29)	13.6	14.6	14.4	-	+0.3
	All smoking (age 15+)	17.6	16.7	19.4	-	+2.25
	Daily smoker (age 15+)	15.2	14.4	16.2	-	+1.4
Western Australia [Tomlin, Joyce & Patterson, 2012; Tomlin & Joyce,	Daily smoker (age 16+)	10.8	9.6	11.3	-	+1.1
	Ex-smoker (age 16+)	17.0	16.8	16.8	-	-0.1
	Never-smoker (age 16+)	58.5	60.5	58.3	-	-1.2

2013; Rodmiljac &
Joyce, 2014]

Key: Blank cells indicate a rate was not reported in the source.

*When a rate was available for 2014, change in rate since plain packaging was calculated as: $((\text{rate}^{2013} + \text{rate}^{2014}) / 2) - ((\text{rate}^{2011} + \text{rate}^{2012}) / 2)$.

*When a rate was unavailable for 2014, change in rate since plain packaging was calculated as: $(\text{rate}^{2013} - (\text{rate}^{2011} + \text{rate}^{2012}) / 2)$.

*When a rate was unavailable for 2011, change in rate since plain packaging was calculated as: $((\text{rate}^{2013} + \text{rate}^{2014}) / 2) - \text{rate}^{2012}$.

§ aged 16+