to smoking habits of the general population for although this could have encouraged acceptance of NSM cigarettes at the beginning of the study it could not have been responsible for the absence of any awareness of the change of cigarettes at the crossover.

The wide range of estimated nicotine deliveries calculated from stub analyses (fig 2) indicates that individual intakes of nicotine and other substances in cigarette smoke cannot be safely deduced from measurements of their yields when the cigarettes are smoked in a standard way by machines. Methods for accurate quantification of individual smoking habits without affecting them are essential in further studies of this kind. Measurements of carboxyhaemoglobin might prove valuable for this purpose.

The reduction of cough score of the men smoking NSM cigarettes before the crossover was temporary and small. The largest difference was between a score of 4 and 5, which represented roughly the difference between "I can only remember coughing a couple of times today" and "I have coughed a few times today." A larger difference might perhaps have been observed if the average score had been higher. The lack of any divergences of score after the crossover may have been due to the small difference in estimated tar—and presumably of compounds of the smoke that cause cough—between the two groups (see table II). That spirometric tests showed no difference is not surprising since there is now evidence that about seven years are required to establish rates of change of these values with sufficient confidence to distinguish even between smokers and non-smokers,[10] and it has been reported that the immediate increase of airways resistance on smoking NSM or conventional cigarettes is similar.[11]

Our main conclusions are: firstly, since cigarettes containing 30% NSM were acceptable to 199 out of 200 heavy cigarette smokers, it is reasonable to suppose such cigarettes are likely to be generally acceptable and those who smoke them may benefit at least by some decrease in cough; secondly, cigarettes with a nicotine delivery of no more than 1·0 mg are also likely to be widely acceptable and smokers who change to this lower level from cigarettes delivering nearly 1·4 mg are unlikely to have any increased exposure to tobacco smoke, as previous studies have suggested.[6-8] Furthermore, since on the reverse change some men changed their smoking habits to avoid a significant increase of nicotine intake, many smokers might in time become accustomed to an even lower yield of nicotine.

These conclusions are based on small samples but are unlikely to be grossly misleading. If correct they are important, for 79 out of 109 brands listed by the Department of Health and Social Security in their tar and nicotine tables in February 1976 delivered more than 1·0 mg nicotine and, with it, a larger dose of tar than most cigarettes delivering less nicotine. According to our findings, many smokers would be quite content and might suffer less harm to their health than at present if stronger brands of cigarettes were not available. Inclusion of NSM in cigarettes night make it easier for the manufacturers to reduce the tar and nicotine.

Further studies of this question are undoubtedly necessary, for our results are based on smokers who were not a random sample of any defined population. Longer trials lasting for as much as five to 10 years would be needed to assess the effects of smoking such cigarettes on lung function or mortality rates from smoking-related diseases. Our findings show how important it is that in such studies careful assessments should be made of any changes in smoking habits that may follow changes in the types of cigarettes smoked.

We would like to thank New Smoking Materials Ltd for their support and, in particular, Dr David Conning and Mr J V Gregg for help with the analysis. We are grateful to Mr Michael Healy of the Clinical Research Centre at Northwick Park Hospital for the statistical design of the study. We would also like to thank Mrs M Stuart, Mrs M Asher-Relf, and Mrs Mary Beyfus for all the help they gave in running the study.

References

1 Todd, G F, *Changes in Smoking Patterns in the UK*. London, Tobacco Research Council, 1975.
2 Medical Research Council's Committee on Research into Chronic Bronchitis. *Questionnaire on Respiratory symptoms and Instructions for its Use*. London, MRC, 1966.
3 Field, G B, *International Journal of Epidemiology*, 1974, **3**, 135.
4 Ingham, J G, *British Journal of Social and Clinical Psychology*, 1965, **4**, 131.
5 Freedman, S, Fletcher, C M, and Field, G B, *Journal of the National Cancer Institute*, 1972, **48**, 1805.
6 Ashton, H, and Watson, D W, *British Medical Journal*, 1970, **3**, 679.
7 Russell, M A H, *et al*, *British Medical Journal*, 1973, **4**, 512.
8 Frith, C D, *Psychopharmacologia*, 1971, **19**, 188.
9 Guillerm, R, *et al*, *Les Bronches*, 1974, **24**, 211.
10 Fletcher, C, *et al*, *The Natural History of Chronic Bronchitis and Emphysema*. London, Oxford University Press, 1976.
11 Costello, J F, *et al*, *Lancet*, 1975, **2**, 678.

Low-tar medium-nicotine cigarettes: a new approach to safer smoking

M A H RUSSELL

British Medical Journal, 1976, **1**, 1430-1433

Summary

The logic of expecting people who cannot stop smoking to switch to cigarettes that have hardly any nicotine is questionable. Tar and nicotine yields of cigarettes available in Britain today correlate 0·93, and further reduction of tar intake is limited by the reluctance of smokers to tolerate similar reductions in nicotine. A new approach would be to aim at lowering tar yields of cigarettes from the present average of 18 mg to around 6 mg but maintaining nicotine yields at around 1·0 to 1·2 mg, which would be acceptable to most smokers. This approach requires that emphasis be placed on tar: nicotine ratios as well as on the absolute yields. These ratios for brands on sale in Britain today average 14·2 and range from 9·6 to 20·8. They provide an additional guide for comparing the relative harmfulness of different brands. For example, 35% of cigarette smokers in Britain smoke either Embassy Filter or Players No 6 Filter; by changing to John Player Carlton King Size they could reduce their tar intake by more than 20% without having to suffer any nicotine deprivation.

Addiction Research Unit, Institute of Psychiatry, Maudsley Hospital, London SE5

M A H RUSSELL, MRCP, MRCPSYCH, senior lecturer and honorary consultant psychiatrist

Introduction

In 20 years there has been only modest success in reducing the prevalence of smoking and the consumption of cigarettes.[1] Health educational emphasis is now shifting to persuading smokers to smoke cigarettes with very low yields of tar and nicotine.[2 3] But smokers cannot easily stop smoking because they are addicted to nicotine,[4 5] and to expect people who cannot stop smoking to smoke cigarettes that have hardly any nicotine is illogical. People smoke for nicotine but they die from the tar. Their risk of lung cancer and bronchitis might be more quickly and effectively reduced if attention were focused on how to reduce their tar intake, irrespective of nicotine intake. The most logical way to do this would be to develop a cigarette with a very low tar yield but a medium nicotine yield. This approach requires that emphasis should be placed on the ratio of tar to nicotine yield as well as on the absolute yields. This paper examines these ratios and the differences between the brands in the latest tar and nicotine yield tables for cigarettes sold in the United Kingdom[2] and suggests how an index based on the ratio of tar to nicotine would serve as an additional guide for assessing the amount of tar likely to be taken in from different brands.

Methods

The data for this study were the official estimates of tar and nicotine yields of cigarettes sold in the United Kingdom and published in January 1976 by the Health Departments of the United Kingdom.[2] The figures for each brand are the mean of samples of 150 cigarettes located in manufacturers' and bonded warehouses between March and August 1975. In the published tables the figures are rounded down, but for this study the Department of Health kindly provided figures to two decimal points. The product-moment correlation and regression line of tar yield on nicotine yield of the 110 brands was calculated. The ratio of tar yield to nicotine yield was also calculated for each brand, giving an index of the yield of tar (mg) per 1·0 mg nicotine.

Results

Tar and nicotine yields of the different brands are shown in table I. The tar yield averaged 18·37 mg (SD 6·0) and the nicotine yield 1·33 mg (SD 0·5), and there was a high positive correlation between them ($r = 0·93$; $P < 0·001$). There were a few brands, however, that produced more than the average amount of tar in relation to nicotine and others that produced a bit less. The ratio of tar yield to nicotine yield for each brand, expressed as mg tar per 1·0 mg nicotine, is shown in table I. The average for all the brands was 14·16 (SD 1·8). In 12 brands the tar:nicotine ratio was unduly high (over 16) and in 10 brands it was relatively low (below 12). There was a small negative correlation between the tar: nicotine ratio and the nicotine yield, with high-nicotine cigarettes tending to yield a little less tar per unit of nicotine and the very low nicotine cigarettes yielding proportionately more ($r = -0·47$; $P < 0·001$).

TABLE I—*Nicotine and tar yield of cigarettes available in Britain in 1975*

Nicotine yield (mg/ cigarette)	Brand	Filter (F) or plain (P)	Tar yield (mg/ cigarette)	Tar: nicotine ratio
	Very low nicotine			
0·06	Embassy Ultra Mild	F	1·25	20·83‡
0·08	Players Mild De Luxe	F	1·37	17·13
0·18	Silk Cut Extra Mild	F	2·27	12·61*
0·49	Piccadilly Mild	F	7·52	15·35
	Low nicotine			
0·65	Player's No 6 Extra Mild	F	8·74	13·45
0·67	Player's Special Mild	F	8·98	13·40
0·67	Silk Cut No 3	F	8·29	12·37
0·68	Silk Cut	F	7·98	11·74*
0·68	Silk Cut No 1	F	8·69	12·78
0·75	Piccadilly No 7	F	13·19	17·59‡
0·75	Silk Cut King Size	F	8·67	11·56*
0·76	Pall Mall Long Size	F	10·48	13·79
0·80	Belair Menthol Kings	F	12·67	15·84
0·80	Consulate Menthol	F	12·60	15·75
0·80	Embassy Extra Mild King Size	F	11·16	13·95
0·82	Rothmans Ransom	F	9·58	11·68*
0·86	Gauloise Disque Bleu	F	15·31	17·80‡
0·87	Embassy Extra Mild	F	11·77	13·53
0·87	Everest Menthol	F	13·41	15·41
0·88	Gauloises Caporal Filter	F	15·23	17·31‡
0·92	St Moritz	F	11·92	12·96
0·94	Kensitas Mild	F	13·69	14·56
0·94	Kent	F	14·91	15·86
1·01	Cambridge	F	16·74	16·57‡
1·03	Guards King Size	F	15·94	15·48
1·04	Gitanes Caporal Filter	F	15·74	15·13
1·06	Camel Filter Tip	F	16·86	15·91
1·06	Piccadilly Filter de Luxe	F	16·86	15·91
1·09	Crown Filter	F	18·16	16·66‡
1·11	Three Castles Filter	F	15·19	13·68
1·14	St Michel Filter	F	21·51	18·87‡
1·16	Benson and Hedges Gold Bond	F	17·17	14·80
1·17	Cadets	F	17·89	15·29
1·17	Guards	F	17·25	14·74
1·19	Embassy Gold	F	17·74	14·91
1·19	Marlboro	F	15·89	13·35
1·20	Benson and Hedges Sovereign	F	17·62	14·68
1·20	Embassy Regal	F	17·19	14·33
1·21	Embassy Plain	P	19·96	16·50‡
1·21	Kent De Luxe Length	F	17·92	14·81
1·22	Peter Stuyvesant King Size	F	15·24	12·49†
1·22	Slim Kings	F	17·99	14·75
1·22	Sobranie Virginia International	F	16·55	13·57
1·25	Woodbine Filter	F	18·13	14·50
1·26	John Player Carlton Premium	F	15·47	12·28†
1·26	Kensitas Club	F	18·81	14·93
1·26	Player's No 6 Classic	F	18·26	14·49
1·27	Nelson	F	18·47	14·54
1·28	Kensitas King Size	F	17·33	13·54
1·29	Cameron	F	19·13	14·83
1·29	Peter Stuyvesant Luxury Length	F	16·64	12·90
1·30	Dunhill King Size	F	18·27	14·05
1·31	Dunhill International	F	18·33	13·99
1·31	Embassy Filter	F	19·08	14·56
1·31	Kensitas Corsair	F	19·02	14·52
1·31	Player's No 6 Filter	F	19·58	14·95
1·32	Kensitas Tipped	F	18·97	14·37
1·32	Park Drive Tipped	F	18·09	13·70
1·32	Player's No 6 Kings	F	19·65	14·89
1·33	John Player Special	F	19·31	14·52
1·33	Louis Rothmans Select	F	16·80	12·63†
1·33	Senior Service Tipped	F	19·22	14·45
1·33	Solent	F	21·54	16·20‡
1·34	Benson and Hedges King Size	F	19·26	14·37
1·36	Embassy Kings	F	19·07	14·02
1·36	Gauloises Caporal Plain	P	23·90	17·57‡
1·36	Sterling	F	19·29	14·18
1·37	Player's No 10	F	19·75	14·42
1·38	John Player Carlton Long Size	F	15·59	11·30*
1·39	Du Maurier	F	19·49	14·02
1·39	Player's Gold Leaf	F	19·99	14·38
1·39	Rothmans International	F	17·26	12·42†
1·42	Bachelor	F	21·40	15·07
1·42	John Player Kings	F	20·58	14·49
1·42	Piccadilly King Size	F	20·25	14·26
1·43	Craven A Cork Tipped	P	23·23	16·24‡
1·44	John Player Carlton King Size	F	15·28	10·61*
1·44	Lark Filter Tip	F	18·34	12·74†
1·48	Chesterfield Filter Tip	F	18·83	12·72†
1·48	Gitanes Caporal Plain	P	23·07	15·59
1·48	Player's Gold Leaf King Size	F	20·17	13·63
1·48	Rothmans King Size	F	21·08	14·24
1·49	Piccadilly No 1	P	23·61	15·85
	High nicotine			
1·50	Weights Filter	F	19·03	12·69
1·51	Player's Filter Virginia	F	21·85	14·47
1·52	L and M Box Filter Tip	F	18·85	12·40
1·55	Player's Perfectos	F	21·55	13·90
1·58	Silva Thins	F	20·39	12·91
1·61	Richmond Plain	P	22·66	14·07
1·63	Lambert and Butler International Size	F	19·60	12·02
1·63	Player's Mild Navy Cut	P	20·40	12·52
1·67	Player's No 6 Plain	P	24·41	14·62
1·68	Weights Plain	P	24·54	14·61
1·71	Kensitas Plain	P	22·79	13·33
1·73	Gallaher's De Luxe Mild	P	23·70	13·70
1·80	Richmond Filter	F	24·58	13·66
1·83	Woodbine Plain	P	24·18	13·21
1·86	Senior Service Plain	P	26·08	14·02
1·87	Player's Medium Navy Cut	P	26·16	13·99
1·89	Capstan Medium	P	26·84	14·20
1·95	Park Drive Plain	P	24·82	12·73
	Very high nicotine			
2·09	Gold Falke	P	27·12	12·98
2·11	Churchman's No 1	P	31·67	15·01
2·16	Pall Mall Filter	F	20·66	9·56†
2·18	Player's No 3	P	32·02	14·69
2·30	Gallaher's De Luxe Medium	P	30·10	13·09
2·40	Lucky Filters	F	23·33	9·72†
2·56	Lucky Strike Plain	P	29·92	11·69
3·18	Pall Mall King Size	P	34·53	10·86
3·39	Capstan Full Strength	P	33·97	10·02

The brands are grouped according to nicotine yield. Smokers should try to switch to a low or very low nicotine brand and select the brand in that nicotine yield group that has the lowest tar:nicotine ratio. The least harmful and most harmful brands *in each group* are marked as follows:
*Recommended brands. †Less harmful brands. ‡Most harmful brands.

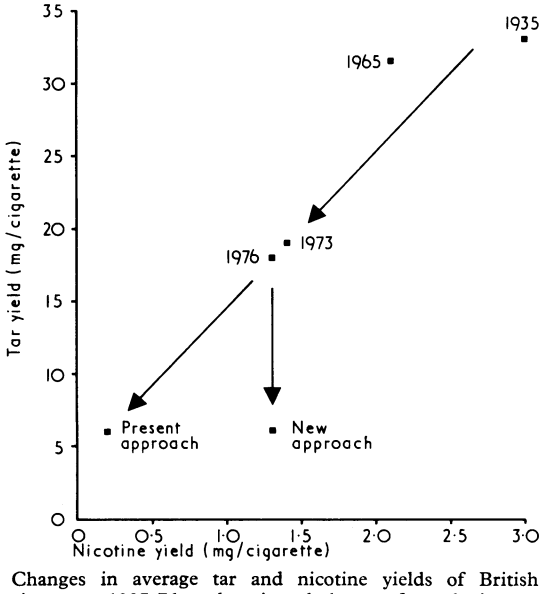
Discussion

The obvious approach to safer cigarettes would seem to be to identify and then reduce the harmful products in the mainstream smoke, but it is not quite so straightforward. Of the many harmful components of cigarette smoke, tar is probably most lethal and is generally held to be responsible for cigarette-induced lung cancer and bronchitis.[6] A case is beginning to emerge for attributing to carbon monoxide (CO) the increased risk of coronary heart disease among cigarette smokers.[7 8] The amount of damage caused by other toxic components is less clear, though several have been listed by the Hunter Committee as warranting attention[9]; these include hydrogen cyanide, phenols, aldehydes, oxides of nitrogen and sulphur, ammonia, hydrogen sulphide, nitrosamines, and toxic metals. Few would argue that cigarettes would be less harmful if the yields of all these poisons were substantially reduced.

What about nicotine? There is no firm evidence that it is harmful in smoking doses, though it has not been cleared of contributing to cardiovascular disease or harming the fetus. Because of this doubt it is certainly desirable that smokers should take in as little nicotine as possible. But nicotine is the primary addictive component of tobacco,[4 5] so that it is not really feasible to lower the nicotine yields of cigarettes beyond the minimal requirements of smokers. In theory, so long as sufficient nicotine is present, reducing all the other harmful constituents to very low levels would be tolerated by smokers. In practice, some adjustment may be necessary to changes in and loss of flavour contained in the tar.

LOW-TAR LOW-NICOTINE APPROACH

The average tar and nicotine yields of British cigarettes have declined considerably. The average yields per cigarette were 32·8 mg tar and 3·0 mg nicotine in 1935; 31·4 mg tar and 2·1 mg nicotine in 1965; and 18·7 mg tar and 1·4 mg nicotine in 1973.[10] These reductions were mainly due to the massive swing since 1955 from the use of plain to filter-tipped cigarettes. In 1955 fewer than 2% of all cigarettes smoked were filter-tipped; by 1960 the figure was 16% and in 1970 it was over 78%.[1] There are already indications that this change has considerably reduced the risk of lung cancer in smokers.[8 11] This is a major achievement and will probably save more lives than much fruitless effort to persuade people not to smoke. It may not be over-cynical to suggest that it was motivated by financial cost rather than concern for health, the price of filter paper being a good deal less than that of highly taxed tobacco.



Changes in average tar and nicotine yields of British cigarettes, 1935-76, and projected changes for reducing tar intake to 33% of 1976 level.

This trend to lower tar and nicotine yields seems now to have flattened however, and there has been little change since 1973 (see figure). The latest figures for cigarettes tested in the second half of 1975 (table I) showed average yields of 18·4 mg tar and 1·3 mg nicotine compared with 18·7 mg tar and 1·4 mg nicotine in 1973. This flattening in the rate of decline of tar and nicotine yields since 1973 has occurred despite the fact that over this precise period the Government has taken its first positive action by publishing their first official tar and nicotine table in April 1973 and subsequent tables at six-monthly intervals[2 3]—not to mention the clear advice, printed on these tables, urging smokers who cannot stop to switch to a brand with a lower tar yield. The Health Education Council too has attempted to persuade smokers to change to low-tar brands.

This apparent barrier at an average nicotine yield of around 1·0 mg or more suggests that smokers go no lower because to do so deprives them of satisfaction. Table I shows the striking predominance of brands in the medium-nicotine range. This is mirrored by the nicotine yields of the most popular brands shown in table II. One in three of all cigarette smokers in Britain smoke either Embassy Filter or Players No 6 Filter,[12] both of which have a nicotine yield of 1·3 mg; and about 75% of cigarette smokers choose cigarettes in the medium-nicotine range, whereas no more than 12% smoke a brand with a yield of less than 1·0 mg.[12]

TABLE II—*Nicotine yields of most popular brands of cigarette sold in Britain*

	Nicotine yield (mg)	% of smokers who smoked it regularly in 1975*
Players No 6 Filter	1·3	19
Embassy Filter	1·3	16
Embassy Regal	1·2	11
Benson and Hedges King Size	1·3	7
Players No 10 Filter	1·4	6
Rothmans King Size	1·5	3
Benson and Hedges Sovereign	1·2	3
Park Drive Plain	2·0	3
Woodbine Plain	1·8	3
		71

*Abstracted from survey of representative sample of 1574 cigarette smokers in Britain carried out in September 1975 by NOP Market Research Limited.[12]

The proportion of smokers who regularly smoke a low-nicotine brand is apparently increasing slowly but it is unlikely that a substantial majority will ever be satisfied by very low nicotine levels. Furthermore, many who do succeed in switching to low-nicotine cigarettes may achieve this only because they compensate by taking more puffs or inhaling more deeply, in which case much of the benefit of having switched to a low-tar low-nicotine brand is cancelled out.

Hence, although the low-tar low-nicotine approach has achieved much, and the filter-tipped cigarettes smoked by most smokers today are a good deal less harmful than the plain cigarettes of 20 years ago, further progress is hampered by a nicotine-need barrier. In my view, merely to continue along the same lines will achieve little more. A new approach is necessary. Fortunately a low-tar medium-nicotine approach has enormous potential.

LOW-TAR MEDIUM-NICOTINE APPROACH

The logic behind a low-tar medium-nicotine approach is very simple. Most smokers smoke to obtain nicotine and do not stop smoking because they cannot easily do without it. For the same reason they cannot easily switch to cigarettes with a very low nicotine yield. Unfortunately, with today's cigarettes the yields

of tar and nicotine are locked together so that the correlation between them is high (0·93). This means that most smokers cannot switch to a brand with a very low tar yield without also having to put up with a very low nicotine yield. Only the 12% of smokers who tolerate a nicotine yield below 1·0 mg can lower their risks of cancer and bronchitis by smoking cigarettes with the relatively low tar yields of 10 mg or less. The majority who require cigarettes with a nicotine yield of 1·3 or more are forced to also take in a tar yield of 18 mg or more. What most smokers require is a cigarette with a medium nicotine yield (1·0-1·5 mg) but a low or very low, rather than medium, tar yield. This would not save them from the lesser risks of a medium-nicotine intake but would enable them to reduce the far greater risks of a medium-tar intake.

Such cigarettes are unfortunately not yet available, but this is largely because no one has thought of making them. Table I shows, however, that there is some variation between brands in tar: nicotine ratio. On average, a smoker must take about 14 mg of tar into his lungs if he is to enjoy the effect of 1 mg of nicotine. Nevertheless, some brands allow this to be enjoyed at a cost of less than 12 mg of tar whereas others produce more than 16 mg of tar for the same amount of nicotine (table I). I am suggesting that the smoker should be allowed about 1·0 mg nicotine at a cost of about 5 mg tar. This is certainly not beyond the technical skills of the tobacco industry. All they require is the motivation to channel their skills in this direction.

This motivation might be provided if the Government, in their six-monthly tar and nicotine tables, would focus attention not so much on the tar yield (for this is how they currently categorise groups of cigarette brands) but on the nicotine yield and the ratio of tar to nicotine, as in table I. This would enable smokers to get down to as low a nicotine level as possible (for this too is desirable) and to then choose the safest cigarette at this level in terms of tar: nicotine ratio. In other words, they could choose the brand that produced the least amount of tar in relation to their individual nicotine need. Table I shows the safest and most hazardous brands for each nicotine level. If, for example, the 35% of cigarette smokers who smoke the two most popular brands (Embassy Filter, Players No 6 Filter) were to switch to John Player Carlton King Size they would overnight reduce their tar intake by at least 20% without having to suffer any nicotine deprivation. Such publicity and openness would influence consumer demand and stimulate competition among tobacco companies to produce increasingly safer cigarettes. If such a response is too sluggish selective taxation would provide an effective tonic. Similar principles could be applied to reducing the intake of carbon monoxide and other harmful components of tobacco smoke.

A word of caution is necessary: the amount of tar taken in is not the only criterion of tar hazard. The tar from different brands of cigarette may vary in harmfulness ("specific carcinogenicity") and in its interaction with other components of smoke. One study, however, has shown that reducing the tar: nicotine ratio does not increase mouse skin carcinogenicity.[13]

HOW TO REDUCE NATIONAL TAR INTAKE BY TWO-THIRDS

Theoretically there are four different ways to reduce, by as much as two-thirds, the tar intake into the nation's lungs. The first would be to reduce the prevalence of smoking by two-thirds. This approach has failed in the past and is unlikely to succeed in the foreseeable future. Moreover, if it is the lighter, less-addicted smokers who stop the drop in prevalence would have to be more than two-thirds for the overall tar intake to be reduced by this amount. The second approach would be to persuade the smoking population to cut down their cigarette consumption by two-thirds. This too has failed in the past and is in the long-term as difficult as giving up smoking altogether. The third approach would be to persuade smokers to smoke cigarettes with an average tar yield of 6·0 mg rather than the current average of about 18·0 mg. But to achieve this with present-day cigarettes would require that smokers tolerate a reduction in nicotine yield from the current average of 1·3 mg down to about 0·4 or 0·5 mg, and this too seems unlikely. The fourth, logical and realistic approach would be to lower the tar yields of cigarettes to an average of 6·0 mg while maintaining a medium nicotine yield of around 1·0 to 1·3 mg (see figure). By such means it might be possible to lower the intake of tar into the nation's lungs by as much as two-thirds by the early 1980s.

I thank Dr Griffith Edwards, Dr Malcolm Lader, and Mr G F Todd for their helpful comments, Nigel Rawson for checking the statistical calculations, Jean Crutch for secretarial help, and the Medical Research Council and the Department of Health and Social Security for financial support.

References

1 Todd, G F, (editor), *Statistics of Smoking in the United Kingdom*. London, Tobacco Research Council, 1972 and supplements, 1973, 1974.
2 Health Departments of the United Kingdom. *Tar and Nicotine Yields of Cigarettes*. London, DHSS, January 1976.
3 Department of Health and Social Security, *Report of the Standing Scientific Liaison Committee to the Secretary of State for Social Services on the Publication of Tar and Nicotine Yields of Packeted Cigarettes*. London, DHSS, 1973.
4 Russell, M A H, *Lancet*, 1974, **1**, 254.
5 Russell, M A H, in *Research Advances in Alcohol and Drug Problems*, vol 3, ed R J Gibbins *et al*. New York, Wiley and Sons, in press.
6 Royal College of Physicians, *Smoking and Health Now*. London, Pitman, 1971.
7 Astrup, P, *British Medical Journal*, 1972, **4**, 447.
8 Wald, N J, *Lancet*, 1976, **1**, 136.
9 Department of Health and Social Security, *Tobacco Substitutes and Additives in Tobacco Products*, First Report of the Independent Scientific Committee on Smoking and Health. London, HMSO, 1975.
10 Todd, G F, *Changes in Smoking Patterns in the UK*. London, Tobacco Research Council, 1975.
11 Wynder, E L, Mabuchi, K, and Beattie, E J, *Journal of the American Medical Association*, 1970, **213**, 2221.
12 NOP Market Research Limited. *Report on a Survey carried out for the Office of Population Censuses and Surveys*. London, October 1975.
13 Davies, R F, and Whitehead, J K, *British Journal of Cancer*, 1970, **24**, 191.