

# An analysis of smoking prevalence in Australia

## Final



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Our team is comprised of skilled economists, benefiting from rigorous intellectual backgrounds. All our senior economic consultants possess postgraduate economics degrees from leading universities, and have a wealth of academic and practical experience.

This study was commissioned by Philip Morris International. All judgements expressed in this paper are those of London Economics. All errors remain the responsibility of London Economics.

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## 1 Introduction and key findings

It is clear that cigarette consumption has significant public health impacts. In light of this, there has been a concerted move in a number of jurisdictions to adopt fiscal, regulatory and other policy measures with the objective of reducing cigarette consumption in both the short term and longer term by influencing consumer behaviours. One measure considered in a number of countries is a requirement to remove all brand imagery from tobacco product packaging, so that cigarettes are only available for purchase in plain packaging.

In December 2012, the Australian government implemented plain packaging legislation with the stated objective of improving public health by reducing smoking<sup>1</sup>. At the same time, and through separate legislation, the government more than doubled the size of the health warning appearing on the front of packs<sup>2</sup>.

London Economics were commissioned by Philip Morris International to undertake an analysis of the impact of plain packaging on smoking prevalence amongst the Australian adult resident population. To undertake this analysis, London Economics commissioned Ipsos Observer (based in the United Kingdom) to administer online questionnaires through a number of local suppliers in possession of Australian panels of potential respondents at various points before and after the introduction of plain packaging.

This report provides an interim assessment of the analysis undertaken. As far as we are aware, this analysis is one of the first comprehensive studies considering smoking prevalence since the introduction of plain packaging. In contrast to a number of other studies that are *predictive* in nature, this analysis concentrates on *actual* smoking behaviour, as reported by study participants, following the introduction of plain packaging and larger health warnings. The key findings are as follows:

- **Over the timeframe of the analysis, the data does not demonstrate that there has been a change in smoking prevalence following the introduction of plain packaging and larger health warnings despite an increase in the noticeability of the new health warnings.**

At this early stage, it is important to note it is not possible to assign a *causal* relationship between the changes in the noticeability of health warnings or smoking prevalence and the introduction of plain packaging, as there have been a number of other confounding factors that have occurred before and during the period of this analysis (including a number of tax increases, seasonality trends, a pre-existing downward trend in smoking behaviour and the increase in health warning size itself).

As more robust information becomes available, a range of econometric techniques could be adopted to disentangle the relative effect of plain packaging and larger health warnings on smoking behaviour.

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<sup>1</sup> Tobacco Plain Packaging Act 2011, No. 148, 2011, An Act to discourage the use of tobacco products, and for related purposes.

<sup>2</sup> Prior to the introduction of plain packaging, health warnings made up 30% of the front of packs and 90% of the back. Following the introduction of plain packaging, health warnings made up 75% of the front of packs (and 90% of the back).

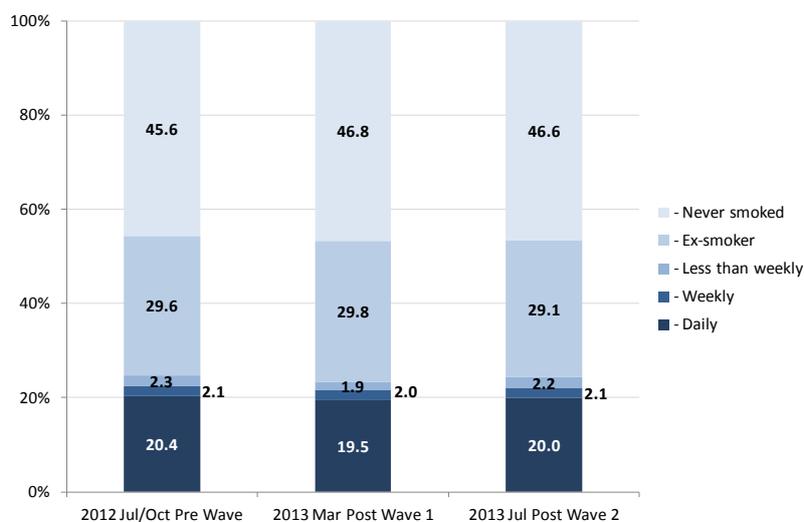
## 2 Findings

As the overarching objective of plain packaging is to improve public health by reducing tobacco consumption, the core question in this analysis is whether there has been any change in smoking prevalence amongst the resident Australian population.

**Over the timeframe of the analysis, the data does not demonstrate that there has been a change in smoking prevalence following the introduction of plain packaging.**

Specifically, using the classification of smoking prevalence as outlined in the Annex, the analysis indicates that **20.4%** of Australian adults responded that they were daily smokers (any form of tobacco product) prior to the introduction of plain packaging. In addition, a further **2.1%** of respondents indicated that they were weekly (but not daily) smokers; and **2.3%** smoked less than weekly. Furthermore, **29.6%** of respondents indicated they were ex-smokers and **45.6%** indicated that they had never smoked. This is presented in Figure 1.

**Figure 1: Smoking prevalence in Australia**



**Source: London Economics (2013)**

**Base:**

All potential respondents.

Q: Have you ever smoked a full cigarette (either manufactured or roll your own) or a cigar or pipe?

Q: In your opinion, would you have smoked at least 100 cigarettes (manufactured or roll your own), or the equivalent amount of tobacco in your life?

Q: Have you ever smoked on a daily basis? (either manufactured or RYO cigarettes, cigars or pipes)

Q: How often do you now smoke cigarettes, pipes or other tobacco products?

Q: How often, if at all, do you now smoke manufactured cigarettes?

Q: How often, if at all, do you now smoke roll your own cigarettes?

Q: How often, if at all, do you now smoke cigars or pipes?

**Sample size and effective sample size (Sample • ESS):**

2012 Jul/Oct Pre Wave (9,226•5,816); 2013 Mar Post Wave 1 (5,114•3,969); 2013 July Post Wave 2 (5,247•4,171)

↑↓ Indicates significantly higher/lower than previous wave at 95% confidence level

▲▼ Indicates significantly higher/lower than Pre Wave at 95% confidence level

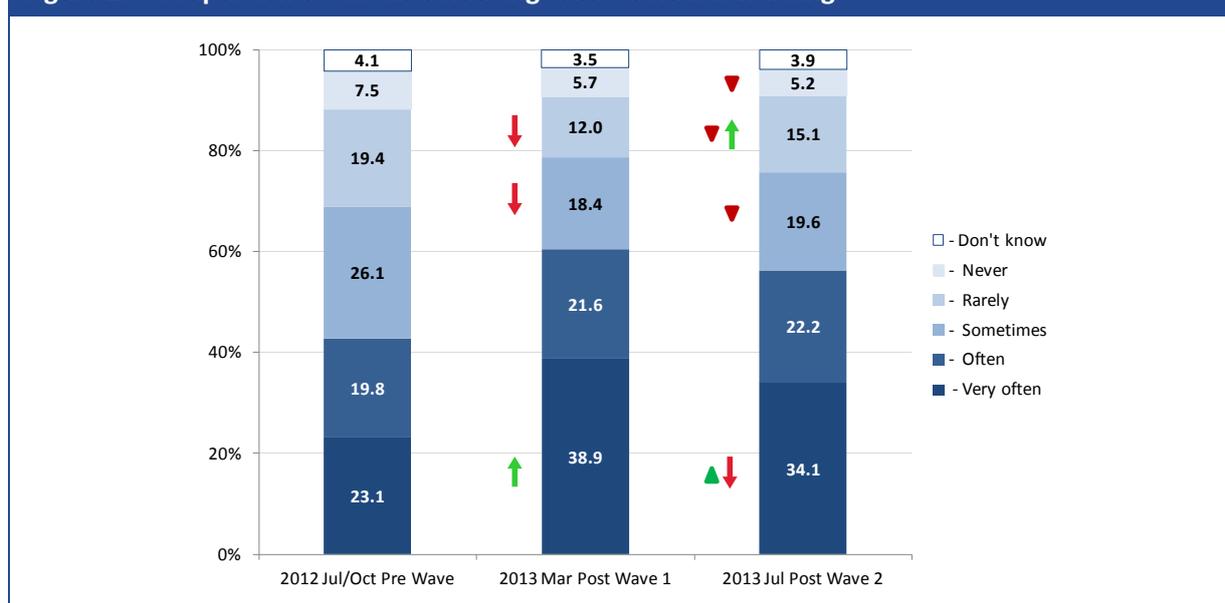
The survey results indicate that "daily" and "less than weekly" smoking prevalence fell following the introduction of plain packaging, while weekly smoking fell and returned to pre-implementation levels. In addition, the proportion of individuals claiming to have never smoked increased, while the proportion of respondents claiming to be ex-smokers decreased. However, from a statistical perspective, none of these changes were different from zero.

In greater detail, three months following the introduction of plain packaging, daily smoking prevalence had declined by **0.9 percentage points** (to **19.5%**), while weekly smoking prevalence and less-than-weekly smoking incidence had declined by **0.1 percentage point** (to **2.0%**) and **0.4 percentage points** (to **1.9%**) respectively. In total, the proportion of adult respondents indicating that they smoked any form of tobacco declined from **24.8%** to **23.4%**. As previously stated, from a statistical perspective, these changes are not significantly different from zero.

Eight months following the introduction of plain packaging, the apparent decline experienced in the first three months started to reverse. Specifically, between the first and second wave following the introduction of plain packaging, the proportion of respondents indicating that they were daily smokers increased by **0.5 percentage points** (to **20.0%**), while the proportion responding that they were weekly smokers or less-than-weekly smokers increased by **0.1 percentage points** (to **2.1%**) and **0.3 percentage points** (to **2.2%**) respectively. In other words, the proportion of respondents indicating that they smoked tobacco products increased by **0.9 percentage points** (from **23.4%** to **24.3%** between three and eight months following the introduction of plain packaging). Again, both wave-on-wave, and comparing the pre plain packaging wave with the most recent wave, these changes in smoking prevalence are not statistically significant.

Turning to the noticeability of health warnings, the analysis indicates that a higher proportion of smokers noticed health warnings either 'often' or 'very often'. In particular, compared to the **42.9%** of smokers in these categories prior to the introduction of plain packaging, in the first survey post plain packaging, **60.5%** of smokers noticed the health warnings either 'often' or 'very often' (with the proportion noticing health warnings 'very often' statistically significantly higher than pre plain packaging).

**Figure 2: Proportion of smokers noticing tobacco health warnings**



**Source: London Economics (2013)**

**Base:** Those who self-identify as an occasional, light, social, heavy or chain smoker.  
 Q – In the last month, how often have you noticed the warning labels on cigarette (or other tobacco) packaging?

**Sample size and effective sample size (Sample • ESS):**

2012 Jul/Oct Pre Wave (2,357•1,478); 2013 Mar Post Wave 1 (1,201•920); 2013 July Post Wave 2 (1,242•996)

↑↓ Indicates significantly higher/lower than previous wave at 95% confidence level

▲▼ Indicates significantly higher/lower than Pre Wave at 95% confidence level

However, this proportion had decreased eight months following the introduction of plain packaging with **56.3%** of respondents indicating that they had noticed the health warnings either 'often' or 'very often' (with the proportion noticing health warnings 'very often' statistically significantly higher than pre plain packaging).

While health warning noticeability increased, it is not clear, and this report does not assess, whether this was due to the removal of brand imagery from packs, the increase in health warning size, or other factors.

**In summary, over the timeframe of the analysis, although the noticeability of the new and larger health warnings has increased, this has not translated into statistically significant changes in smoking prevalence amongst the resident adult population. Specifically, the data does not demonstrate that there has been a change in smoking prevalence following the introduction of plain packaging and more prominent health warnings.**

## Annex 1 Methodology

### A1.1 Definitions

There have been a number of previous studies undertaken assessing the extent of smoking prevalence in Australia. In particular, the National Drug Strategy Household Survey (commissioned by the Australian Government) has been undertaken at various points in time, with the most recent survey taking place in 2010 (NDSHS 2010) along with associated results in 2011. Crucially, throughout this analysis, we have attempted to ensure that there is the greatest degree of methodological comparability between the definitions of smoking prevalence (in particular) used in previous analyses and those presented here. In particular, throughout the analysis we define the various potential smoking prevalence behaviours (relating to any tobacco product), which are consistent with the 2010 NDSHS, as follows<sup>3</sup>:

- **Daily:** A person reporting smoking daily
- **Weekly:** A person reporting smoking weekly
- **Less than weekly:** A person reporting smoking less than weekly
- **Ex-smoker:** A person who has smoked at least 100 cigarettes or equivalent tobacco in their lifetime, but does not smoke at all now
- **Never smoked:** A person who does not smoke now and has smoked fewer than 100 cigarettes or the equivalent tobacco in their lifetime

### A1.2 Survey Administration

To understand the initial impact of the introduction of plain packaging in Australia, we administered a series of online surveys, both pre- and post- the introduction of plain packaging. In particular, **9,226** Australian residents aged 18 or above were surveyed between July and October 2012 prior to the introduction of plain packaging across the Australian states and Territories. A further **5,114** individuals were surveyed in March 2013, approximately 3-4 months following the introduction of plain packaging legislation, while **5,247** individuals were surveyed in July 2013 (7-8 months post introduction).

When collecting the information in the baseline survey (pre plain packaging), given the size of the data collection exercise and the reach of panel providers in Australia, respondents were sampled based on quotas broken down by age, region and gender (and weighted accordingly (see section A1.4)). Furthermore, an additional sample of individuals aged between 18 and 21 was sampled (and subsequently weighted) to ensure sufficient sample size was available for analysis of potential behavioural changes.

In the post plain packaging surveys, respondents were randomly sampled using a stratified sample broken down by age, gender and region of residence (and weighted accordingly).

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<sup>3</sup> The analysis of smoking prevalence is based on the following questions:

**Q:** Have you ever smoked a full cigarette (either manufactured or roll your own) or a cigar or pipe? **Q:** In your opinion, would you have smoked at least 100 cigarettes (manufactured or roll your own), or the equivalent amount of tobacco in your life? **Q:** Have you ever smoked on a daily basis? (either manufactured or roll your own cigarettes, cigars or pipes) **Q:** How often do you now smoke cigarettes, pipes or other tobacco products? **Q:** How often, if at all, do you now smoke manufactured cigarettes? **Q:** How often, if at all, do you now smoke roll your own cigarettes? **Q:** How often, if at all, do you now smoke cigars or pipes?

## A1.3 Quality Assurance

In terms of the administration of the survey, exceptional care was taken throughout the process.

**First**, given the sensitivity of the topic under consideration, the Australian panels were screened to ensure that only adults were contacted in the first instance. In addition, to ensure that no-one below the age of 18 answered the questionnaire, the online survey required an exact date of birth at commencement of the survey (with survey termination for those below the age of 18). **Secondly**, to maintain the quality of the responses, for those individuals who responded to any of the surveys, we ensured that they did not become eligible to (potentially) participate in a repeat survey for at least 6 months following their initial participation. **Thirdly**, in terms of the responses provided online, significant attention was paid to the quality of these responses, and in particular, the assessment of whether any individuals either *flat-lined* (i.e. answered 'don't know/ not applicable' to every question) and other forms of passive response, or provided highly contradictory responses (i.e. individuals who might claim to have 'never smoked' but then subsequently indicated that they smoked on a daily basis). In this final cleaning stage of data quality assurance, approximately ½% of responses were removed from the analysis.

It is important to note that there are some differences in survey administration approach between the 2010 NDSHS and the data collection presented here. For instance, the 2010 NDSHS uses a 'drop and collect' approach and surveys approximately 25,000 individuals aged 18 or above, as well as approximately 1,500 individuals aged between 12 and 17. This compares to the approach presented here, which is an online survey, and was administered to approximately 9,000 individuals aged 18 or above prior to the introduction of plain packaging and 5,000 individuals aged 18 or above per wave following the introduction of plain packaging. Given the different approaches to survey administration, the results presented here are not intended to be comparable to those earlier estimates, but rather show a consistent assessment of the wave-on-wave change smoking prevalence in the months immediately before and after the introduction of plain packaging.

## A1.4 Weighting

To ensure that the sample better reflects the demographic and socioeconomic characteristics of the Australian resident population, as is standard practice, we used information from the Australian Bureau of Statistics (2011 Australian Census) to weight the data. Specifically, using a RIM weighting<sup>4</sup> approach the sample data was weighted by age x gender x region of residence<sup>5</sup> (Level 1), educational attainment x age (Level 2) and employment status x age (Level 3).

## A1.5 Base sizes

In Table 1, we provide information on the base sizes according to a number of demographic and socioeconomic characteristics in the *raw* sample, as well as the characteristics of the weighted sample.

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<sup>4</sup> RIM weighting is an iterative proportional fitting procedure used for weighting adjustment. It aims to weigh all of the characteristics under consideration simultaneously, whilst also attempting to avoid distorting each variable when trying to attain all of the desired proportions among the various characteristics.

<sup>5</sup> Due to the relatively small populations in the Australian Territories, the ACT has been combined with New South Wales while the Northern Territory has been combined with South Australia.

We also present information from the 2011 Australian Census to demonstrate the representativeness of the data underpinning this analysis.

	<b>ABS 2011 Census</b>	<b>Pre Wave Jul-Oct 2012</b>		<b>Post Wave 1 March 2013</b>		<b>Post Wave 2 July 2013</b>	
		<b>Un- weighted</b>	<b>Weighted</b>	<b>Un- weighted</b>	<b>Weighted</b>	<b>Un- weighted</b>	<b>Weighted</b>
<b>Age</b>							
18-24	12.2%	19.9%	12.3%	13.2%	12.2%	13.5%	12.2%
25-34	18.0%	16.7%	17.9%	17.8%	18.0%	17.8%	18.0%
35-44	18.5%	17.3%	18.5%	18.5%	18.5%	18.2%	18.6%
45-54	17.9%	15.9%	17.9%	17.9%	17.9%	18.0%	17.9%
55 or above	33.4%	30.3%	33.4%	32.7%	33.4%	32.4%	33.4%
<b>Gender</b>							
Male	48.9%	40.9%	48.7%	48.7%	48.8%	49.1%	48.8%
Female	51.1%	59.1%	51.3%	51.3%	51.2%	50.9%	51.3%
<b>Region</b>							
New South Wales & ACT	33.9%	33.9%	33.9%	33.7%	33.9%	33.3%	33.9%
Victoria	25.1%	26.3%	25.1%	24.9%	25.1%	24.9%	25.1%
Queensland	19.9%	19.2%	19.9%	19.8%	19.9%	19.8%	20.0%
West Australia	10.4%	9.4%	10.4%	10.3%	10.4%	10.6%	10.4%
S. Australia & Northern Territory	8.5%	8.8%	8.5%	8.6%	8.5%	8.8%	8.5%
Tasmania	2.3%	2.5%	2.3%	2.7%	2.3%	2.6%	2.3%
<b>Employment Status</b>							
Working (Employed/Self-employed)	58.2%	50.7%	58.6%	53.8%	58.6%	55.6%	58.5%
Non-working (Unemployed/ Inactive)	41.8%	49.3%	41.4%	46.2%	41.4%	44.4%	41.5%
<b>Personal Income</b>							
High (AU\$1,000 per week or above)	27.5%	23.5%	26.1%	27.4%	27.9%	27.8%	27.9%
Mid (AU\$400-999 per week)	31.7%	29.8%	31.8%	28.8%	30.2%	31.1%	32.7%
Low (Below AU\$400 per week)	29.1%	31.9%	27.7%	31.1%	29.1%	26.7%	24.8%
Not Stated	11.8%	14.8%	14.4%	12.7%	12.8%	14.4%	14.6%
<b>Education Level</b>							
College or above	55.8%	70.6%	55.5%	68.3%	55.6%	68.4%	55.5%
Year 12 or below	44.2%	29.4%	44.5%	31.7%	44.5%	31.6%	44.5%
<b>Total</b>		<b>9,226</b>		<b>5,114</b>		<b>5,247</b>	

Source: London Economics (2013)



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