

National Institute for Health and Clinical Excellence
Pre-meeting Briefing
Tobacco Harm Reduction Programme Development Group
*The Effectiveness of Nicotine Replacement Therapy for Smoking Reduction and/or
Temporary Abstinence Amongst English Smokers*

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CONTACT DETAILS: Dr Emma Beard
Department of Epidemiology and Public Health
University College London
1-19 Torrington Place
WC1E 6BT
e.beard@ucl.ac.uk

Objectives of the meeting

The aim of this meeting will be to overview the use and effectiveness of NRT for smoking reduction and during periods of temporary abstinence among smokers in England. The specific objectives are:

1. Present data on the prevalence of NRT use for smoking reduction and/or temporary abstinence and associated socio-demographic/smoking characteristics.
2. Present data on the effectiveness of the use of NRT for smoking reduction and/or temporary abstinence.
3. Present data on the factors which may affect the effectiveness of the use of NRT for smoking reduction and/or temporary abstinence.
4. Present data on stop smoking practitioners and managers' views of harm reduction and associated personal and job characteristics.

Prevalence and associated socio-demographic and smoking characteristics

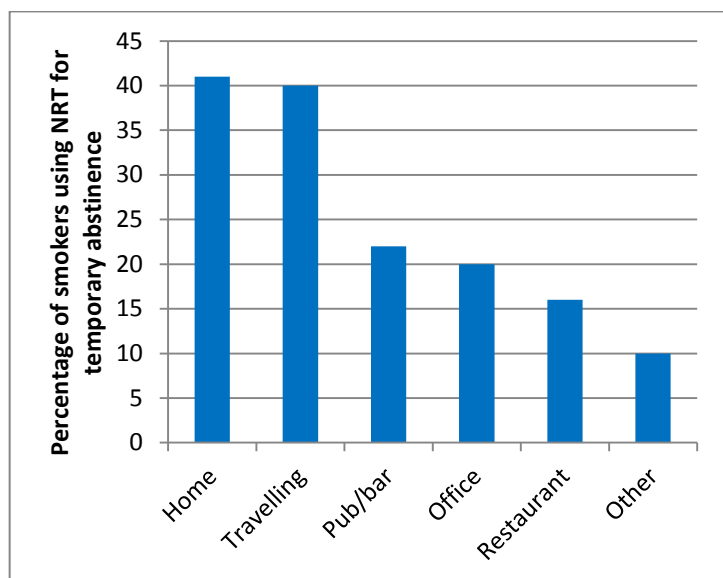
Data on the current usage of NRT for smoking reduction and/or temporary abstinence in England is available from the Smoking Toolkit Study (see www.smokinginengland.info), a population based survey of adults aged 16+. This points towards a prevalence of around 39% for smoking reduction without NRT, 6% for smoking reduction with NRT, 5% for the use of NRT during periods of temporary abstinence, and 7% for the use of NRT for both smoking reduction and temporary abstinence [1, 2]. Amongst those using NRT for temporary abstinence, the most common situations involve the use of NRT at home or whilst travelling [3] (see Figure 1).

By far the most frequently used product for harm reduction is the nicotine patch [unpublished] (see Figure 2). This is rather counterintuitive given that one may have assumed that the faster acting products which allow accurate titration of nicotine levels would be more suited. Interviews with smokers suggest that this preference may be due to the patches ease of use, discreetness, long established history as a nicotine product, unawareness of other products, and preference for a prolonged nicotine release [4].

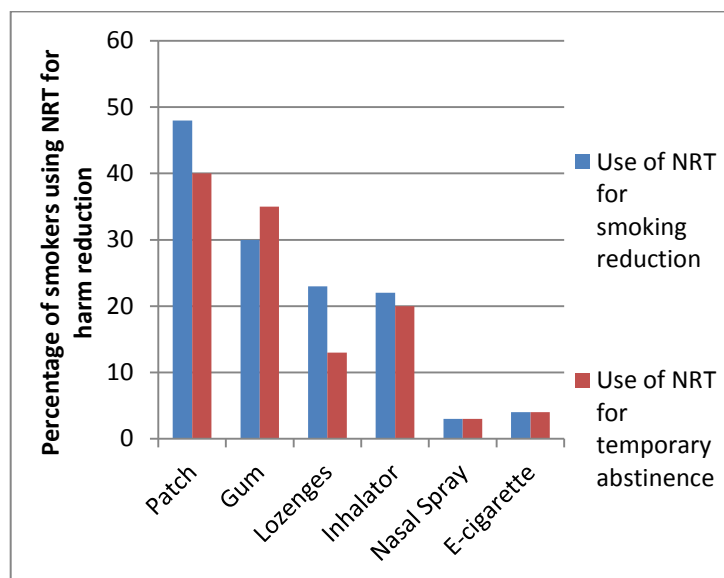
November 2021: NICE guidelines PH45 (June 2013) PH48 (November 2013) have been updated and replaced by NG209.

The recommendations labelled [2013] or [2013, amended 2021] in the updated guideline were based on these evidence reviews.

See www.nice.org.uk/guidance/NG209 for all the current recommendations and evidence reviews.



Note: 473 smokers using NRT for temporary abstinence: Data were weighted to match the 2001 census



Note: Total number of smokers= 20,188; using NRT for smoking reduction= 2,733; using NRT for temporary abstinence= 2,547; Data were weighted to match the 2001 census

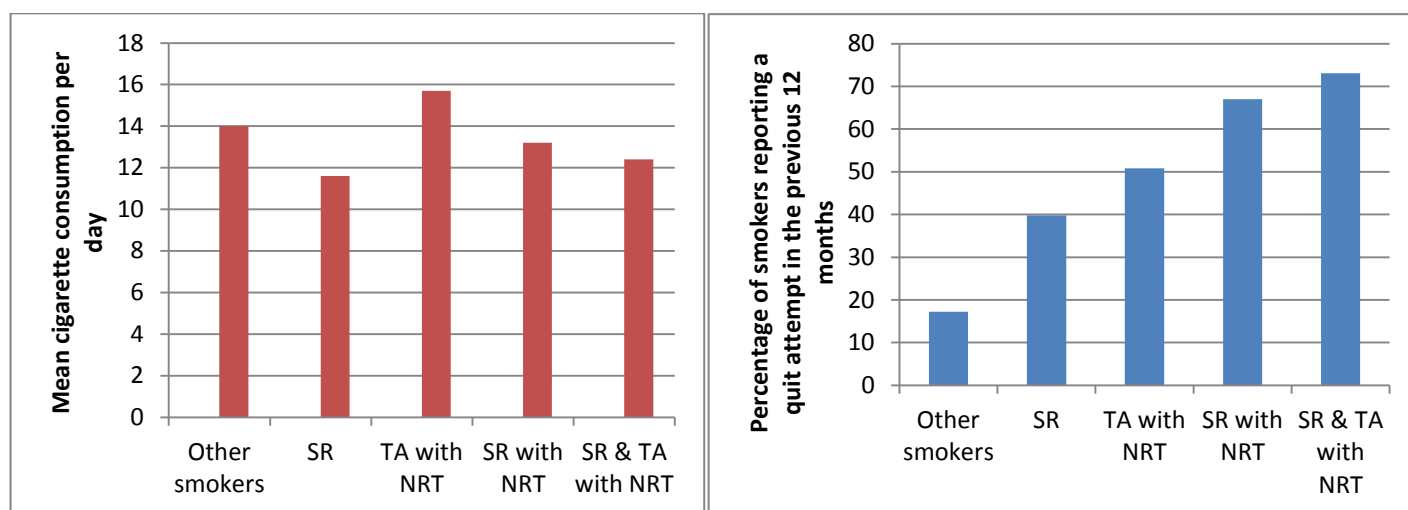
Figure 1: Percentage of smokers using NRT during different situations requiring temporary abstinence

Figure 2: Percentage of smokers using the various types of NRT for smoking reduction and/or temporary abstinence

Prevalence does not appear to have changed substantially over time [1], however, it does vary as a function of socio-demographic and smoking characteristics. Those using NRT to help them reduce their intake are more likely to be older than those cutting down without NRT, while women are more likely to use NRT for temporary abstinence. There does not appear to be any difference in social-grades [1]. Those using NRT for smoking reduction and/or temporary abstinence are also more nicotine dependent than those cutting down or temporarily abstaining without NRT [Data unpublished].

Effectiveness of the use of NRT for smoking reduction and/or temporary abstinence

Concerns have been raised that the use of NRT for smoking reduction and/or temporary abstinence may undermine smokers' motivation to stop smoking altogether. Data from clinical trials suggests that, on the contrary, use of NRT for smoking reduction could increase the rate at which smokers try and succeed in stopping [5]. They also suggest that the use of NRT for smoking reduction can lead to significant declines in cigarette consumption and concurrently toxin intake. However, there are several reasons why these data may not mean that people who reduce smoking in the general population are more likely to reduce or stop smoking than those who do not: *a)* behavioural support is not usually provided at a population level, *b)* NRT is generally not free of charge, *c)* volunteers for the trials may have been more highly motivated to reduce than those using NRT in the population of smokers as a whole, and *d)* in the general population there are significant numbers of smokers with mental and physical health problems who are interested in harm reduction; the exact individuals usually excluded from the clinical trials.



Notes: Data weighted to match the 2001 census; SR = smoking reduction; TA= temporary abstinence; Every category in both graphs differs significantly from every other category: $p < 0.001$ for all pair-wise comparisons except for the comparison in cigarette consumption between TA with NRT and SR & TA with NRT where $p < 0.05$; post-hoc tests were conducted using the Scheffe's Method for cigarette consumption and Standardized Residual Method for percentage making quit attempt.

Figure 3: Smoker behaviour as a function of their harm reduction activities; a) Mean cigarette consumption; b) Percentage of smokers reporting a quit attempt in the previous 12 months

The Smoking Toolkit Study provides data on the effectiveness of the use of NRT for smoking reduction and/or temporary abstinence in the English population. In terms of reductions in cigarette consumption, analyses have found that those using NRT for harm reduction purposes smoke more cigarettes per day than those attempting smoking reduction or temporary abstinence without NRT [1, 2] (see Figure 3a). Cigarette consumption also varies as a function of the situation requiring one to temporarily abstain; those using NRT in the office smoke fewer cigarettes than those using NRT whilst travelling [3]. However, such cross-sectional data does not allow the determination of cause and effect. Thus it is possible that those using NRT for harm reduction purposes were a prior more nicotine dependent. Support for this argument comes from prospective analyses, which have found reductions in consumption over time amongst those using NRT for smoking reduction and/or temporary abstinence. However, as these reductions appear to be in the range of only 1-2 cigarettes per day [6], it may be concluded that the use of NRT for smoking reduction or temporary abstinence at a population level is not associated with reduced harm. Perhaps the extensive behavioural support provided in the clinical trials is necessary for sizable reductions to be incurred.

It is also possible that smokers instead of reducing their cigarette consumption are modifying how they smoke their cigarettes and therefore decreasing their toxin intake. Support for this argument comes from the finding that despite little difference in cigarette consumption when smokers are using and not using NRT for harm reduction, cotinine levels (a measure of nicotine intake) are lower, although not significantly, during NRT use [7]. Smokers who are attempting to reduce their cigarette consumption do report modified smoking behaviour, including not inhaling as much smoke and putting their cigarettes out early [4].

In contrast, the findings regarding smoking cessation are consistent with the previous clinical trials. Analysis of data from the Smoking Toolkit Study has found positive associations between the use of NRT for smoking reduction and/or temporary abstinence and recent attempts to quit smoking [1, 2] (see Figure 3b). Of interest, is that the likelihood of a previous quit attempt varies as a function of the situation requiring one to temporarily abstain [3]; whether NRT is used in multiple situations or only one situation requiring temporary abstinence [3]; and whether smokers use NRT only for smoking reduction, only for temporary abstinence, or for both purposes [2]. Positive associations have also been found prospectively with quit attempts and four-week point prevalence cessation [6]. From this it may be concluded that the use of NRT by continuing smokers far from undermining quitting at a population level, may promote it.

Although previous analysis have not found any differences in the effectiveness of the various NRT products for harm reduction [1]; recent analyses with larger samples point towards a superiority of the nicotine gum and nicotine patch; those using the nicotine gum smoke the fewest cigarettes, while those using the nicotine patch have the highest odds of a previous quit attempt [unpublished]. The patch is also reported by smokers, in addition to the nicotine inhalator, to be the most helpful during periods of temporary abstinence [3]. Prospective analyses are required to assess this further, given that the data may be confounded by its cross-sectional nature.

The Smoking Toolkit Study also provides data on the association between attempts at harm reduction and psychological variables. Smokers who are attempting to cut down are more likely to report that they want to quit smoking, intend to quit smoking, and are confident in their ability to quit smoking; and are less likely to report that they enjoy smoking and are happy with life than other smokers generally. The latter finding may either be a consequence of attempts at smoking reduction decreasing happiness, perhaps as a result of experiencing withdrawal symptoms or because smokers have reduced access to a source of enjoyment; or because those attempting smoking reduction were a prior less happy individuals. Those using NRT for smoking reduction are also more likely to report that they want to quit smoking, but are less likely to report that they are confident in their ability to quit than those cutting down without NRT. Those using NRT for temporary abstinence are also more likely to report that they want to quit smoking and intend to quit smoking than those abstaining temporarily without NRT, and are less likely to report confidence in their ability to quit or enjoyment of smoking. The lower levels of self-efficacy may reflect the fact that smokers who are less confident in their ability to quit are more likely to choose to use NRT for harm reduction purposes [8, 9].

Factors associated with effectiveness

Qualitative interviews with smokers using NRT for smoking reduction and/or temporary abstinence point towards a number of factors which may affect the effectiveness of harm reduction activities [4].

Methodological issues: these include smokers inaccuracies in recalling their cigarette consumption and the possibility that smokers may not be interpreting smoking reduction in the way that researchers intend the term to be used; perhaps due to a reliance on terminology which is unfamiliar to smokers. Evidence for this comes from the Smoking Toolkit Study, which has found that those responding to a question asking if they are reducing their cigarette consumption, differ to a small but significant degree to those responding to a question asking if they are reducing their cigarette consumption without an intention to quit smoking [unpublished]. Both of these questions have been used in previous studies to assess smoking reduction amongst those who are unwilling or unable to quit smoking.

Psychological/Behavioural issues: these include the setting of unrealistic goals, using a wide range of methods and aids to attain these, modification of smoking behaviour, and the under-use and incorrect use of NRT. Preliminary findings are available which suggest that providing smokers with Carbon Monoxide (CO) monitors to allow self-monitoring of their cigarette intake, in addition to the setting of realistic goals, may be a useful method for reducing smokers' intake of smoke and increasing their motivation to stop completely [10]. Analysis of data from the Smoking Toolkit Study has also found an effect of the frequency of NRT use and extent of NRT use on cigarette consumption and recent attempts to quit smoking. A positive association has been noted between the length of time NRT is used for and cigarette consumption, while a significant negative association with previous attempts to quit smoking. This may be expected if we assume that those using NRT for longer periods of time are the most dependent smokers [unpublished]. In contrast, although no association between the frequency of NRT use for harm reduction and cigarette consumption is found, a positive association with smoking cessation is; with those using NRT more frequently for smoking reduction and/or temporary abstinence having higher odds of a previous quit attempt compared to those using NRT infrequently [unpublished].

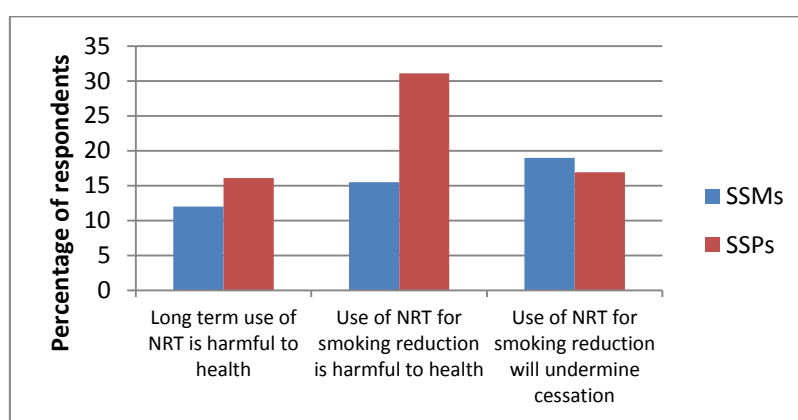
Social/emotional circumstance and characteristics of smokers: it is quite likely that the emotional state and social circumstance of the smoker will affect cigarette consumption. Socio-demographic and smoking characteristics are also likely to be influential. Analysis of data from the Smoking Toolkit Study has found that amongst those attempting harm reduction, the odds of reporting a previous attempt to quit smoking is higher for females with a high nicotine dependency and those of a younger age. In contrast, cigarette consumption appears to be the lowest amongst female smokers of a young age, of a low nicotine dependency and high social-grade [unpublished].

Health care professionals' beliefs about the use of NRT for harm reduction purposes

Some are concerned that healthcare professionals, who have traditionally been provided with abrupt cessation only messages, would not be accepting of a harm reduction approach. This is of particular importance given that stop smoking services may offer NRT for harm reduction purposes as a route to quit in the near future. Failure to recommend tobacco harm reduction

strategies in a suitable manner could represent a missed opportunity to capitalise on the medical encounter.

A number of factors will be important in whether or not health care professionals offer harm reduction as a treatment option [11], including their beliefs. A recent survey of stop smoking managers and practitioners found that a significant proportion of those working in stop smoking services believe that the long term use of NRT and the concurrent use of NRT and cigarettes are harmful to health. A significant proportion also believed that the use of NRT for smoking reduction may undermine smoking cessation [12] (see Figure 4). The most commonly reported harms being that the long-term use of NRT will lead to addiction and oral-mouth cancer, while the use of NRT for smoking reduction will lead to addiction and overdose.



Note: SSPs= stop smoking practitioners; SSMs= stop smoking managers;
Total number of stop smoking practitioners= 484; total number of stop smoking managers= 58

Figure 4: Percentage of stop smoking managers and practitioners reporting that the use of NRT for harm reduction purposes is harmful to health and will undermine smoking cessation

Of interest, is that beliefs differed as a function of managers' relationship with their commissioner and influence on the commissioning process, while among practitioners as a function of the length of time they had been working for, gender, and frequency of update training. This gives some indication as to how these beliefs may be counteracted. Importantly, practitioners who believed that the use of NRT for smoking reduction might hinder cessation were less likely to advise reduction as a treatment option.

Conclusion

It may be concluded from the data presented above that the use of NRT by continuing smokers probably does little to reduce the harm from smoking but far from undermining quitting, it may promote it at a population level. The lack of sizable reductions in cigarette consumption may be due to a number of factors including the under-use of NRT, use of ineffective methods to cut down, the setting of unrealistic goals, and smokers' characteristics.

Consequently, if smokers are to be encouraged to cut down or to use NRT for harm reduction purposes consideration needs to be given to providing additional behavioural support. This may include instructions on how to use NRT and how to attain significant declines in cigarette intake; similar perhaps to the behavioural techniques used in the clinical trials. As it remains possible that smokers may be modifying how they smoke their cigarettes, population based data is also required on the association between NRT use for harm reduction purposes and biological measures of disease risk (for example, NNAL). Finally, further consideration needs to be given to stop smoking managers' and practitioners' inaccurate beliefs about harm reduction, and to the other factors which could affect whether they advise smokers to cut down or to use NRT for smoking reduction and/or during periods of temporary abstinence.

References

1. Beard, E., McNeill, A., Aveyard, P., Fidler, J., Michie, S., & West, R. (2011). Use of nicotine replacement therapy for smoking reduction and during enforced temporary abstinence: A national survey of English smokers. *Addiction*, *106*, 197–204.
2. Beard, E., & West, R. (2012). Use of Nicotine Replacement Therapy for Smoking Reduction and Temporary Abstinence: An update of Beard et al (2011). *Addiction*, *107*(6), 1186-1187.
3. Beard, E., Michie, S., Fidler, J., & West, R. (in press). Use of Nicotine Replacement Therapy in Situations Involving Temporary Abstinence From Smoking: A National Survey of English Smokers. *Addictive Behaviors*, <http://dx.doi.org/10.1016/j.addbeh.2012.09.013>.
4. Beard, E., Vangeli, E., Michie, S., & West, R. (2012). The use of Nicotine Replacement Therapy for smoking reduction and temporary abstinence: An interview study. *Nicotine & Tobacco Research*, *14*(7), 849-856.
5. Moore, D., Aveyard, P., Connock, M., Wang, D., & Fryu-Smith, A. (2009). Effectiveness and safety of nicotine replacement therapy assisted reduction to stop smoking: Systematic review and meta-analysis. *British Medical Journal*, *338*, b1024.
6. Beard, E., McNeill, A., Aveyard, P., Fidler, J., Michie, S., & West, R. (2011). Association between use of nicotine replacement therapy for harm reduction and smoking cessation: a prospective study of English smokers. *Tobacco Control*, [doi:10.1136/tobaccocontrol-2011-050007](https://doi.org/10.1136/tobaccocontrol-2011-050007).
7. Beard, E., Fidler, J., & West, R. (2011). Is use of nicotine replacement therapy while continuing to smoke associated with increased nicotine intake? Evidence from a population sample. *Psychopharmacology*, *218*, 609–610.
8. Beard, E., McNeill, A., Aveyard, P., Fidler, J., Michie, S., & West, R. (2012). Mediation analysis of the association between use of NRT for smoking reduction and attempts to stop. *Psychology & Health*, *27*(9), 1118-1133.
9. Beard, E., & Brown, J., & West, R. (submitted). Does smoking reduction make smokers happier? Evidence from a cross-sectional survey. *British Journal of Health Psychology*.
10. Beard, E., & West, R. (2012). Pilot study of the use of personal carbon monoxide monitoring to achieve radical smoking reduction. *Journal of Smoking Cessation*, *7*(1), 12-17.
11. Michie, S., Johnston, M., Abraham, C., Lawton, R., Parker, D., Walker, A., et al. (2005). Making psychological theory useful for implementing evidence based practice: A consensus approach. *Quality & Safety in Health Care*, *14*, 26–33.

12. Beard, E., McDermott, M., McEwen, A., & West, R. (2012). Beliefs of stop smoking practitioners in England on the use of Nicotine Replacement Therapy for smoking reduction. *Nicotine & Tobacco Research, 14*(6), 639-647.