

## ORIGINAL ARTICLE

## Observational study of the visibility of branded tobacco packaging and smoking at outdoor bars/cafés in Wellington, New Zealand

Natasha Martin, Hugh McHugh, Jono Murtagh, Connor Oliver-Rose, Div Panesar, Harriet Pengelly, Scott Rieper, Henry Schofield, Vidit Singh, Amanda Speed, Rhona Strachan, Te Kahui Tapsell, Sara Trafford, Stefan van Ryn, Ethan Ward, Rosie Whiting, Merryn Wilson-van Duin, Zhou Wu, Gordon Purdie, Frederieke S van der Deen, George Thomson, Amber L Pearson, Nick Wilson

### Abstract

**Aim** To collect data on tobacco brand visibility on packaging on outdoor tables at bars/cafés in a downtown area, prior to a proposed plain packaging law.

**Method** The study was conducted in the Central Business District of Wellington City in March 2014. Observational data were systematically collected on tobacco packaging visibility and smoking by patrons at 55 bars/cafés with outdoor tables.

**Results** A total of 19,189 patrons, 1707 tobacco packs and 1357 active smokers were observed. One tobacco pack was visible per 11.0 patrons and the active smoking prevalence was 7.1% (95%CI: 4.9–9.2%), similar to Australian results (8.3%). Eighty percent of packs were positioned face-up (showing the brand), 8% face-down (showing the large pictorial warning), and 12% in other positions. Pack visibility per patron was significantly greater in areas without child patrons (RR=3.1,  $p<0.0001$ ). Both smoking and pack visibility tended to increase from noon into the evenings on weekends. Inter-observer reliability for key measures in this study was high (Bland-Altman plots).

**Conclusion** Tobacco branding on packaging was frequently visible because of the way smokers position their packs. These results highlight the residual problem posed by this form of marketing. The results also provide baseline data for the future evaluation of plain packaging if a proposed law is implemented in New Zealand. Other results warrant further research, particularly the reasons for lower pack visibility and smoking when children were present.

There is strong evidence that indicates that tobacco marketing plays a role in maintaining and increasing tobacco smoking.<sup>1</sup> Advertising can prompt smokers, including those intending to quit, to engage in smoking and purchase tobacco products.<sup>2</sup> As such, the regulation of tobacco marketing has been a worthwhile focus in health interventions.<sup>1,3</sup>

With the growing use of tobacco advertising bans in many countries, tobacco packaging has become an important avenue of product promotion for tobacco companies. Indeed, tobacco packaging “assists consumers to select among other relatively homogenous products”.<sup>4</sup> Corporate branding is a well-established marketing tool for generating customer loyalty, particularly for tobacco products; “cigarette brands enjoy the highest brand loyalty of all consumer products, with less than 10% changing brands annually”.<sup>4</sup>

Legislated changes to the design of tobacco packaging have been associated with changes in quitting behaviours in several countries. For example, the introduction of pictorial health warnings on packages in New Zealand was associated with increased recognition of the national Quitline number amongst all sociodemographic groups, an increase in new callers, and an increase in the proportion of new callers obtaining the number from the health warning printed on their tobacco packaging.<sup>5,6</sup> More recently in Australia in 2012, a study found a 78% increase in national Quitline calls after brand

imagery was effectively eliminated as part of a new plain packaging law (paired with larger pictorial warnings).<sup>7</sup>

Tobacco pack visibility on outdoor tables in public areas (e.g., at cafés or bars) might be a form of indirect tobacco advertising.<sup>8</sup> Repeated (and often unconscious) exposure to brands has been associated with increased ease in brand identification, more positive attitudes towards the brand, and an increased chance of brand selection.<sup>9</sup> Children and adolescents have been shown to be especially vulnerable to tobacco marketing.<sup>10</sup>

Plain (limited branding) tobacco packaging is, therefore, hypothesised to reduce the market influence of tobacco companies, and possibly leading to a reduction in smoking.<sup>4,11</sup> Australia was the first country in the world to implement plain packaging legislation, and New Zealand is currently developing legislation along these lines.<sup>12</sup> In Australia, plain packaging restrictions include large pictorial warnings, unappealing and consistent (across all brands and product types) pack colouring and regular, small font.

A 2011–12 Australian study, before the introduction of plain packaging, found that 11% of patrons at outdoor tables of cafés or bars had a visible pack, with most packs displayed face-up (revealing the tobacco branding).<sup>8</sup> The study was repeated following the introduction of plain packaging with the proportion of visible tobacco packs decreasing by 15%, and the proportion of packs placed face-up decreasing by 12%.<sup>13</sup>

Currently, the levels of tobacco packaging visibility are unknown in New Zealand. Yet this information will prove useful to understand the impact (if any) of the proposed plain packaging law. The specific aims of this study were therefore threefold:

- Measure the level and type of tobacco pack visibility and active smoking at outdoor areas of cafés and bars in an urban area of New Zealand;
- Make comparisons with the 2011–12 Australian study; and
- Investigate relationships between pack visibility, active smoking and the presence of children.

## Methods

**Study site and venue selection**—Three areas within the Central Business District of Wellington City were selected for the observation of tobacco pack visibility, active smoking and numbers of patrons and children at the outdoor areas of bars and cafés. These areas were selected based on pilot observations and local knowledge that they contained a relatively high number of venues with both outdoor seating and relatively high levels of patronage. These selected areas were: Cuba Street, Courtenay Place and the Waterfront.

Eligible venues included cafés, restaurants, bars and pubs with outdoor tables visible from the footpath. Venues were excluded if patrons appeared likely to remain at the tables for under 10 minutes, such as fast food outlets and ice cream shops (as per the 2011–12 Australian study<sup>8</sup>). Thus, the 55 selected venues included: 21 in Cuba Street, 12 in the Waterfront area, and 22 in Courtenay Place.

**Pilot test and inter-observer reliability**—Prior to data collection, a pilot test of the data collection instrument was conducted, where all observers visited one area at various times and tested the form. Revisions were made to facilitate efficient and unobtrusive data collection. Inter-observer reliability was then investigated using 17 observers in 10 pairs of non-communicating observers (an average of 3.4 pairs per venue, for 54 venues). Observer agreement was compared using Bland-Altman plots for observational variables.

**Data collection methods**—Observational data were collected over two weeks in March 2014 (early autumn) by 17 medical students of the University of Otago (Wellington). Observers viewed every designated eligible venue along a route in each study area within a 30-minute period, recording observations on a standardised, printed-paper form. Observations were collected 5–8pm on weekdays and 12–8pm on weekends on nine separate days, with the intention to collect data when patronage was highest. Venues which were closed during observation times were recorded as ‘missing’.

Observers recorded the air temperature (Celsius) and wind speed (kilometres/hour) from the national weather service (<http://www.metservice.co.nz>). Observers also discreetly noted, for each venue, the number of: (i) seated (or standing if tables were designed for standing only) patrons, adults and children (12 years or younger) separately; (ii) non-patron children within 10m of the venues' outdoor tables; (iii) active smokers, (including holding/rolling/lighting a cigarette); (iv) tobacco packages (boxes and roll-your-own pouches) visible on tables; and (v) the orientation of visible packages: (a) face-up (showing branding); (b) face-down (larger pictorial health warning); (c) standing on side/top/bottom (boxes only); (d) in a case/tin; (e) largely concealed (e.g., by a wallet or phone, or in a pocket or bag), so that orientation was not ascertained; or (f) with an unknown orientation (e.g., when unable to get close enough to discern orientation).

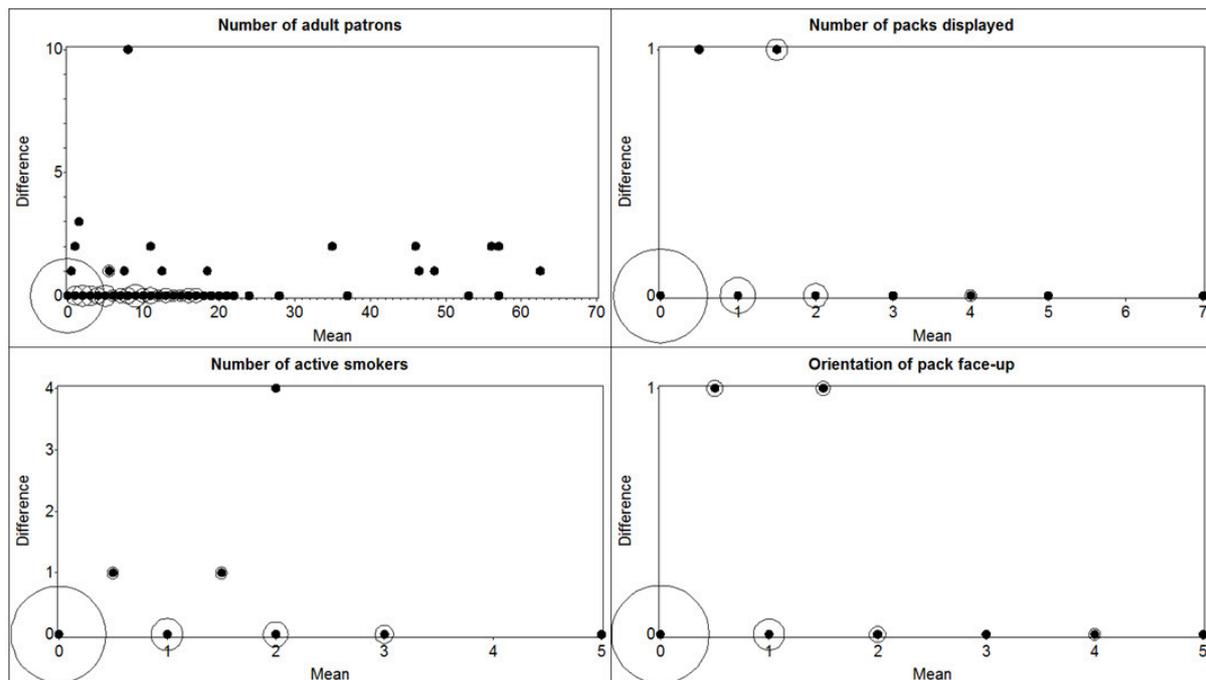
**Data processing and analyses**—Recorded observations were entered into Microsoft Excel. Data was managed and figures were drawn using SAS v9.2 software (SAS Institute Inc., Cary, NC). Data analyses were performed with STATA v11.2 (StatCorp LP, College Station, TX). Data were treated as clustered by venues using STATA estimation commands for survey data. Confidence intervals for the ratio of visible packs to patrons were calculated by transforming confidence intervals from the binomial distribution using the total of visible packs and patrons.<sup>14</sup>

**Ethics approval**—Approval for this study was obtained via the University of Otago level B ethics approval process on 12 March 2014 (D14/077).

## Results

This observational method appeared to work well in this New Zealand setting. Evaluation of the inter-observer reliability indicated high agreement between observers (see Figure 1 for key variables).

**Figure 1. Selected Bland-Altman plots from the study of inter-observer reliability\***



\* A fuller set of such plots is available from the authors on request.

A total of 2971 venue observations were collected from the 55 venues in this study (Table 1). All observations detailed in Table 1 took place on days without rain, with an average daytime temperature of 18°C (range: 13–21°C), and average wind speed of 18 kmph (range: 2–46 kmph). Each venue was observed an average of 54 times.

**Table 1. Descriptive statistics for observed packs, smokers, patrons and non-patron children within 10m of venues for the three study areas in central Wellington City (March 2014)**

Characteristic	Study Areas (N)			Total
	Courtenay Place	Cuba Street	Waterfront	
Number of venues	22	21	12	55
Average observations per venue	47	59	59	
Total venue observations	1024	1239	708	2971
Packs	636	597	474	1707
Active smokers	508	504	345	1357
Adult patrons	3893	4359	10,476	18,728
Child patrons	26	38	397	461
Non-patron children (within 10m)	32	105	504	641

A total of 19,189 patrons were observed in the outdoor seating areas of the venues, including 461 (3%) child patrons (with another 641 non-patron children within 10m of the venue tables). In total, 1357 (7%) adult patrons were observed actively smoking. The point prevalence of observed active smoking was highest at Courtenay Place (13%), followed by Cuba Street (12%) and the Waterfront area (3%). A total of 1707 packs were visible on tables (one pack per 11.0 adult patrons; or 1.3 packs per active smoker).

The Waterfront area, with 56% of adult patrons, differed greatly from the other areas. It had the majority of all child patrons observed (86%), the lowest percentage of packs visible (28% of all packs) and the lowest proportion of active smokers (25%).

Table 2 shows the percentages of smokers (7.1%) and visible packs (8.9%) per patron. The prevalence rates of active smoking and visible pack per patron for the three areas were significantly different ( $p < 0.0001$ ), with the Waterfront area having lower rates than Cuba Street and Courtenay Place. After 5pm, smoking prevalence and visible packs per patron rates were statistically significantly higher during the weekdays, compared to on the weekend ( $p = 0.004$ ,  $p = 0.015$  respectively).

Of the 1707 tobacco packs observed, 80% were oriented face-up (showing the tobacco branding), 8% were face-down (showing the larger pictorial health warning on the back), 2% of the observed packs were standing on either the side, top or bottom, and only 7% of packs were either in a case or tin or concealed so that the labels were not able to be seen but the observer could still see that a pack was present (Table 3). The orientation of 3% of visible tobacco packs was identified as unknown as the observer could not get close enough to discern the orientation of the pack.

Both the levels of smoking and of pack visibility per adult patron at venues with and without children present (either as patrons or within 10m) were significantly higher when there were no children compared to when at least one child was present ( $p < 0.0001$ ) (Table 4). This pattern was consistent for each of the three study areas when there were child patrons (Table 5).

**Table 2. Active smoking and visible tobacco packs by area and day of the week (central Wellington City, March 2014)**

Area/time	People smoking / all patrons ratio		Visible tobacco packs / all patrons ratio	
	N	% (95%CI)	N	% (95%CI)
<b>Total</b> (n=19,189)	1357	7.1 (4.9 – 9.2)	1707	8.9 (6.2 – 11.8)
<b>By area:</b>				
Cuba Street (n=4397)	504	11.5 (8.2 – 14.7)	597	13.6 (8.3 – 19.4)
Waterfront (n=10,873)	345	3.2 (2.1 – 4.2)	474	4.4 (2.8 – 6.0)
Courtenay Place (n=3919)	508	13.0 (9.6 – 16.3)	636	16.2 (12.0 – 20.7)
<b>By day of week (after 5pm):*</b>				
Monday – Wednesday (n=4485)	414	9.2 (6.9 – 11.5)	588	13.1 (10.2 – 16.2)
Thursday – Friday (n=2390)	264	11.0 (8.5 – 13.6)	324	13.6 (9.9 – 17.4)
Saturday – Sunday (n=1821)	111	6.1 (3.7 – 8.5)	151	8.3 (5.1 – 11.7)

\* Observations were collected between 5-8pm on weekdays and 12-8pm on weekends, with the intention to collect data when patronage was highest.

Note: calculations of active smokers and visible packs may be more relevant per adult patron, rather than per patron as children <12 years very rarely smoke. However, to facilitate comparability with the Australian study, we used 'per total patrons' in this table (versus 'per adult patrons' in other Tables 4 and 5 and Figure 1).

**Table 3. Tobacco pack orientation on the outdoor tables of venues (central Wellington City, March 2014)**

Pack orientation	n	% (95%CI)
Face-up (brand imagery side up)	1366	80.0 (77.5 – 82.6)
Face down (pictorial health warning up)	141	8.3 (6.4 – 10.1)
Standing on the side, top or bottom	31	1.8 (1.2 – 2.4)
In a case or tin	29	1.7 (0.7 – 2.7)
Partly concealed (e.g., with wallet, phone, but ignoring lighters)	97	5.7 (4.0 – 7.3)
Unknown	43	2.5 (0.4 – 4.6)
<b>Total</b>	<b>1707</b>	<b>100%</b>

**Table 4. Comparison of pack visibility and active smoking at venues with and without children (as patrons or within 10 meters of the venue tables, central Wellington City, March 2014)**

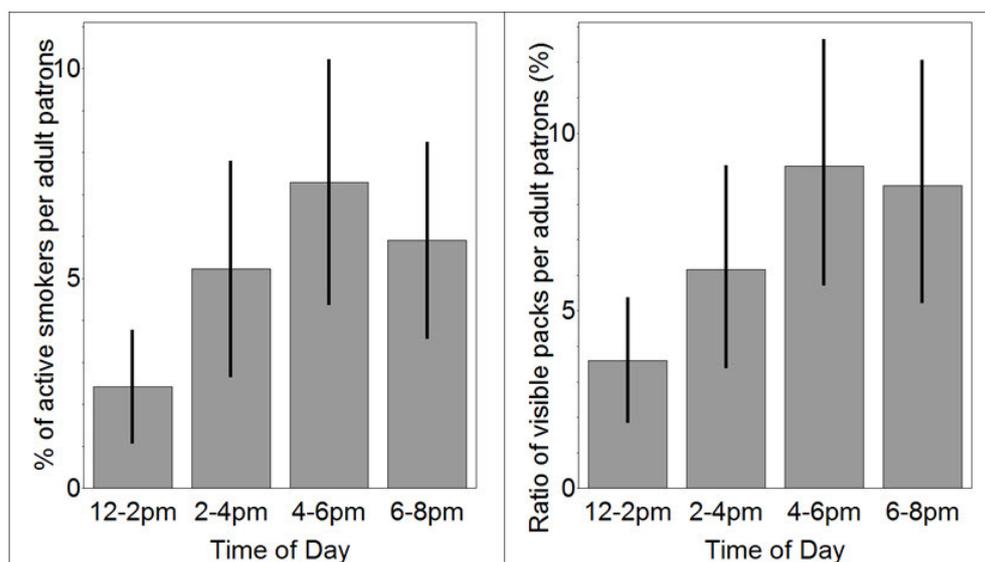
	Packs or active smokers (n)	Adult patrons (n)	Ratio (%) (95%CI)	Risk ratio (RR)	P-value (two-tailed)
<b>Pack visibility</b>					
No children (n = 2729 venue observations)	1464	12,535	11.7 (9.0 – 14.5)	2.98	<0.0001
One or more children (n = 242)	243	6193	3.9 (2.4 – 5.5)	1.00 (ref)	
<b>Active smoking</b>					
No children (n = 2729)	1159	12,535	9.2 (7.2 – 11.3)	2.89	<0.0001
One or more children (n = 242)	198	6193	3.2 (1.9 – 4.5)	1.00 (ref)	

**Table 5. Comparison of pack visibility prevalence rates at venues with and without child patrons by study area and for the total observations in Wellington City (March 2014)**

Site		Observations of venues (n)	Packs (n)	Adult patrons (n)	Ratio (%) (95%CI)	Risk ratio (RR)	P-value (two-tailed)
<b>Cuba Street</b>	No child patrons	1215	578	4082	14.2 (9.1 – 19.8)	2.06	0.014
	1+ child patrons	24	19	277	6.9 (0.9 – 13.6)	1.00 (ref)	
<b>Waterfront</b>	No child patrons	557	304	5367	5.7 (4.1 – 7.3)	1.70	0.018
	1+ child patrons	152	170	5109	3.3 (1.6 – 5.1)	1.00 (ref)	
<b>Courtenay Place</b>	No child patrons	1007	620	3723	16.7 (12.8 – 20.8)	1.77	0.086
	1+ child patrons	17	16	170	9.4 (1.0 – 19.3)	1.00 (ref)	
<b>Total</b>	No child patrons	2778	1503	13,172	11.4 (8.8 – 14.2)	3.09	<0.0001
	1+ child patrons	193	205	5556	3.7 (2.2 – 5.3)	1.00 (ref)	

During the weekend there were statistically significantly higher percentages of active smokers per adult patron from 4-6pm compared to 12-2pm (Figure 2). There was also a general upward trend in active smokers from noon to 6pm, with a decrease from 6-8pm. Percentages of visible packs per adult patron steadily increased from noon to 4-6pm, with statistically significantly higher averages from 2-8pm compared to 12-2pm.

**Figure 2. The percentage of active smokers and percentage packs displayed out of all adult patrons, averages (and 95%CI) by time of day on the weekends only (Wellington City, March 2014)**



## Discussion

**Main findings and interpretation**—This study identified an overall level of pack visibility of 9%, compared to a slightly larger pack visibility level of 11% found in the similar Australian study.<sup>8</sup> The majority of packs were oriented face-up (80%), showing the branding. Similarly, the Australian study found 81% were face-up.<sup>8</sup>

The face-up orientation hides the larger pictorial health warnings and maximises the “passive marketing” associated with the tobacco brand imagery. Possible reasons for these findings are that smokers could have a negative psychological response to pictorial images on tobacco packs<sup>15</sup> or that other factors, such as this orientation’s ease of opening the pack to access cigarettes or rolling tobacco.

Observed point prevalence rates of active smoking in this study were similar to those found in the Australian study (7% and 8% respectively).<sup>8</sup> This is not surprising, given similarities in national adult smoking prevalence rates (15% and 16% respectively).<sup>16,17</sup> The lowest smoking prevalence and pack visibility rates were observed in the Waterfront area, perhaps due to this area’s popularity among families and tourists. Conversely, Cuba Street and Courtenay Place are popular areas for adult nightlife, which may relate to higher smoking rates and pack visibility.

We found a pattern of an increased proportion of active smokers and of visible packs in the early evening (relative to noon). This increase could be partly related to greater alcohol consumption as the day progressed, since there is an association between the amount of alcohol consumed and increased smoking behaviour.<sup>18,19</sup> But other explanations are possible, such as more smoking occurring after meals.

Another interesting observation was the significantly lower prevalence rates of active smoking and pack visibility per patron at venues with children present (either as patrons or non-patrons within 10m of venue tables). This contrasts with a previous (albeit much smaller) study in the same city that found no association between smoking prevalence and child presence.<sup>20</sup> Differences between study findings might reflect the protective decisions by parents to reduce secondhand smoke exposure, a different sample of venues, and/or that the presence of children may inhibit smoking behaviour by some smokers.

**Strengths and weaknesses of the study**—To our knowledge, this study combining pack visibility and smoking behaviour was just the second of its kind in the world. A specific strength was the high level of inter-observer reliability in data observations (see Figure 1), providing accurate measurements and avoiding related biases.<sup>21,22</sup> Data collection on the presence of children, both as patrons as well as nearby non-patrons was a unique feature (not in the Australian study). Children may be particularly vulnerable to the health harms from secondhand smoke exposure, to potential pack-related passive advertising, and to the normalising effects of visible smoking.<sup>23</sup>

A limitation of this study was the lack of examination of differences by neighbourhood socioeconomic status (SES), as we only had the resources to sample three areas in central Wellington (which lacked measurable variation in SES). In contrast, the largely comparable Australian study considered variations across locations of different SES.<sup>8</sup> Future larger, funded studies could potentially include study areas with varying SES. This work could inform the extent to which the future plain packaging law could help address the health inequalities caused by the tobacco epidemic. Another limitation was the subjective element of assessing children “within 10 meters” of venue tables (an issue that could not be assessed objectively as the ethics approval for this study did not include photography).

**Possible implications for research**—This study may provide robust baseline data for a future follow-up study investigating the effects of plain packaging legislation if implemented in New Zealand (and contributes to further international comparisons). Another implication is the need to further explore the observed association between the presence of children and both lower pack visibility and lower smoking levels. Although this relationship was observed across all three routes, it is possible that other factors (e.g., patron demographics) may have partly been the cause of this observed association and not necessarily changes by smokers when they see children around them. Finally, the diurnal patterns in smoking could be studied further to examine the potential role of alcohol. This study found an association between the presence of children and lower prevalence rates of active smoking and pack visibility.

## Conclusion

This study found that tobacco branding on tobacco packaging was frequently visible because of the way smokers position their packs. These results highlight the residual problem posed by this form of marketing. The results also provide baseline data for the future evaluation of plain packaging if a proposed law is implemented in New Zealand. Other results warrant further research, particularly the reasons for lower pack visibility and smoking when children were present.

**Competing interests:** Nil.

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Department of Public Health, University of Otago, Wellington: Gordon Purdie (Biostatistician); Frederieke S van der Deen (PhD Candidate); George Thomson (Associate Professor); Amber Pearson (Research Fellow); Nick Wilson (Associate Professor).

**Acknowledgements:** We thank the anonymous reviewer who identified scope for methodological improvements in this work.

**Funding:** This work had no funding support as it was done as part of medical student training in public health research.

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## SUMMARIES

## This Issue in the Journal

### **The prevalence of low vitamin B12 status in people with type 2 diabetes receiving metformin therapy in New Zealand—a clinical audit**

*Sylvan Haeusler, Amber Parry-Strong, Jeremy D Krebs*

The prevalence of low vitamin B12 in people with type 2 diabetes taking metformin is 18.7%. The likelihood of a low B12 increased with age and higher dose of metformin. It is recommended that people over 50 taking metformin should be screened for B12 levels.

### **Intensification of blood pressure treatment in Pasifika people with type 2 diabetes and renal disease: a cohort study in primary care**

*Jasmine Tan, Fifita McCreedy, John Collins, Tim Cundy, Oketi Tepueluelu, Fiona Noovao*

This paper investigated the efficacy of blood pressure lowering conducted in primary care practice in Pasifika patients with type 2 diabetes and chronic kidney disease over 2 years. The integrated model of care involving a diabetologist, primary care physicians and nurses in an ethnic-concordant primary care setting was successful in improving patients' medication adherence and blood pressure. This translated to improved cardiac outcomes and slower decline in kidney function especially in those who have a reduction in the urinary protein excretion (which is a surrogate for kidney injury).

### **Observational study of the visibility of branded tobacco packaging and smoking at outdoor bars/cafés in Wellington, New Zealand**

*Natasha Martin, Hugh McHugh, Jono Murtagh, Connor Oliver-Rose, Div Panesar, Harriet Pengelly, Scott Rieper, Henry Schofield, Vidit Singh, Amanda Speed, Rhona Strachan, Te Kahui Tapsell, Sara Trafford, Stefan van Ryn, Ethan Ward, Rosie Whiting, Merryn Wilson-van Duin, Zhou Wu, Gordon Purdie, Frederieke S van der Deen, George Thomson, Amber L Pearson, Nick Wilson*

This study aimed to collect data on tobacco brand visibility on packaging on outdoor tables at bars/cafés prior to New Zealand's proposed plain packaging law. Observational data were systematically collected at 55 bars/cafés with outdoor tables (in Central Wellington City). A total of 19,189 patrons, 1707 tobacco packs and 1357 active smokers were observed. One tobacco pack was visible per 11.0 patrons and the active smoking prevalence was 7.1%, similar to Australian results (8.3%). Eighty percent of packs were positioned face-up (showing the brand), 8% face-down (showing the large pictorial warning), and 12% in other positions. Pack visibility per patron was significantly greater in areas without child patrons (RR=3.1,  $p<0.0001$ ). In summary, tobacco branding on tobacco packaging was frequently visible because of the way smokers position their packs. These results highlight the residual problem posed by this form of marketing. The results also provide baseline data for the future evaluation of plain packaging if a proposed law is implemented in New Zealand.

### **Variation in gout care in Aotearoa New Zealand: a national analysis of quality markers**

*Gary Jackson, Nicola Dalbeth, Leanne Te Karu, Doone Winnard, Peter Gow, Catherine Gerard, Nikolai Minko*

We used health data to determine that for New Zealanders aged 20–79 years with gout, 57% were dispensed allopurinol in 2010/11. Of these, 69% were receiving allopurinol regularly, and only 34% of people dispensed allopurinol had serum urate testing in a 6-month period. The annual

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