

Nicotine Replacement Therapy (NRT)

February 2011

What is NRT?

The aim of Nicotine Replacement Therapy (NRT) is to reduce the withdrawal symptoms associated with nicotine addiction by replacing some of the nicotine obtained from cigarettes. The nicotine is referred to as 'clean' or 'therapeutic' nicotine, as it is not associated with the harmful constituents found in tobacco smoke. Treating nicotine addiction with NRT enables people who smoke to focus on the two other aspects of smoking - the habits or behaviours associated with smoking and the emotional aspects, such as stress and boredom.

For many people, quitting is a major life change that often involves making several attempts over time before quitting for good. NRT assists with the physical addiction to nicotine while quit smoking counselling from a service such as the Quitline helps with the behavioural and emotional aspects. Research has shown that the best outcomes are achieved when NRT or other medications such as Champix are combined with ongoing counselling and support.

Which NRT product should I use?

There are a number of different brands of NRT available from chemists or the supermarket such as Nicorette, Nicobate and QuitX. Each brand has a range of different products available such as patches, gum, the inhaler, lozenges and sublingual tablets. All of these products are equally as effective if used as recommended and therefore the choice of product depends on personal preference. People who smoke are advised to discuss with a Quitline counsellor, a pharmacist or their GP which product or brand might be best for them.

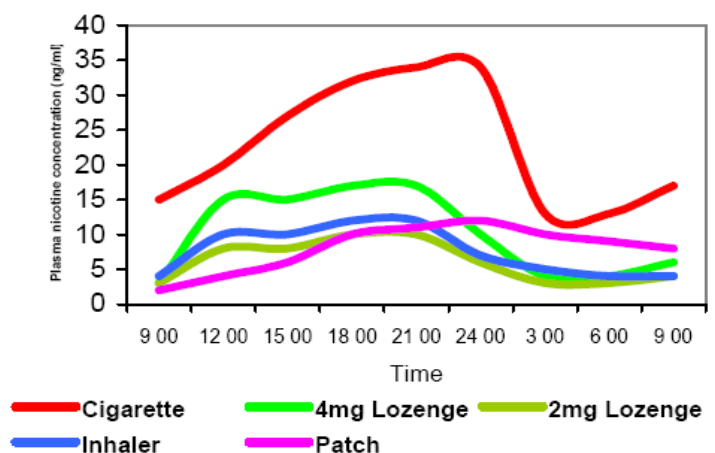
Will I still experience cravings when using NRT?

Blood nicotine levels are lower in people using NRT

compared to people who smoke. This means that for those people who are heavy smokers, the standard doses of NRT may not be sufficient to manage nicotine cravings and withdrawal symptoms.

Cigarettes provide significantly more nicotine than any form of NRT so heavy smokers may still experience nicotine cravings. In these situations, the use of more than one form of NRT such as patches and gum (combination therapy) may be necessary. People who smoke tend to be very self aware about the amount of nicotine they need to satisfy their addiction and are usually best able to determine what level of NRT is right for them.

The following graph illustrates the differences in blood plasma levels of nicotine over 24 hours for an 'average' smoker i.e. 25 cigarettes/day (the red line) - compared to different forms of NRT used at recommended levels. It is clear from the graph that NRT provides a level of nicotine in the blood, but less than that provided by cigarettes.



What are the 2007 changes approved for the use of NRT in Australia?

Previously NRT was not recommended for people still smoking, pregnant women and young people. Following the evidence on the safety of NRT these and other restrictions have been relaxed. The key changes are:

- **Combination Therapy:** patches can be used in combination with gum or other intermittent forms of NRT to reduce cravings for those who are more nicotine dependent
- **Cut Down To Stop (CDTS):** patches or other forms of NRT can be used to help reduce the number of cigarettes smoked prior to quitting
- Young people (12 and older), pregnant women and some people with cardiovascular disease can safely use some forms of NRT
- 'Stepping down' or 'weaning' from higher to lower strength patches is no longer considered necessary, using the 21 mg patch and then stopping abruptly is just as effective
- Using NRT to quit is always safer than continuing to smoke

What NRT products are there?

All NRT products are sold with a Consumer Medicine Information (CMI) leaflet. If this leaflet is not in the packet when NRT is purchased, then ask the pharmacist for one. It is recommended that this information be read before using any NRT product. A summary of NRT products is provided here but it is not a replacement for the CMI provided by the pharmaceutical company.

NRT products can be divided into two groups: patches and oral or intermittent forms (gum, inhaler, lozenge, sublingual tablet). All oral forms of NRT essentially work in the same way. They all provide nicotine by absorption through the lining of the mouth. Oral forms of NRT can be used as a cigarette substitute and are very effective if you want to cut down the number of cigarettes you smoke prior to quitting.

The choice of an oral form of NRT will depend on personal preferences and many people try different forms of NRT before working out what suits them best.

Obtaining nicotine from NRT is very safe compared to smoking. If nausea or any other adverse effects from NRT are experienced, then you should reduce the amount you are using or stop using it, and speak to your pharmacist or GP. The experience of nausea may occur, but nicotine toxicity is unlikely to occur from the correct use of NRT products.

While NRT is a safe form of medication for adults who smoke, it is a poison and therefore caution needs to be exercised around small children. Caution is particularly needed with products such as the gum and mini lozenges that could be mistaken for lollies.

Nicotine patches on the PBS

From February 2011, Nicotine patches became available on the Pharmaceutical Benefits Scheme (PBS).

With this PBS subsidy, smokers who obtain a doctor's prescription for patches will receive a four-week course for approximately \$33.30 or \$5.60 if they hold a Centrelink health care card.

Patches

The nicotine patch is designed to continuously deliver nicotine to the bloodstream via the skin. Blood plasma levels of nicotine slowly rise during the first few hours after application with the maximum level being reached after 6-10 hours. The 21 mg/24 hour patch is recommended for those smoking more than 15 cigarettes per day and their first cigarette within 30 minutes of waking. Using this patch for 24 hours, however, may lead to vivid dreams and/or disturbed sleep. If this is experienced then it is advisable to remove the patch overnight. After patch removal, nicotine already in the skin continues to be absorbed for up to two hours.

If vivid dreams and/or disturbed sleep are experienced, then the 15 mg/16 hour patch may be a better alternative. However, when the patch is not worn overnight strong nicotine cravings may be experienced in the mornings after waking. This is more likely in the early stages of quitting or cutting down when nicotine dependence is higher. Intermittent forms of NRT such as lozenges, inhalers, gum and tablets can be used to provide a more immediate dosage of nicotine while waiting for the nicotine from the patch to be delivered.

The rate of delivery is similar for both the 21 mg/24 hour patch and the 15 mg/16 hour patch. However, the 21 mg patch does deliver a higher overall dose of nicotine than the 15 mg patch. The amount of nicotine delivered by the 21 mg patch is approximately half that obtained from smoking 25 cigarettes/day.

Cut Down Then Stop (CDTS). The patches marketed as 'Pre-quit' patches (Nicabate) are actually 21 mg patches that can be used to cut down the number of cigarettes smoked prior to quitting. Recent research

has found that using patches or intermittent forms of NRT to cut down the number of cigarettes smoked prior to quitting, doubles the success rate compared to using patches for abrupt quitting.

Clear patches provide the same therapeutic benefits as flesh-coloured patches and may be preferred as they are less obvious when the skin area is visible.

The patch should be applied to a clean, dry, hairless area of the skin above the waist such as the upper arm with the location changed daily to avoid skin irritation. Adverse effects of the patch include itching and tingling of the skin at the application site, redness of the skin and sleep disturbances such as insomnia.

Gum

Nicotine gum can be used to actively control nicotine cravings when they are felt. The gum contains nicotine which is absorbed through the lining of the mouth and then enters the blood stream. Maximum blood levels are reached within 5-10 minutes.

Chew Park Chew: Gum is available in two strengths, 2 mg and 4 mg, and needs to be chewed in a particular way to achieve maximum benefit. The gum should be chewed slowly until a peppery taste becomes strong and/or a tingling sensation is noticed. It then needs to be 'parked' between the gums/teeth and cheek until the taste has faded and then chewing is repeated.

The blood levels of nicotine reached using gum are approximately one-third (2 mg) or two-thirds (4 mg) of that achieved from cigarettes. The gum is available in a variety of flavours such as mint, fruit and the 'classic' nicotine flavour. Adverse effects of gum usage include nausea and vomiting, indigestion, hiccups and occasionally headaches if the gum is chewed too rapidly. These unpleasant effects can be minimised by using the products as recommended.

Inhaler

The nicotine inhaler can be used to control cravings by copying the hand to mouth action of smoking. The inhaler consists of a plastic mouthpiece and cartridge containing 10 mg of nicotine. The cartridge is placed in the mouthpiece and when closed the foil ends are punctured to allow the release of nicotine as a vapour. Each cartridge contains enough nicotine for about 20 minutes of ‘puffing’.

Although the device is called an inhaler, nicotine is absorbed through the lining of the mouth, not the lungs or airways.

The inhaler produces nicotine concentrations that are about one-third of those achieved with smoking. Unpleasant side effects include coughing, headache, heartburn, nausea, hiccups and throat irritation.

Lozenge

The nicotine lozenge can be used to actively control nicotine cravings when they are felt. The lozenge is available in two strengths, 2 mg and 4 mg. The stronger lozenge is recommended for more nicotine dependent smokers.

The lozenge is placed in the mouth and occasionally moved from side to side until completely dissolved, usually within 30 minutes. The nicotine from the lozenge is absorbed through the lining of the mouth. The lozenge should not be chewed or swallowed whole. People should not eat or drink while the lozenge is in the mouth.

This form of NRT is suitable for people who have problems with gum but prefer an oral form of NRT. Adverse effects are similar to the gum.

Nicabate has introduced the Mini lozenge, available in two strengths, 1.5 mg and 4 mg. The Mini lozenge

is used in a similar way as the lozenge but may be preferred because of its smaller size. Company trials of the Mini lozenge found that nicotine was absorbed more rapidly from the lozenge than the equivalent or similar strength of gum.

Sublingual Tablet

The sublingual tablet has been designed to enable a more discrete way to control cravings when they are felt. The tablet is placed under the tongue where it dissolves slowly within 30 minutes, releasing nicotine which is absorbed through the lining of the mouth. It should not be chewed or swallowed. Adverse effects are similar to the lozenge.

How do I know if I need to use NRT?

NRT is only recommended for those people who are assessed as nicotine dependent. You can work out your level of nicotine dependence by answering the following two questions:

1. How soon after waking do you smoke your first cigarette?
 - a. Less than 5 minutes (3 points)
 - b. Five to 30 minutes (2 points)
 - c. 31 to 60 minutes (1 point)
2. How many cigarettes do you smoke each day?
 - a. More than 30 cigarettes (3 points)
 - b. 21 to 30 cigarettes (2 points)
 - c. 11 to 20 cigarettes (1 point)

Score	nicotine dependence
5 or 6	Heavy
3 or 4	Moderate
2	Low

Knowing your nicotine dependence can help you decide which products would be most beneficial to help you quit. The following table can help with product selection.

The recommended treatment period for all products is 8-12 weeks. Regular use beyond 12 months is not generally recommended although long term use of some forms of NRT has been reported with no adverse health effects.

Product	Dosage
Combination Therapy	For people with a Heavy dependence on nicotine and who experience cravings using only one form of NRT <ul style="list-style-type: none"> • 15 mg/16 hour patch in combination with 2 mg gum or • 21 mg/24 hour patch in combination with 2 mg gum or 2 mg lozenge or 1.5 mg Mini lozenge or • patch in combination with any intermittent form of NRT
Patch	Heavy to Moderate dependence: 21 mg/24 hour patch or 15 mg/16 hour patch Moderate to Low dependence: 15 mg/16 hour patch Use 1 patch daily
Gum	Heavy to Moderate dependence: 4 mg (after the first 2 weeks you may prefer to use the 2mg gum) Moderate to Low dependence: 2 mg Use 1 piece per hour or 10-15 pieces per day
Lozenge	Heavy to Moderate dependence: 4 mg lozenge or Mini lozenge Moderate to Low dependence: 2 mg lozenge or 1.5 mg Mini lozenge Use 1-2 lozenges per hour (8-12 per day) Use 1 Mini lozenge every 1-2 hours
Inhaler	Use 6-12 cartridges per day depending on level of dependence
Sublingual tablet 2mg	Heavy dependence: 2 tablets per hour or 24 per day Moderate dependence: 1-2 tablets per hour or 12-24 per day Low dependence: 1 tablet every 1-2 hours or 8-12 per day

References

- Action on Smoking and Health Australia. (2007). *Guidelines for Healthcare Professionals on using Nicotine Replacement Therapy for smokers not yet ready to stop smoking*. Sydney: Action on Smoking and Health Australia.
- Zwar, N., Richmond, R., Borland, R., Peters, M., Stillman, S., Litt, J., et al. (2007). *Smoking cessation pharmacotherapy: an update for health professionals*. Melbourne: The Royal Australian College of General Practitioners.
- Zwar, N., Richmond, R., Borland, R., Stillman, S., Cunningham, M., & Litt, J. (2004). *Smoking Cessation Guidelines for Australian General Practice. Practice Handbook*. Canberra: Australian Government, Department of Health and Aging.