

# Some advice on managing smoking cessation-related weight gain

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Editor: Andy McEwen

Date of last review: March 2025

## Summary and recommendations

People who smoke should know that cessation leads to weight gain in 80–90% of those achieving abstinence, but it is more than 10kg in only 10–20% of those who stop smoking. They also deserve to be told that it is permanent unless they make special efforts to prevent it or lose it again. People who smoke should also know that smoking is about as harmful as morbid obesity (a BMI of more than 40 kg/m<sup>2</sup>) and that the health benefits of cessation not only far outweigh the health risks of weight gain, but occur in spite of these risks.

The old advice to quit smoking first and lose weight afterward is probably reasonable advice for many. However, losing weight is hard and only a minority will lose 5–10kg and sustain this; so regular weighing seems sensible before excessive weight gain has occurred. Given the possibility that dieting while quitting could harm the chances of achieving abstinence, weighing too regularly (daily or even weekly) is possibly not a good idea.

If weight gain is a concern, UK GPs with access to weight loss support on prescription or exercise on prescription should consider these options with their patients and discuss the benefits. Physicians could also consider longer-term NRT use in people for whom weight gain is particularly hazardous, though this should be a second-line option.

## Introduction

Weight gain is a common consequence of stopping smoking but many experts in smoking cessation play this down and often the advice given to clients about possible weight gain and weight management strategies are inaccurate.

The aim of this briefing is to summarise the evidence for practitioners, making clear where there are uncertainties. It is based on Medline searches, examination of systematic reviews, a Cochrane review on preventing weight gain on smoking cessation, and clinical experience.

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### How much weight do people who stop smoking gain?

A recent systematic review and meta-analysis showed that, on average, people who stop smoking gain about 4.7kg during the first year of continuous abstinence.<sup>1</sup> However, the standard deviation is very large (4.7kg) meaning a prediction of average weight gain will be wrong for most people. Around a quarter of people who smoke will gain less than a kilogram or lose weight on stopping, while another quarter will gain over 8kg.

The meta-analysis showed that mean weight gain is rapid in the first three months; about 1kg per month, but the rate of gain slows down (although cohort studies show that it outstrips weight gain of people who continue to smoke for several years after stopping smoking). These studies show that mean weight gain of clinic-treated people who stop smoking is about 7kg more than people who continue to smoke.<sup>2,3</sup> Some have suggested that weight gain is temporary, but this is derived from cross-sectional studies and cohort studies show no evidence of this.

Most people who smoke make repeated attempts to stop smoking before achieving permanent abstinence and there is a concern that repeated periods of abstinence could lead to incremental weight gain. Available data suggest this does not happen and that resumption of smoking leads to loss of weight,<sup>2,3</sup> but data is insufficient to be totally reassuring.

### Can we predict who will gain excessive weight?

The most robust data we have on the extent of weight gain after stopping smoking comes from cohort studies of clinic-treated people, usually enrolled in clinical trials. Their rigorous assessment of length of abstinence leads to more valid estimates of weight gain after cessation.<sup>4</sup> Most people who stop smoking do so without formal clinical support. These people are typically less dependent on tobacco and a systematic review found some evidence that people who smoke less gain less weight.<sup>5</sup> The review reported that the factor most consistently associated with lower weight gain is higher age at cessation.<sup>5</sup> There are contradictory data on whether women gain more weight, but even if weight gain is similar, this represents a greater percentage weight gain in women.<sup>5</sup> These characteristics, however, are very poorly predictive meaning that they cannot be used to pick a group at special risk for clinical intervention.<sup>2</sup> There is evidence from a twin study that weight gain on cessation is mediated genetically.<sup>6</sup>

Another factor associated with weight gain is past history of weight gain on stopping smoking and it seems likely that this would be the most powerful predictor, but the data is insufficient to be sure.<sup>7</sup> In the absence of useful clinical markers, we suggest that monitoring weight gain and intervening early in people gaining more than the mean 1kg/month would be appropriate, but this is based on common sense and not evidence.

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### Does worrying about weight gain or actually gaining weight reduce the success of a quit attempt?

A survey showed that 84% of people who smoke are unwilling to accept a gain of more than 5kg in body weight, and 28% are not prepared to accept any weight gain when they stop smoking.<sup>8</sup> However there is inconsistent evidence that fear of weight gain or actual weight gain after quitting does in fact lead to relapse. Some studies show no association or associations only in one gender,<sup>9,10</sup> others that weight gain or fear of weight gain is associated with increased relapse,<sup>11,12</sup> or that weight gain is associated with a lower risk of relapse.<sup>7,13</sup> Methodological differences make it hard to draw a conclusion.

Weight concern often stems from unrealistic fears of the effect on appearance of modest weight gain.<sup>14</sup> Two trials addressed these fears with cognitive behavioural therapy.<sup>14,15</sup> Although the first was promising, showing an increased rate of abstinence, the second did not confirm this and a meta-analysis of both suggests that addressing worries about weight gain does not increase abstinence.<sup>14,16</sup> Patients may bring up the issue and the clinician should respond appropriately but to date, no special treatment to address weight concern has been found to be helpful.

### Does weight gain after cessation negate the health benefits of quitting?

Smoking cessation is unequivocally effective at reducing the risk of future disease. This is the main reason people stop smoking and they can be strongly reassured that the benefits of cessation outweigh the risk due to weight gain. A cohort study showed that on average, a person who stops smoking aged 40 years gains approximately nine years of life compared to continued smoking.<sup>17</sup> On average, such a person will gain around 7kg, a BMI increase of about 2.5kg/m<sup>2</sup>. A meta-analysis of cohort studies shows that a 2.5kg/m<sup>2</sup> increase in BMI for anyone with a starting BMI >22 increases mortality by 14%,<sup>18</sup> whereas continued smoking increases it by 100%.<sup>17</sup> Furthermore, the nine year increase in life expectancy following cessation at 40 years of age occurred despite the weight gain, so stopping without weight gain is likely to be associated with even greater benefits than this.

That said, smoking cessation-related weight gain has adverse consequences. Two cohort studies show that the incidence of type II diabetes is increased in the first few years after cessation, which is partly but not completely explained by weight gain.<sup>19,20</sup> Smoking cessation improves lung function in the first year after abstinence and this benefit is not as great in those who put on most weight so efforts to reduce weight gain are likely to benefit the patient.<sup>19,21</sup>

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### Does smoking cessation medication reduce weight gain?

A Cochrane review that examined interventions to prevent post-cessation weight gain showed clear evidence that NRT, varenicline, and bupropion (licensed medication for cessation) all reduce weight gain by about 0.5 to 1kg during the period of use of medication.<sup>16</sup> The data is insufficient to know whether the effect of the typical 2–3 months of treatment is permanent. However, data from observational studies show that people stopping smoking using NRT for a year or more put on several kilograms less than those who stop without NRT.<sup>22–24</sup>

In the UK, NRT is now licensed for lifetime use to reduce or stop smoking, opening the possibility that people who used to smoke might choose to use or be prescribed long-term NRT. Long-term use of nicotine may cause glucose intolerance or adverse changes in lipid metabolism. The data comes mainly from short-term experiments and one case-control study of long-term users and is not consistent.<sup>25–30</sup> Perhaps the most relevant data comes from a cohort of snus users.<sup>31</sup> (Snus is a form of moist tobacco that is left in the mouth and long-term use of snus is more prevalent than cigarette smoking in Swedish men). This study reported no greater prevalence and a somewhat lower incidence of diabetes for people who used to smoke using snus than people who stopped all tobacco use. Until we have randomised trials of long-term use of NRT it is not possible to recommend long-term NRT for all people who stop smoking worried about weight gain. People who smoke and their physicians may need to weigh the reasonably strong evidence of modest benefit against the potential risks.

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### Is going on a diet when trying to quit smoking a good idea?

Dieting while quitting could harm a quit attempt if it means a person goes hungry. There is a close neurophysiological connection between urges to smoke and hunger and good evidence from short-term experiments that hunger is associated with higher urges to smoke and more intensive smoking.<sup>32,33</sup> Aside from this, some observational studies also report that lower weight gain is associated with higher relapse to smoking,<sup>7,13</sup> although the evidence is inconsistent (see above). Consequently, many experts and guides for patients advise people not to go on a diet while trying to stop smoking.

Recent data challenge this prohibition. Very low calorie diets typically ask users to abstain from all food and eat specially provided meal replacements, which leads to rapid weight loss. One high quality randomised trial showed that going on such a diet while quitting smoking was associated both with lower hunger (perhaps because the ketotic state suppresses hunger), lower urges to smoke, and a 60% relative increase in abstinence.<sup>34</sup> There was suggestive evidence only of a long-term reduction on weight gain. Experience in our clinic suggests few patients are prepared to accept this or stick to the diet, however.

Another dietary programme that is associated with reduced weight gain is one in which the patient and clinician set a target for weight gain, set a calorie goal, and regularly monitor against the target. The Cochrane review found three such trials and the data showed reasonable evidence that those programmes could prevent about 2.5kg of weight gain at one year, though the estimate is imprecise. This treatment programme is similar to the approach adopted by commercial weight control programmes common in the UK and many developed countries, and referral to such schemes is available for many GPs 'on prescription' in the UK. One concern is that the data is insufficient to exclude the possibility that calorie restriction reduces smoking abstinence, but there is no strong evidence that it does.

### Is an exercise programme while quitting helpful?

While going hungry is associated with stronger urges to smoke, there is strong and convincing evidence from short-term laboratory studies that exercising reduces urges to smoke and smoking behaviour in people who temporarily abstain from smoking.<sup>35</sup> However, a Cochrane review of randomised trials showed insufficient evidence that an exercise programme itself increases long-term cessation success.<sup>36</sup>

The Cochrane review of preventing weight gain after smoking cessation included three trials of exercise programmes. In all three programmes, participants received regular supervised exercise as well as encouragement and behavioural support to increase physical activity at home. In the short-term, these programmes had no effect on weight gain, but by one year, people randomised to the programmes gained 2kg less than those not offered them. Given the discrepant and counter-intuitive findings, this could be a chance finding. However, supervised exercise programmes are available 'on prescription' for many UK GPs and referral to these could be considered as a means of preventing weight gain on cessation.

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