



## Few smokers in South Auckland access subsidised nicotine replacement therapy

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### Abstract

**Aims** Nicotine replacement therapy (NRT) is a life-saving, cost-effective smoking cessation treatment that doubles the chances of long-term abstinence regardless of the amount of additional support provided. We investigate the proportion of working age people (age 15–64 years) in Counties Manukau District Health Board (CMDHB) who obtained at least one packet of subsidised NRT during 2007, and whether this varied by demographic characteristics.

**Method** We linked health data in residents of CMDHB aged 15 to 64, using a cross sectional method, to estimate the odds of Māori and Pacific ethnic groups with high smoking prevalence accessing subsidised NRT during 2007 using logistic regression. Demographic variables such as age, gender, other ethnic groups, and socioeconomic deprivation (NZdep) were also included.

**Results** Subsidised NRT was infrequently (proportion of 'ever users' 0.5%/year, or about 2.1% of smokers) claimed for in CMDHB in 2007. When adjusted for demographic variables, Pacific peoples were 60% less likely to claim NRT than European (odds ratio 0.34; 95%CI 0.29–0.41), despite a higher prevalence of smoking in the former group. An over four-fold increased use of NRT was observed in those aged 55 to 64 years compared to 15 to 25 year olds.

**Conclusion** Dispensing of NRT is low overall in CMDHB. Lowest rates of treatment were observed in younger age groups, men and Pacific and Māori people. Programmes to increase uptake of such treatment in these groups are urgently needed.

Tobacco smoking in New Zealand accounts for about 23% of all cancer deaths and 16% of deaths from all causes.<sup>1</sup> When risk factors are ranked, smoking is responsible for more premature death and disability than competing risks such as physical inactivity, high blood pressure, low fruit and vegetable intake, and high cholesterol.<sup>2</sup>

Stopping smoking is the most important thing a person can do to improve their health. Those that quit before the age of 35 years have a normal life expectancy.<sup>3</sup> Also, quitting at any age (up until one's 70s) increases life expectancy by reducing risk of developing diseases such as lung cancer, cardiovascular disease, and chronic obstructive pulmonary disease. Smoking also has economic consequences for both individuals and companies. A packet of 20 cigarettes per day costs an individual \$3600/annum. For employers, smokers are sick more often and those who quit experience fewer days of illness and are absent from work less.<sup>4</sup>

In New Zealand the majority (~80%) of people who smoke wish to quit and this desire is relatively constant across socioeconomic, ethnic, and age distributions.<sup>5</sup> Each year about 45% of people who smoke will try to quit.<sup>5</sup> Three-quarters of these will

make a pharmacologically unaided quit attempt—an approach associated with the lowest long-term quit rates (2–3%). Use of smoking cessation treatments will roughly double these rates.

From surveys of smokers, older age groups were more likely to use medication to help them quit. Nearly 45% of smokers aged 50–59 years used quit products during their last attempt, compared to 12% aged 15–19. The most commonly used medicines were the nicotine patch (used by 68% of smokers in the last quit attempt) and nicotine gum (used by 35%). Less commonly used products were bupropion, nicotine inhalers and the lozenge, used by less than 10% of smokers during their last attempt.<sup>5</sup> Of smokers that access services, the majority obtained help to quit from Quitline, family or friends or their general practitioner.<sup>5</sup>

In New Zealand, government subsidised nicotine gum, patch, or lozenge are available through the Quit Group's 'Quit Card' scheme. These cards can be supplied by all health professionals with prescribing rights and others who have completed training. The cards are redeemed at a community pharmacy for NZ\$5 and a month's supply of nicotine patch, lozenge or gum will be dispensed. NRT may be accessed in other ways that are not subsidised such as from supermarkets and pharmacies. Other (unsubsidised) forms of NRT are available such as the microtab and inhaler.

In Counties Manukau District Health Board (CMDHB), smoking cessation services are available to inpatients and outpatients, with healthcare professionals increasingly trained in the delivery of brief advice to quit and the provision of NRT. The Quit Group reported 103 Quit card providers in CMDHB in 2008, with 17 residing in the District Health Board (DHB).<sup>6</sup> Initiatives are being undertaken by the DHB to promote smoking cessation in primary care, by training GPs and practice staff. Of note, all GPs were not able to provide subsidised NRT using the Quit Card system until after the study period (2008).

With the reported low use of the national toll-free Quitline by Pacific people in New Zealand,<sup>7</sup> our hypothesis was that Pacific people, who make up 20% of the CMDHB population, may have relatively low access to pharmacological quit support.

## Methods

We identified individuals usually resident in Counties Manukau who had evidence of health service use in 2007, indicated by hospital admission, claim for a pharmaceutical, laboratory test, or who appeared in mental health or outpatient datasets for that year who made up the denominator or 'health contact' population (similar to census estimates for 15 to 64 year age categories). We were able to link demographic variables (age, gender, ethnicity, socioeconomic status (NZdep06)) with medication use, using the national health identifier (NHI). We then identified individuals who had at least one claim for NRT in 2007. Use of subsidised NRT was then compared to the national prevalence of smoking (2006).

We eliminated all individuals that had died between 1 January 2007 and 31 December 2007, using national mortality data. Date of birth was used to select all individuals aged between 15 and 64 years on 1 June 2007. Ethnic groups were prioritised in the following order: Māori, Pacific, Indian, Chinese, Other Asian, European, and Other. The usually combined 'Asian' category was further split into Indian and Chinese because of the wide disparity in health status between these groups.

We linked access to at least one claim for NRT in 2007 (dependent variable) to demographic characteristics (independent variables) using univariate odds ratios and logistic regression for multivariate estimates. All demographic variables were force fit into multivariate logistic models. The glm function of the R package<sup>8</sup> and Microsoft Excel software were used for all analyses. We also used

linked health use data from 2007, to indicate individuals who had important diseases (diabetes or severe mental illness), or a hospital admission event to see if these groups had different rates of treatment. An indicator of diabetes was used based on linked health data,<sup>9</sup> and antipsychotic use (an indicator of severe mental illness) to determine the excess odds of prescription if health services had been accessed. Interaction terms were not included in the model. We tested model fit by investigating the proportion of discordance between observed and model predicted outcomes.

NRT purchased either over the counter in a pharmacy, or from a supermarket or other source was not included in this analysis because it is not recorded. Other medications may be used to support a quit attempt but were not included here. Both bupropion and varenicline are not subsidised, so do not appear in the pharmaceutical claims database, and nortriptyline is commonly used for other indications such as depression. Reports indicate that NRT is the most commonly used pharmacological quit aid in NZ, and that <20% of smokers use other smoking cessation products concomitantly.<sup>5</sup>

Ethical approval was not sought as all data was de-identified using encrypted national health identifier and only aggregate measures are reported.

## Results

In 2007, we counted 314,103 (cf. 305,710 from 2006 census projected to 2007) residents of CMDHB aged 15–64 as having health contact and were alive throughout that year (Table 1). CMDHB has a high proportion of people who identify with one or more of the Pacific ethnic groups represented in New Zealand (CMDHB 20% cf. NZ 6%) whereas Māori account for nearly the same proportion (13%) as expected from their national average in these age categories. NRT was claimed for by 1,475 (0.5%) individuals during 2007, or about 2.1% of the estimated 70,000 smokers in CMDHB.<sup>10</sup>

Demographic variables predicted variation in dispensing of subsidised NRT (Table 2). Women were more likely than men to record a claim for NRT (adjusted OR 1.25; 95%CI 1.13–1.38). Older age categories claimed more NRT than younger ones.

Whereas Māori had increased claims for NRT, which reflects their increased prevalence of smoking (Table 3), Pacific peoples were dispensed subsidised NRT at a rate less than half that of Europeans (despite a prevalence of smoking 75% higher than European). Increased uptake of subsidised NRT was associated with lower socioeconomic status, consistent with known smoking prevalence gradients.

The majority of those with a claim for NRT only had one during that year (74%; 1092/1468). Older age groups were more likely than younger age groups to access two or more NRT products (Figure 1).

Indicators of psychosis (any prescription for an antipsychotic) was associated with five times the odds of claiming an NRT prescription than those not in this category. Also, people who received hospital treatment in 2007 and those with indicators of a diagnosis of diabetes were two to three times more likely to receive NRT after adjustment for other demographic factors (Table 2).

**Table 1. CMDHB 'health contact' population (2007), 15 to 64 years by gender**

| <i>Category</i>        | <i>Gender</i> |          |               |          | <i>Total*</i> |          |
|------------------------|---------------|----------|---------------|----------|---------------|----------|
|                        | <b>Male</b>   | <b>%</b> | <b>Female</b> | <b>%</b> | <b>Number</b> | <b>%</b> |
| <b>Age category</b>    |               |          |               |          |               |          |
| 15 to 24               | 33,693        | 10.7     | 34,269        | 10.9     | 67,975        | 21.6     |
| 25 to 34               | 28,956        | 9.2      | 34,758        | 11.1     | 63,731        | 20.3     |
| 35 to 44               | 33,140        | 10.6     | 38,536        | 12.3     | 71,686        | 22.8     |
| 45 to 54               | 30,146        | 9.6      | 32,047        | 10.2     | 62,205        | 19.8     |
| 55 to 64               | 22,023        | 7.0      | 23,136        | 7.4      | 45,173        | 14.4     |
| <b>Ethnic group</b>    |               |          |               |          |               |          |
| European               | 51,613        | 16.4     | 60,672        | 19.3     | 112,286       | 35.7     |
| Māori                  | 18,252        | 5.8      | 23,496        | 7.5      | 41,751        | 13.3     |
| Pacific                | 29,595        | 9.4      | 34,664        | 11       | 64,264        | 20.5     |
| Chinese                | 5,143         | 1.6      | 8,346         | 2.7      | 13,492        | 4.3      |
| Indian                 | 8,859         | 2.8      | 10,031        | 3.2      | 18,896        | 6.0      |
| Other Asian            | 4,886         | 1.6      | 6,674         | 2.1      | 11,562        | 3.7      |
| Other†                 | 31,210        | 9.9      | 20,596        | 6.6      | 51,852        | 16.5     |
| <b>NZdep</b>           |               |          |               |          |               |          |
| Not specified          | 39            | 0        | 16            | 0        | 55            | 0.0      |
| 1 - 2 (least deprived) | 12,355        | 3.9      | 13,983        | 4.5      | 26,343        | 8.4      |
| 3 - 4                  | 25,806        | 8.2      | 28,699        | 9.1      | 54,510        | 17.4     |
| 5 - 6                  | 19,505        | 6.2      | 21,240        | 6.8      | 40,756        | 13.0     |
| 7 - 8                  | 10,696        | 3.4      | 12,010        | 3.8      | 22,713        | 7.2      |
| 9 - 10 (most deprived) | 81,157        | 25.8     | 88,531        | 28.2     | 169,726       | 54.0     |
| <b>Total*</b>          | 149,558       | 47.6     | 164,479       | 52.4     | 314,103       | 100      |

\*The total column includes 66 individuals with unspecified gender

†This group includes mainly people of Middle Eastern, Latin American, and African ethnicity

**Table 2. Crude and adjusted odds ratios for dispensed NRT in 2007\***

| <i>Category</i>     | <i>Dispensed NRT?</i> |           | <i>% dispensed</i> | <i>Crude OR (95% CI)</i> | <i>Multivariate OR* (95% CI)</i> |
|---------------------|-----------------------|-----------|--------------------|--------------------------|----------------------------------|
|                     | <i>Yes</i>            | <i>No</i> |                    |                          |                                  |
| <b>Gender</b>       |                       |           |                    |                          |                                  |
| Male                | 622                   | 148936    | 0.418              | 1 (referent)             | 1 (referent)                     |
| Female              | 853                   | 163626    | 0.521              | 1.25 (1.13–1.38)         | 1.20 (1.08–1.34)                 |
| <b>Age category</b> |                       |           |                    |                          |                                  |
| 15 to 24            | 97                    | 67878     | 0.143              | 1 (referent)             | 1 (referent)                     |
| 25 to 34            | 240                   | 63491     | 0.378              | 2.65 (2.09–3.35)         | 2.81 (2.22–3.57)                 |
| 35 to 44            | 50                    | 71280     | 0.070              | 3.99 (3.19–4.98)         | 4.22 (3.38–5.27)                 |
| 45 to 54            | 372                   | 61833     | 0.602              | 4.21 (3.37–5.27)         | 4.65 (3.71–5.82)                 |
| 55 to 64            | 328                   | 44845     | 0.731              | 5.12 (4.08–6.42)         | 5.58 (4.44–7.02)                 |
| <b>Ethnic group</b> |                       |           |                    |                          |                                  |
| European            | 714                   | 111572    | 0.640              | 1 (referent)             | 1 (referent)                     |
| Māori               | 411                   | 41340     | 0.994              | 1.56 (1.37–1.76)         | 1.45 (1.27–1.66)                 |
| Pacific             | 166                   | 64098     | 0.259              | 0.40 (0.34–0.48)         | 0.34 (0.29–0.41)                 |
| Chinese             | 5                     | 13487     | 0.037              | 0.06 (0.02–0.14)         | 0.07 (0.03–0.17)                 |
| Indian              | 23                    | 18873     | 0.122              | 0.19 (0.13–0.29)         | 0.17 (0.11–0.26)                 |
| Other Asian         | 17                    | 11545     | 0.147              | 0.23 (0.14–0.37)         | 0.25 (0.16–0.41)                 |
| Other               | 139                   | 51713     | 0.269              | 0.42 (0.35–0.50)         | 0.41 (0.34–0.49)                 |

**Table 2. Continued**

| <i>Category</i>           | <i>Dispensed NRT?</i> |           | <i>% dispensed</i> | <i>Crude OR (95% CI)</i> | <i>Multivariate OR* (95% CI)</i> |
|---------------------------|-----------------------|-----------|--------------------|--------------------------|----------------------------------|
|                           | <i>Yes</i>            | <i>No</i> |                    |                          |                                  |
| <b>NZdep</b>              |                       |           |                    |                          |                                  |
| 1 and 2 (least deprived)  | 48                    | 26295     | 0.183              | 1 (referent)             | 1 (referent)                     |
| 3 and 4                   | 178                   | 54332     | 0.328              | 1.79 (1.30–2.47)         | 1.77 (1.28–2.45)                 |
| 5 and 6                   | 148                   | 40608     | 0.364              | 2.00 (1.44–2.77)         | 2.00 (1.44–2.78)                 |
| 7 and 8                   | 175                   | 22538     | 0.776              | 4.25 (3.07–5.86)         | 3.71 (2.68–5.13)                 |
| 9 and 10 (most deprived)  | 925                   | 168801    | 0.548              | 3.00 (2.25–4.01)         | 3.36 (2.49–4.54)                 |
| <b>Diagnostic groups†</b> |                       |           |                    |                          |                                  |
| Antipsychotic use††       | 78                    | 3202      | 2.378              | 5.41 (4.30–6.81)         | 5.52 (4.39–6.96)                 |
| Diabetes                  | 188                   | 15875     | 1.170              | 2.74 (2.35–3.20)         | 2.06 (1.74–2.44)                 |
| Annual hospitalisation    | 453                   | 35933     | 1.245              | 3.43 (3.07–3.83)         | 2.87 (2.55–3.22)                 |

OR—Odds Ratio; CI—Confidence Interval.

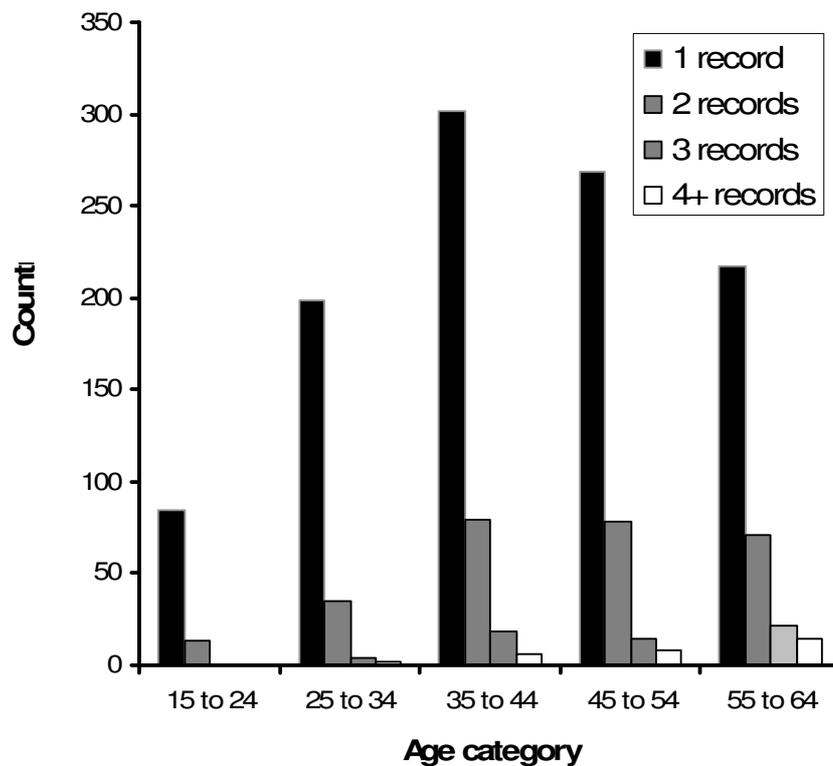
\* Missing gender and NZdep variables removed from analysis (n=121).

Adjusted for all other variables included in table except ‘diagnostic groups’ category.

† Referent—people not in each category.

†† Any prescription for which a claim was made in 2007.

**Figure 1. Number of NRT prescription records, by age category.**



**Table 3. Crude prevalence of regular smoking among adults (aged  $\geq 15$  years) in CMDHB, by ethnicity in 2006<sup>10</sup>**

| <i>Ethnic group</i> | <i>Males (%)</i> | <i>Females (%)</i> | <i>Total (%)</i> | <i>NZ Total (%)</i> |
|---------------------|------------------|--------------------|------------------|---------------------|
| Māori               | 42.5             | 50.3               | 46.8             | 42.2                |
| Pacific             | 34.3             | 26.7               | 30.3             | 30.3                |
| NZ European         | 20.8             | 19.3               | 20               | 19.4                |
| Asian               | 16.3             | 3.4                | 9.6              | 11.1                |
| MELAA               | 22               | 8.9                | 15.5             | 15.1                |
| Other ethnicity     | 16.6             | 15.4               | 16               | 16.6                |
| <b>Total</b>        | <b>24</b>        | <b>20.4</b>        | <b>22.1</b>      | <b>20.7</b>         |

MELAA – Middle Eastern, Latin American and African ethnicity.

We do not have individual level data indicating smoking status. To compare ethnic-specific NRT dispensing rates, we divided the multivariate odds ratio for subsidised

NRT by smoking prevalence for those ethnic groups which were comparable (in MOH smoking prevalence data). This index of NRT dispensing for Europeans was 1/0.194, or 5.14, for Māori 1.45/0.422 or 3.44, and for Pacific people 0.34/0.303 or 1.22. Thus, adjusted for ethnic specific smoking prevalence, Māori rates of NRT dispensing are 30% lower, whilst Pacific dispensing rates are 76% lower than European rates. Equivalent estimates for NZDep06 quintiles show similar claim levels apart from 7<sup>th</sup> and 8<sup>th</sup> combined deciles (Table 2) which had higher rates of dispensing.

Indices of global model fit (see methods) showed good agreement (<1% discordance) between observed and predicted values.

## Discussion

Our principle finding was that only about 2% of CMDHB smokers are dispensed subsidised NRT in 2007. A number of other patterns emerged. First, older age groups (35 to 64 years) and women are more likely to be dispensed NRT. Second, of ethnic groups with a high prevalence of smokers, Pacific people have the lowest rates of NRT claims. Māori also have lower rates of NRT dispensing than European (after adjustment for smoking status), however, the disparity is less than the difference between Pacific and European.

Reassuringly, we found individuals in the most deprived areas had a similar likelihood of claiming such treatment based on their reported prevalence of smoking as people from less deprived areas. For those that encounter the health care system, we see evidence of increased provision of NRT with those using antipsychotics, with a diagnosis of diabetes, or hospitalisation having evidence of increased rates of such treatment. This pattern suggests that people who are likely to get the most benefit from quitting are being targeted—or at least those who are in more frequent contact with the health services—however, the global picture suggests vast room for improvement.

The majority of smokers that make a quit attempt in CMDHB access NRT only once per year, obtaining at most, one month's supply. Older age groups have a higher likelihood of getting a second prescription dispensed. This evidence suggests that the majority of smokers attempting to quit are not using NRT long enough to get maximum benefit, as indicated by national guidelines ( $\geq 8$  weeks).<sup>11</sup> This may reflect either a failure of the quit attempt, early abandonment of NRT during a successful quit attempt, or failure of health care providers to supply NRT for long enough.

To our knowledge this is the first use of health administrative databases to assess use of NRT or pharmaceutically supported quit attempts at a population level. This technique has been used for other purposes such as to monitor the prevalence of diabetes in our own jurisdiction as well as overseas in Denmark<sup>13</sup> and Ontario, Canada.<sup>14</sup>

Putting aside the issues of differential rates of treatment, subsidised NRT was used by only 0.5% of the population, so that only ~2.3% of the estimated smokers in CMDHB annually accessed NRT. The number of calls registered by the Quit Group from CMDHB over this period was instead 8.2% of the smoking population.<sup>15</sup> This suggests many clients are not using NRT or their use is not recorded. The price of

NRT has been reduced substantially by government subsidy, so that cost is unlikely to pose a major barrier.

As in many other developed countries many smokers who choose to use NRT access this over-the-counter.<sup>16</sup> However, in our own informal survey of five community pharmacies in CMDHB, pharmacists reported low rates of over the counter sales (about 10%). Reasons for the low rate of claims for subsidised NRT may be due to a lack of awareness of the utility of such treatment and how to access it. Other barriers may include attitudes and beliefs by smokers in CMDHB that stopping smoking is best done ‘cold-turkey’, or that NRT is ineffective or dangerous.

Our study is limited in a number of ways. First, this study is cross-sectional, at one point in time. We are uncertain if any group’s claims of subsidised NRT have increased over time. Second, our study is limited to one region of New Zealand, and thus such patterns cannot necessarily be generalised to other areas, although we have no reason to believe that rates of NRT use would be different elsewhere. Third, we have used a simplified metric for access to NRT – using pharmaceutical claims – and have no way of assessing whether usage of the medication has followed dispensing. Also, to be linked with individuals, dispensing must be linked to NHI. If Quit cards are redeemed at pharmacies that do not have the person’s NHI on record, such dispensing episodes will not be counted. Finally we were not directly able to link the claims with smoking status.

The different rates of NRT use by ethnic groups may be due to divergent knowledge of NRT effectiveness and how to access it, or variation in use of cessation services. The nation’s largest provider of subsidised NRT, the Quit Group which manages the national Quitline service has previously reported low use of their service by Pacific people (<5% of callers in 2005) which triangulates with our study.<sup>7</sup> In contrast, Māori uptake of the Quitline service was reportedly high, again concurring with our results. Whereas Māori have ethnic specific cessation services (e.g. Aukati Kai Paipa, available in CMDHB through the charitable trust Raukura Hauora o Tainui ki Tamaki), Pacific people are not similarly served.

“Pacific” people in New Zealand come from a range of cultural, linguistic and national backgrounds and include recent immigrants from (mostly Polynesian) Pacific nations as well as those settled in New Zealand for generations. Pacific people in New Zealand are concentrated in Counties Manukau, with more than one in three (38%) of all NZ-based Pacific people residing there. Pacific people in New Zealand have underutilised health care services (compared to need and other groups’ utilisation rates) in other areas such as mental health.<sup>17</sup>

What needs to be done to improve access to NRT in this group is unclear, but more research is required to delineate structural impediments to support for a quit attempt as well as any cultural beliefs about the utility of such treatment. Simple barriers such as language may explain some of this reduced rate of treatment. For example, literacy surveys show that 75% of Pacific adults in New Zealand have English literacy levels insufficient to function in today’s economic market (cf. 42% for European and 70% for Māori).<sup>18</sup>

Younger age groups were also low users of NRT. Smoking cessation interventions in young populations have proved disappointing, with few interventions supported by

high quality evidence.<sup>11</sup> Nevertheless, younger smokers stand to benefit most from quitting and NRT is likely to improve their odds of quitting over cold turkey methods. Healthcare professionals who interact with young people need to ask about smoking status, advise those who smoke to stop, and most importantly offer treatment. NRT can be used in smokers under the age of 18. Additionally, opportunities outside the healthcare setting need to be explored to assist young people who smoke to stop.

In light of our findings, urgent strategies are required to address the ethnic treatment disparities to NRT use. Solutions will need to involve both health care and non health care settings. For example, smoking cessation interventions delivered in the workplace have been shown to be effective to help workers quit.<sup>19</sup> A large proportion of Pacific and Māori are currently employed in manufacturing industries and workplaces may be a strategic entry point to such groups.<sup>20</sup> Benefits beyond the individual may be expected - previous evidence suggests that in social networks of smokers, if one quits, others in the household or network are more likely to do so.<sup>21</sup>

Currently, CMDHB engages Pacific churches and Marae in health promotion campaigns to address issues of obesity and diabetes prevention. Equally, however, such programmes may incorporate smoking cessation streams – considering the clear effectiveness of such programmes and the demonstrated need. Methods also are available to train lay people to deliver smoking cessation interventions, enabling them to lead groups and prescribe subsidised nicotine replacement therapy. Such a ‘peer education’ approach may be one method of reaching people that remain difficult to access from population based strategies. As well as highlighting new services that may be offered, existing services may be tailored to better meet the needs of Pacific, Māori and low income groups.

Incentives to provide smoking cessation through primary care with high proportions of Pacific or Māori enrolees are an example of one such strategy. To achieve the greatest reduction in smoking prevalence these programmes need to run in conjunction with other important population level strategies that aim to reduce initiation and prompt smoking cessation.

## Conclusion

Our study shows low rates of use of NRT—a potentially life saving intervention for smokers—in Counties Manukau in 2007. We also identified a disparity in treatment for smoking cessation in an area of New Zealand with arguably the highest concentration of health need. To see a reduction in health inequality for Pacific and Māori populations, we argue that action to increase the uptake of NRT in this group be prioritised. The use of combinations of NRT, along with prolonged use ( $\geq 8$  weeks) are also likely to increase quit rates and reduce illness and need for hospital treatment associated with tobacco use.

**Competing interests:** Dr Hayden McRobbie has undertaken research and consultancy for manufacturers of smoking cessation medications, and also received honoraria for speaking at their meetings.

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