

Supporting visitor compliance with a smoke-free policy at hospital using a nicotine replacement therapy vending machine

Abstract

Issue addressed: To support visitors to comply with Central Coast Local Health District's (CCLHD) smoke-free hospital grounds policy, a need was identified for round-the-clock availability of nicotine replacement therapy (NRT). Providing NRT through a vending machine was identified as a possible solution. This initiative complemented other strategies that provide staff and patients who smoke with NRT.

Methods: NRT was originally provided through a snack vending machine; however, there were commercial and regulatory concerns with this method.

In 2015, dedicated NRT vending machines were installed at Gosford and Wyong Hospitals, and were operated by the Health Promotion Service. The appropriate regulatory permission was gained to supply a specific brand of NRT. Sales and incident data were recorded, and ongoing smoking counts were performed both before and after installation.

Results: In all, 247 sales of NRT gum were made through the vending machines from early 2017 to late 2019. Smoking counts show that there are very low rates of visitor smoking (<1%) in the approximately 4.5 years pre- and post-installation of dedicated vending machines. There was no statistically significant change in the smoking rate of visitors since the vending machine was installed at Wyong Hospital.

Conclusions: While NRT is generally provided to patients and staff within health settings to support compliance with smoke-free policies, alternatives to smoking for visitors are typically overlooked. A NRT vending machine achieves this. However, because there are few purchases made, the vending machines as currently operating are unlikely to make any significant impact on smoke-free policy compliance at these hospitals.

So what? While vending machines have limited effectiveness on overall smoke-free policy compliance, this strategy may have applicability to all sectors with smoke-free policies, especially those operating 24 hours a day, as a means of providing an alternative to smoking for visitors.

1 | INTRODUCTION

Central Coast Local Health District (CCLHD) implemented a smoke-free by-law covering its grounds in 2013 following changes to the Smoke-free Environment Act 2000.¹ The smoke-free by-law built upon many years of smoke-free policy implementation going back to a smoke-free buildings and vehicles policy in 1988 and a smoke-free grounds policy in 1999, and enabled CCLHD to enforce the smoke-free policy on its grounds through the issuing of warnings and fines of \$300.

A number of articles in the literature outline the benefits of smoke-free policies for reducing smoking and exposure to environmental tobacco smoke in the hospital context, as well as ways to ensure policy compliance.²⁻⁹ Methods for ensuring policy compliance in these studies include the following: policy communication and awareness, signage, enforcement, penalties for breaches, availability of nicotine replacement therapy (NRT), comprehensive smoking bans, mechanisms for monitoring compliance, and organisational changes. Smoke-free policy compliance is often reported to be sub-optimal and may be impacted by a number of challenges, particularly poor enforcement due to staff fear of aggression when approaching smokers.^{4,6-8}

In various settings, strategies to reduce smoking among visitors and members of the public have typically been limited to the implementation of smoke-free policies and informing people about such policies. Methods to support visitor compliance are limited. Within New South Wales (NSW) Health, a number of strategies to support patients and staff to comply with smoke-free policies at NSW Health facilities are outlined in the NSW Health Smoke-free Health Care Policy,¹⁰ including the provision of NRT; however, visitors

are generally overlooked besides ensuring that they are “informed about smoke-free requirements under this policy, the (Smoke-free Environment) Act and smoke-free by-laws, where they exist.”

Numerous strategies have been utilised by CCLHD over time to facilitate visitor compliance with smoke-free policies, including installation of signage and playing no smoking announcements and classical music on speakers at the hospital main entrances to reduce loitering¹¹ and smoking.¹²

To support visitors further, availability of NRT round-the-clock was identified as a possible solution. NRT is an effective method for managing nicotine cravings for smoking cessation, and is available in many forms including patches, inhalator, spray, lozenges and gum.¹³ There are many considerations with this strategy and we outline our approach and outcomes over 9 years.

2 | METHODS

When initiating a strategy to facilitate NRT availability to visitors in 2011, a partnership was formed with CCLHD's vending machine contractor to provide NRT lozenges through an existing snack vending machine located at Gosford Hospital Emergency Department. A specified brand of NRT lozenges 4mg 20 packs were purchased at retail price (approximately \$10 at 2019 prices) from supermarkets, and sold through the vending machine for the same price. This approach continued until January 2015, when the contract for vending machines changed to a different company. The new contractor was not willing to provide a space in their vending machines for NRT to be provided, and further investigation identified regulatory issues prohibiting the provision of NRT through a vending machine without permission from the delegate of the Minister for Health.¹⁴

To combat this issue, Central Coast Local Health District Health Promotion Service (CCLHD HPS) began investigating alternative methods to provide NRT for visitors. It was determined that vending machines specifically for this purpose would be appropriate. Vending machines were identified and sourced from a supplier in 2015. These were nappy (diaper) dispensing machines which needed to be specially modified for dispensing NRT. The machines could not be modified to dispense lozenges, and so gum was chosen as the product instead. The cost of purchasing and modifying each machine was \$1515 (excluding goods and services tax). The vending machines are coin operated and powered by two 6 volt batteries. The machines are installed by bolting into the floor. The vending machines were installed in the Emergency Departments at Gosford and Wyong Hospitals in August 2015. These locations were selected to ensure 24/7 access to the vending machines for visitors.

Regulatory issues were addressed to enable NRT to be provided through the vending machines. Permission was required from the NSW Ministry of Health for an exemption from subsection 1 of section 36 of the Poisons and Therapeutic Goods Act 1966,¹⁴ which states that it is an offence to supply certain substances and goods (including NRT) by an automatic machine. This exemption provides specific conditions for the sale of NRT, including the location of the

vending machines, the specific product that can be provided and the duration of the exemption. Exemption is provided on a three-yearly basis and requires an application in writing to the Chief Pharmacist at the NSW Ministry of Health for renewal.

The vending machines dispense a specific brand of NRT gum 4mg 15 packs to help smokers manage their nicotine dependence while at hospital. NRT is purchased off the shelf from a community pharmacy. CCLHD HPS subsidises the cost of the NRT gum – the product is purchased at retail price for \$6.50 (as of December 2019) but is sold for \$4. The product is subsidised from both a practical perspective – the vending machine can only accept a maximum of 4 coins of the same value – and to encourage use of the NRT for compliance with the smoke-free by-law.

The machines are maintained by a Health Promotion Officer from CCLHD HPS, who attends both machines on a regular basis to check stock levels and expiry dates of stock, and re-stock the machine (approximately monthly), replace batteries when necessary (approximately annually), and collect money inserted into the machines. This is typically a 5-10 minute process, during which data are recorded for the number of sales, stock remaining, stock added, and the condition of batteries. Data collection began in February 2017, with data not recorded prior to this time. The capacity of the vending machines is 22 packs of gum.

The vending machines were promoted through verbal advice, but no specific advertising has been conducted. They were installed in the Emergency Department to ensure that visitors who enter the hospital through this high traffic entry point would see the vending machines and utilise the NRT that is available.

The appearance of the vending machines has been modified by installing a decal, which provides a more aesthetically appealing look – see Figure 1. The decal was based on the winning artwork produced as part of a tobacco-themed Aboriginal art competition coordinated by CCLHD HPS in 2018.¹⁵ Information about the NRT product available, the cost of the product and a smoke-free message were also incorporated into the decal design. The decals were installed in October and November 2018.

As part of other smoke-free hospitals work, monitoring of smoking at high-profile locations of Gosford and Wyong Hospitals has been conducted since 2000. This was designed to track the impact of a smoke-free policy on smoking rates at the hospital grounds. The main entrance and Emergency Department entrances at both hospitals are monitored for a 2-hour period (noon – 2pm) on a fair weather day once per quarter. All staff, patients and visitors who pass through a designated area are counted, and their smoking status within that area is recorded. Each instance of smoking within the designated area is recorded. Monitoring was conducted by a Health Promotion Officer from CCLHD HPS using a tally sheet.

2.1 | Data analysis

Descriptive statistics, counts and percentages were used to analyse data. We conducted a t-test of population proportions on smoking

count data and calculated confidence intervals for percentages of visitors smoking using online calculators (StatPac and Calculator.net). Sales from each NRT vending machine were analysed by calculating the average monthly sales, which was determined by adding the total sales for each machine and dividing by the number of months each machine was in operation. Cost data were calculated by multiplying the number of packs of NRT purchased to stock the machines by the retail price from the community pharmacy, and the number of packs of NRT sold through the vending machines by the sale price.



FIGURE 1 The nicotine replacement therapy vending machine featuring a decal utilising an artwork from a smoking cessation themed Aboriginal art competition

3 | RESULTS

Application for authority to provide NRT through an automatic machine was submitted to the NSW Ministry of Health and approval was received in July 2015. Approval was renewed in July 2018.

Data for sales of NRT gum or lozenges are unavailable for the period before February 2017. In the period February 2017 to December 2019, 247 packs of NRT gum were sold through the vending machines—194 from the Wyong Hospital vending machine and 53 from the Gosford Hospital vending machine. Note that for the period June 2018 to May 2019, the Gosford Hospital vending machine was not in operation, as it was removed as part of redevelopment works at the hospital. Uptake has been moderate at best, with 5.5 packs per month sold at Wyong Hospital (over 35 months of operation), and 2.3 packs per month sold during the limited period of operation at Gosford (23 months). The total cost of gum was approximately \$1605.50, with monies received approximately \$988, a difference of \$617.50. There have been four recorded instances of the vending machines running out of stock.

Since the installation of decals on the vending machines, the machines have experienced a 39% increase in sales. Sales from the two machines rose from 6 per month prior to decals being added to 8.3 per month after installation.

Data from smoking counts indicate that there has been a general downward trend in visitor smoking in high-profile locations since 2011,¹⁶ with a number of fluctuations over this time. When looking at Wyong Hospital in particular, where a vending machine has been installed continuously since August 2015, the visitor smoking rate was 0.59% pre-vending machine installation (December 2010–April 2015) and 0.35% post-installation (September 2015–December 2019)—see Table 1. A t-test of population proportions was conducted on the visitor smoking rates, which resulted in a two-tailed probability of 0.1169, so there is no significant difference between the two percentages. Note that there were more smoking counts done after 2015, which accounts for the greater total visitor count after 2015. Given the vending machine at Gosford Hospital was not in place continuously, it was not considered in this data analysis.

4 | DISCUSSION

It is important to support visitors by providing alternatives to smoking and the NRT vending machines provide an effective solution to

TABLE 1 Visitors smoking compared with total visitors in high-profile locations over 9 years at Wyong Hospital, pre- (December 2010–April 2015) and post- (September 2015–December 2019) vending machine installation

	Total visitors	Smoking visitors	Proportion of visitors smoking	95% confidence intervals
Pre (December 2010–April 2015) (6 counts)	2368	14	0.59%	0.22%–1.08%
Post (September 2015–December 2019) (14 counts)	6773	24	0.35%	0.13%–0.55%

this. However, because there are few purchases made, the vending machines as currently operating are unlikely to make any significant impact on smoke-free policy compliance at these hospitals. Utilisation is higher at Wyong Hospital, despite both Emergency Departments seeing a similar number of patients. The vending machine at Wyong Hospital has been able to generate more momentum by being in place continually, and the smoking rate in the Wyong area is higher than in the Gosford area (21.6% compared to 18.6% from 2014-2015 data).¹⁷

There are some occasional issues with the dispensing of the gum – the machine will sometimes dispense multiple packs of gum, and in two instances it has not dispensed product when coins have been inserted (one of these instances was when a machine was out of stock). Processes need to be put in place to ensure that visitors can be reimbursed when they do not receive a product that they have paid for. A contact phone number was included on the vending machine decal for users to report issues and to enable resolution through discussion with CCLHD HPS. Only actual sales (as opposed to machine errors), calculated by stock variances and monies received, were considered in our data analysis.

The location of the vending machines in the hospital Emergency Departments may be a limitation as visitors may access the hospital through other entry points such as the main entry. However, it was determined that 24/7 access to the vending machines was important, and locating the machines in the Emergency Department facilitated this as main entrances were closed after hours.

There was also no formal promotion of the vending machines, which may limit the uptake of NRT. Strategies to encourage use could be implemented to further increase sales.

Challenges with the NRT vending machine were encountered in recent redevelopment works at Gosford Hospital. The vending machine was removed in June 2018 as part of the process to facilitate redevelopment of the Emergency Department, and was re-installed in May 2019 at an after-hours entry near the Emergency Department following redevelopment. NRT was unavailable for visitors during this period. Due to this inconsistency with the vending machine being in place, it was not possible to conduct t-test analysis of the visitor smoking rate for Gosford Hospital as was reported in the results for Wyong Hospital. Other disruptions were also experienced with the redevelopment such as changes to hospital access points and routes to off-site locations where smoking is permitted.

Smoke-free by-law compliance on CCLHD grounds was supported by other strategies, including signage, playing no smoking announcements and classical music on speakers at hospital main entrances, and the provision of nicotine replacement therapy (NRT) to staff and patients.¹⁶ The combined effect of all these strategies has contributed to hospital campuses where visitor smoking rates are very low (<0.6% since December 2010 at Wyong Hospital), though some smoking behaviour still occurs in high-profile locations particularly among visitors and patients.¹⁶ Limitations with the smoking count protocol are described elsewhere.¹⁶ This observed smoking rate represents excellent compliance with the smoke-free by-law, especially considering the

high community smoking rates, and this is the result of approximately 30 years of work since the introduction of the smoke-free buildings and vehicles policy. Compliance is likely also supported by community values, with 84% of people reporting that smoking should not be allowed on hospital grounds, including 73% of current smokers.¹⁸ Visitors typically represent the majority of smokers observed in smoking counts,¹⁶ and prior to the implementation of vending machines visitors had been under-supported in regards to alternatives to smoking, whereas patients and staff have access to NRT and behavioural support. The vending machines therefore play an important role in terms of access to NRT for visitors while having a statistically insignificant impact on visitor compliance with the smoke-free by-law.

To our knowledge, there are no similar strategies reported in the literature, indicating that vending machines are an innovative approach to enable visitors to access NRT. Additional strategies to support visitor compliance with smoke-free policies should be investigated and implemented to contribute towards further reductions in visitor smoking.

5 | CONCLUSION

While NRT is generally provided to patients and staff within health settings to support compliance with smoke-free policies,^{3-4,6-7,9} alternatives to smoking for visitors are typically overlooked. A NRT vending machine achieves this. Because there are few purchases made, the vending machines as currently operating are unlikely to make any significant impact on smoke-free policy compliance at these hospitals, but do support enforcement activities and the equity of the smoke-free policy.

This strategy may have applicability to all sectors with smoke-free policies, especially those operating 24 hours a day.

KEYWORDS

by-law, hospitals, nicotine replacement therapy, policy, smoke-free, vending machine

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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