

# Using Pharmaceutical Benefit Scheme data to understand the use of smoking cessation medicines by Aboriginal and Torres Strait Islander smokers

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**T**obacco smoking is a major health concern for Aboriginal and Torres Strait Islander people. Smoking prevalence among Aboriginal and Torres Strait Islander people aged 15 years and over is 2.8 times the prevalence among other Australians. Smoking-related illnesses are more prevalent in Aboriginal and Torres Strait Islander peoples, who are 1.5 times more likely to die from cardiovascular disease and 2.5 times more likely to develop chronic obstructive pulmonary disease compared to other Australians, and lung cancer continues to be the most prevalent cancer in Aboriginal and Torres Strait Islander peoples.<sup>1-3</sup> Tobacco use is estimated to account for 23% of the health gap between Aboriginal and Torres Strait Islander and non-Indigenous Australians.<sup>4</sup> The reasons for this higher smoking prevalence are multifactorial and include intergenerational trauma, socioeconomic disadvantage and some social and cultural factors.<sup>5-7</sup>

Nicotine Replacement Therapy (NRT), varenicline and bupropion have been shown to increase the success of quit attempts and as such, guidelines for health professionals in Australia recommend offering them to all patients who are interested in quitting smoking.<sup>8,9</sup> Increasing access to smoking cessation medicines to support quit attempts is a priority area of Australia's National Tobacco Strategy and programs funded under the Indigenous Chronic Disease Package.<sup>10,11</sup> A recent national study of a large sample of Aboriginal and Torres Strait Islander smokers found there was lower use of smoking cessation medications compared

## Abstract

**Objective:** To examine the supply of smoking cessation medicines to Aboriginal and Torres Strait Islander smokers compared to non-Indigenous smokers across Australia.

**Methods:** We analysed the total number of smoking cessation prescriptions dispensed over three years through the Pharmaceutical Benefits Scheme (PBS) compared to those supplied nationally through the Closing the Gap (CTG) measure and also in the Northern Territory through the Remote Area Aboriginal Health Service (RAAHS) program.

**Results:** Aboriginal and Torres Strait Islander smokers were supplied with fewer smoking cessation medicines per smoker under the CTG measure compared to non-Indigenous smokers under general PBS benefits. Supply of medicines through the RAAHS program complicated the use of CTG data where higher proportions of Aboriginal and Torres Strait Islander people live in remote areas and use of the CTG measure is lower.

**Conclusions:** Fewer smoking cessation medicines are being prescribed and then dispensed to Aboriginal and Torres Strait Islander smokers than to non-Indigenous smokers.

**Implications for public health:** CTG and RAAHS data may be useful to monitor and evaluate the effectiveness of interventions to improve the use of smoking cessation medicines by Aboriginal and Torres Strait Islander smokers. However, there are limitations and current obstacles to accessing RAAHS data would need to be removed.

**Key words:** Pharmaceutical Benefits, tobacco cessation, Aboriginal and Torres Strait Islander health, smoking cessation medicines, medicine supply

to other Australian daily smokers.<sup>12</sup> While the sample used in this study was large and nationally representative, the authors noted the sample was drawn from Aboriginal Community Controlled Health Services (and may not reflect patients of other health services) and relied on self-reported recall of use, which limited the ability to generalise the findings to the wider Aboriginal and Torres Strait Islander population.<sup>12</sup>

Quantifying the use of medicines for Aboriginal and Torres Strait Islander peoples is difficult, especially for smoking cessation medicines. Of the few published reports that included cessation medicine usage by

Aboriginal and Torres Strait Islander people, most matched individual patient records to prescribing and dispensing data held by the Australian Government or relied on self-reported usage. Both of these methods are time-consuming and have limitations to application on a larger scale.<sup>13</sup> Pharmaceutical Benefits Scheme (PBS) data collected through the Department of Human Services has been used frequently to understand broad trends in the rates of prescribing and dispensing of medicines. This is possible as every PBS listed medicine has a unique PBS item number depending on the quantity of the medicine to be provided and, in some cases, the

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conditions it is subsidised to treat. This has allowed PBS data to identify specific trends in the dispensing and supply of antimicrobials, opioids and cardiovascular medicines and could be used for smoking cessation medicines.<sup>14-16</sup>

### Pharmaceutical Benefits Scheme

The PBS is a cornerstone of the Australian healthcare system where the Australian government subsidises most prescription medicines supplied through approved pharmacies by reducing the cost of the medicine to a specified patient co-payment. As some medicines can be cost-prohibitive, both to the consumer and to the commercial businesses who provide them, the PBS helps facilitate timely, reliable and affordable access to necessary medicines for all Australians. In 2019, the co-payment was capped at AU\$40.30 for general benefits and AU\$6.50 for Australians who receive concessional benefits such as pensioners and those eligible for healthcare cards. The PBS also has a 'Safety Net' limit where if a patient or family pays above an annual threshold of co-payments, they are eligible to receive the next level of benefit including receiving their medicines for no cost. Patients have an expectation of receiving the appropriate benefits, and in most cases, applying these benefits increases the profitability of these medicines for the pharmacy. Therefore, there is a strong motivation to provide these benefits where they apply. Similarly, as the patient's eligibility for concession pricing is fed back to pharmacists in real-time, and applying an incorrect benefit would cost the pharmacy revenue, applying benefits where they are not recognised by the Australian Government is not common.

### Aboriginal and Torres Strait Islander specific PBS benefits

Another potential advantage of PBS data is that there are two specific programs aimed to improve access to medicines for Aboriginal and Torres Strait Islander people; these can serve as an indicator for medicine use in this population.

#### Remote Area Aboriginal Health Service program

The Remote Area Aboriginal Health Service program (RAAHS) was established in 1997 to tackle the logistical and financial barriers to the use of medicines by people living in remote communities across Australia. Under

this system, a contracted pharmacy – usually in a larger urban area – provides medicines to the remote Aboriginal Medical Service (AMS) and the cost of the medicine and patient co-payment is passed onto the Australian Government, removing the cost to the AMS.

This allows the AMS to have access to the range of medicines of a large pharmacy without financial risk and with no need to pass costs on to patients. As the RAAHS program operates outside of standard Medicare processes, a patient's Medicare details or concession information is not required to apply the benefit.<sup>17</sup> In 2016–17, the RAAHS program provided approximately 1.4 million PBS items worth AU\$38 million, with the Northern Territory accounting for 51% of the total national supply and related expenditure.<sup>18</sup>

#### Closing The Gap PBS co-payment measure

The Closing the Gap (CTG) measure commenced in 2010 to address the issue that the cost of medicines was leading to poorer disease management for Aboriginal and Torres Strait Islander Australians living with chronic disease. Under the CTG measure, an eligible health practice registers a patient as being Aboriginal and/or Torres Strait Islander and indicates that reduced access to medicines would affect a chronic condition or increase risk of a chronic condition developing for that patient.<sup>19</sup> The prescription is then annotated with a CTG code to indicate to the dispensing pharmacy that the benefit should apply. As with the PBS Safety Net benefit, this lowers the patient co-payment to the next applicable benefit level, often leading to the provision of medicines at no cost. As the cost to the patient is decreased without increasing the cost to the pharmacy, there is a strong motivator to use this mechanism where it applies. The CTG measure has grown from 1.8 million items in 2011–12 to more than five million items in 2016–17 and has been credited with significantly improving access to medicines.<sup>11,19</sup> As this benefit is applied through PBS mechanisms, patients need to be registered with the Department of Human Services and provide current Medicare/concession details to the pharmacy to receive the benefit. Under both the RAAHS program and CTG mechanisms, non-PBS medicines do not attract any benefit and a practice that supplies medicines under the RAAHS program is not eligible to prescribe CTG benefits for patients.

Data on the provision of medicines under these programs is mostly limited to broad Australian Institute of Health and Welfare and Australian Government figures and is often restricted to the total expenditure of the programs or the gross number of medicines provided, rather than providing information regarding specific medicines.<sup>18-20</sup>

A 2014 report on the Indigenous Chronic Disease Package is currently the only report to include the number of medicines for nicotine dependence supplied under the CTG measure and the RAAHS program benefits and to compare these to national PBS figures.<sup>11</sup> This report showed that the prevalence of Aboriginal and Torres Strait Islander smokers who received smoking cessation medicines in 2010 was 40% lower than that of other Australians, but that this gap narrowed to 23% by 2012.<sup>11</sup> The report did not provide data on the differences between jurisdictions or between the types of medicines supplied.

We collected data on medicines used to assist in smoking cessation that were supplied under the CTG and RAAHS programs to establish the usefulness of this routine data in understanding national trends of supply of these medicines and the barriers that exist in using this data.

## Methods

We submitted requests to the Department of Human Services for data on the monthly dispensing of all PBS medicines listed for smoking cessation since 2010 (17 PBS item numbers) that were supplied under the CTG or RAAHS programs.

This included NRT Patches (13 item numbers) and the oral stop smoking medicines varenicline and bupropion (4 item numbers). Only 11 of the 17 PBS items were provided under CTG. Data was suppressed for cells where fewer than five prescriptions for an individual medicine were dispensed in that month. Suppressed cells indicated dispensing of at least one medicine occurred, but the exact number was not known and could represent any value up to five instances of dispensing, therefore this decreased usefulness of the data as instances of suppressed data was high when provided by PBS item and month, especially for smaller jurisdictions such as the Northern Territory.

To reduce cell suppression, the request was repeated for the 11 PBS item numbers known

to be supplied under CTG, grouped by their therapeutic form (NRT patches, varenicline, bupropion) rather than for each item number, and for year rather than each month. The data was requested for the period of October 2013 until September 2016.

The number of daily smokers for each state and territory was estimated from the National Aboriginal and Torres Strait Islander Social Survey 2014–15 for both Aboriginal and Torres Strait Islander and non-Indigenous smokers.<sup>21</sup> As RAAHS is only applicable for Aboriginal and Torres Strait Islander smokers in remote areas, and CTG measure prescriptions cannot be written by health services using the RAAHS program, we repeated estimates only using the non-remote Aboriginal and Torres Strait Islander population.<sup>21</sup>

The Department could not provide RAAHS data so we requested this data directly from the four pharmacies who supplied medicines through the RAAHS program in the Northern Territory for the year 2016. This year was selected as it was the latest total year before contracted tenders with the Northern Territory Government (the largest operator of eligible health services receiving RAAHS medicines) changed.

We used SPSS V25 to calculate the 95% confidence intervals of the rate ratios between CTG and general PBS prescriptions dispensed.

## Results

From October 2013 to October 2015, there was a total of 1,393,425 smoking cessation medicine prescriptions dispensed under the PBS with 53,484 of these being dispensed specifically under the CTG measure. The majority of prescriptions dispensed under all PBS benefits were for varenicline/bupropion (924,526). Overall, varenicline was the more frequently dispensed smoking cessation medicine under the PBS (63% of smoking cessation prescriptions). NRT patches were the most frequently dispensed smoking cessation medicine under the CTG measure (56%) compared to varenicline (41%) and bupropion (3%).

### CTG supply

There were fewer prescriptions dispensed for smoking cessation medicines per 100 Aboriginal and Torres Strait Islander smokers under the CTG measure compared to non-Indigenous smokers under general

PBS benefits (10.77 vs. 18.06, rate ratio 0.60 [0.59–0.61]), see Table 1. The Australian Capital Territory and New South Wales dispensed the most CTG prescriptions for cessation prescriptions per Aboriginal and Torres Strait Islander smoker while the Northern Territory supplied the fewest. When we use non-remote Aboriginal and Torres Strait Islander smokers as the population denominator (Table 2), the magnitude of the differences between the new rate ratios and the ratios reported in Table 1 are greatest for Queensland, South Australia, Western Australia and the Northern Territory (the jurisdictions with the highest proportions of Aboriginal and Torres Strait Islander people living in remote areas). The differences in average annual dispensing and rate ratio between jurisdictions were smaller when using non-remote Aboriginal and Torres Strait Islander smokers as the population denominator for CTG supply in Table 2 than in Table 1.

In all jurisdictions, NRT patches were more often dispensed than varenicline/bupropion under the CTG measure. In contrast, in all jurisdictions, varenicline/bupropion was dispensed more often than NRT patches dispensed under non-CTG PBS benefits.

**Table 1: Average annual rate of prescriptions for smoking cessation medicines dispensed attracting PBS benefits, October 2014–September 2016.**

|   | NSW                 | VIC                 | QLD                 | SA                  | WA                  | TAS                 | ACT                 | NT                  | National            |
|---|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| <b>CTG benefits (per 100 Aboriginal and Torres Strait Islander smokers)</b>   |                     |                     |                     |                     |                     |                     |                     |                     |                     |
| NRT patches   | 8.96                | 5.99                | 5.86                | 7.98                | 3.23                | 5.86                | 8.69                | 0.97                | 6.01                |
| Varenicline and bupropion   | 6.69                | 4.28                | 5.39                | 5.41                | 2.59                | 4.33                | 7.48                | 0.74                | 4.76                |
| Total   | 15.65               | 10.27               | 11.25               | 13.39               | 5.81                | 10.19               | 16.17               | 1.71                | 10.77               |
| <b>Non-CTG Benefits (per 100 non-Indigenous smokers)</b>  |                     |                     |                     |                     |                     |                     |                     |                     |                     |
| NRT patches   | 6.67                | 5.48                | 5.82                | 6.35                | 4.37                | 9.79                | 4.74                | 2.01                | 5.91                |
| Varenicline and Bupropion   | 11.30               | 10.28               | 14.70               | 12.28               | 13.36               | 12.28               | 10.80               | 13.14               | 12.09               |
| Total   | 18.00               | 15.78               | 19.20               | 19.20               | 17.80               | 22.14               | 15.56               | 15.51               | 18.06               |
| Rate Ratio of Aboriginal and Torres Strait Islander:non-Indigenous prescriptions dispensed for any cessation medicine (95%CI) | 0.87<br>(0.85–0.89) | 0.65<br>(0.62–0.69) | 0.55<br>(0.53–0.56) | 0.70<br>(0.69–0.74) | 0.33<br>(0.31–0.35) | 0.46<br>(0.43–0.50) | 1.04<br>(0.93–1.16) | 0.11<br>(0.09–0.12) | 0.60<br>(0.59–0.61) |

**Table 2: Average annual rate of total prescriptions for smoking cessation medicines dispensed attracting PBS benefits, October 2014–September 2016 (CTG benefits per 100 smokers in non-remote areas).**

|   | NSW                 | VIC                 | QLD                 | SA                  | WA                  | TAS                 | ACT                 | NT                  | National            |
|---|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| <b>CTG Benefits (per 100 Aboriginal and Torres Strait Islander smokers in non-remote areas)</b>   |                     |                     |                     |                     |                     |                     |                     |                     |                     |
| Total smoking cessation medicines   | 16.61               | 10.27               | 15.26               | 17.65               | 10.01               | 10.36               | 16.17               | 9.92                | 14.69               |
| Rate Ratio of Non-remote Aboriginal and Torres Strait Islander: non-Indigenous total prescriptions dispensed for any cessation medicine(95% CI) | 0.92<br>(0.90-0.94) | 0.65<br>(0.61-0.68) | 0.74<br>(0.72-0.76) | 0.92<br>(0.87-0.97) | 0.56<br>(0.53-0.59) | 0.47<br>(0.43-0.51) | 1.04<br>(0.92-1.16) | 0.64<br>(0.58-0.71) | 0.82<br>(0.80-0.82) |

### RAAHS supply in the Northern Territory

Data were provided by two of four pharmacies who were contracted to supply RAAHS medicines in 2016. In total, 413 packs of NRT patches (all brands and strengths) and 141 oral stop smoking medicine packs (varenicline and bupropion, all strengths and quantities) were supplied in 2016 from those pharmacies. This was more than the yearly average supplied under CTG in the Northern Territory (191 packs of NRT patches [all brands and strengths] and 147 oral stop smoking medicine packs).

### Discussion

This study showed that Aboriginal and Torres Strait Islander smokers were dispensed 40% fewer cessation medicines under the CTG measure each year compared to non-Indigenous smokers under general PBS benefits. Some but not all of this is due to the supply of medicines to Aboriginal and Torres Strait Islander smokers in remote areas using RAAHS rather than CTG prescriptions. In non-remote areas where RAAHS cannot be used, 18% fewer prescriptions were dispensed to Aboriginal and Torres Strait Islander smokers using CTG prescriptions each year than the national rate for other smokers.

This lower dispensing of smoking cessation prescriptions to Aboriginal and Torres Strait Islander smokers is consistent with previous self-reported data that fewer Aboriginal and Torres Strait Islander smokers used a smoking cessation medicine in the previous year or had ever used a pharmacotherapy to assist with quit attempts.<sup>12</sup> Previous studies have suggested that potential reasons for lower use of smoking cessation medicines by Aboriginal and Torres Strait Islander smokers include reduced access, fear of side effects, and the comfort and capability of health staff to recommend their use.<sup>22,23</sup>

Our findings using CTG measure data are consistent with previous observations that NRT patches are more frequently provided to Aboriginal and Torres Strait Islander smokers than other medicines such as varenicline.<sup>11,12</sup> Similarly, our finding that varenicline/bupropion was dispensed more often than NRT patches under general PBS benefits is consistent with other reports.<sup>24</sup> This higher prescribing and dispensing of NRT patches compared to oral medicines may be due to patient preference of NRT patches over oral

medications due to a perceived risk of side effects from oral medicines.<sup>12</sup> Alternatively, it may also be due to practice-level factors that favour NRT patch provision; for example, NRT patches can be provided in bulk to remote clinics and initiated by staff other than doctors.<sup>25</sup> This difference warrants further research to identify the causes of this difference and may offer ways to augment service delivery to maximise patient uptake of under-used smoking cessation medicines.

All jurisdictions dispensed more NRT than varenicline/bupropion to Aboriginal and Torres Strait Islander smokers through the CTG mechanism, with the inverse being true for non-Indigenous smokers supplied under general PBS benefits. There was variation between the jurisdictions in the rate of dispensing per smoker with the Northern Territory and Western Australia dispensing any medicines for smoking cessation under CTG at less than half than the average national rate. Nationally, the CTG program accounts for roughly five times as many medicines as RAAHS supply, but for jurisdictions who have a higher proportion of remote-living Aboriginal and Torres Strait Islander peoples, RAAHS makes up a greater proportion of total subsidised medicines<sup>18,19</sup>; for example, the Northern Territory (85%) and Western Australia (42.5%) compared to those with a lower remote living proportion such as South Australia or Queensland (16%) or where RAAHS benefits don't apply (Victoria).<sup>18,20</sup> This difference has been seen in reports specifically looking at cessation medicines and is supported by our observation that more smoking cessation medicines were provided by just two of four supplying pharmacies under the RAAHS program than the CTG measure in the Northern Territory.<sup>11</sup> Similarly, excluding Aboriginal and Torres Strait Islander smokers living in remote areas (where the RAAHS program operates) from the analysis brought the estimates for the Northern Territory, Queensland and Western Australia closer to the national average while having less effect on other jurisdictions.

CTG data was for the most part easily accessed and it is possible to capture medicine-specific information from each state and territory, as well as the date of dispensing and location of the pharmacy it was dispensed through. Cell suppression affects the ability for CTG data to be used to analyse short time periods or for items where supply frequency is low. These limitations would

also apply if analysis was limited to smaller areas. Routine PBS data is not available by age and sex so standardisation to account for the younger age structure of the Aboriginal and Torres Strait Islander population is not possible. Some of the differences between the two populations may be because younger smokers are less likely to use cessation medicines.<sup>25,26</sup>

RAAHS data was not provided by the Department for individual PBS items numbers, which is a major barrier to understanding Aboriginal and Torres Strait Islander medicine use and has been identified in previous reports and reviews.<sup>15,27</sup> Even with personal local connections, we were only able to collect data from two of the four sites providing RAAHS medicines in the Northern Territory. This is not a sustainable strategy and is a barrier to research into medicine use by Aboriginal and Torres Strait Islander people. Better access to RAAHS data to monitor medicines use in jurisdictions with a high proportion of Aboriginal and Torres Strait Islander patients living in remote areas (the Northern Territory, Western Australia) has been called for previously and our study supports this need.<sup>28</sup>

CTG data is likely to be nearly complete for Aboriginal and Torres Strait Islander smokers in non-remote areas as there are strong fiscal incentives to apply the CTG benefit on all eligible prescriptions. However, some Aboriginal and Torres Strait Islander people may choose not to identify as such to officials including health professionals; therefore, some Aboriginal and Torres Strait Islander smokers may receive smoking cessation medicines without CTG benefits. This possible misclassification of some dispensed prescriptions would reduce the detected differences between CTG and non-CTG prescriptions.

PBS data was not originally designed for research purposes and has limitations around establishing the indication and specific dose of medicine used by an individual patient compared to population-level use.<sup>29</sup> The PBS allows for the prescribing of two three-month courses of NRT patches for an individual Aboriginal/Torres Strait Islander patient each year. A course consists of three individual packs of NRT patches (each pack contains 28 patches so is intended to last a month). It is not possible to distinguish between two different patients accessing one course (three packs of patches) each in a calendar year compared to one person

accessing two courses (six packs of patches). Our data cannot be used to identify per-person incidences and we cannot determine how much the estimated reduced number of prescriptions supplied to Aboriginal and Torres Strait Islander smokers compared to non-Indigenous smokers is due to fewer scripts for each smoker being supplied prescriptions or to fewer smokers being supplied any prescriptions.

Similarly, NRT patches are also available over-the-counter, which is not captured in PBS data. Therefore, PBS data alone may underestimate NRT patch use and lead to incorrect comparisons between the supply varenicline/bupropion and NRT patches. However, it should be noted that the current retail price of a month of 21mg NRT patches is AU\$60 while supply under the PBS would be AU\$40.30 or AU\$6.50 or free under Safety Net benefits, so there are financial disincentives to accessing NRT over-the-counter, mitigating the underestimation using the PBS data.

In the Northern Territory, RAAHS data was provided from only two of the four supplying pharmacies, so it is a significant underestimate of the actual RAAHS supply each year across the Territory. Nevertheless, the greater RAAHS supply of NRT compared to varenicline/bupropion matches CTG comparisons in the Northern Territory and other jurisdictions, so it remains likely that more NRT patches than varenicline/bupropion are supplied elsewhere through RAAHS.

## Implications for public health

Our findings strengthen evidence indicating that Aboriginal and Torres Strait Islander smokers are less likely to be dispensed smoking cessation medicines compared to non-Indigenous smokers. More research into the barriers and enablers to this supply is needed.

Evaluation of trends in medicines use in Aboriginal and Torres Strait Islander populations would be a useful way to inform research on the effectiveness of interventions to influence medicine use. A major limiting factor is the lack of access to RAAHS data, which undermines the usefulness of CTG data in jurisdictions where many Aboriginal and Torres Strait Islander people live in remote areas. This poses barriers to the routine use of medicines data for monitoring and research and should be addressed by policymakers.

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