Report of the Standing Scientific Liaison Committee (on the scientific aspects of Smoking and Health) to the Secretary of State for Social Services on the publication of tar and nicotine yields of packeted cigarettes.

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DEPARTMENT OF HEALTH AND SOCIAL SECURITY

[1972]

Standing Scientific Liaison Committee on the Scientific Aspects of Smoking and Health

REPORT TO THE SECRETARY OF STATE ON THE PUBLICATION OF TAR AND NICOTINE YIELDS OF PACKETED CIGARETTES

The Committee* was asked to advise the Secretary of State on the scientific aspects of matters relating to smoking and health, specifically:

"To advise on the significance to health of tar and nicotine yields of cigarettes and how information on the yields and their significance to health can best be made available to the public and how the determinations should be carried out for this purpose".

The Committee has now given consideration to this part of its terms of reference and submits the following report. It intends to keep the subject under review.

1. The Significance to Health of Tar and Nicotine

1.1 Cigarette smokers have on average shorter lives than non-smokers. The main causes of their premature deaths are cancer of the lung, chronic bronchitis and emphysema, and coronary heart disease. In heavy cigarette smokers the death rate is higher than in light smokers. Epidemiological studies show the gross effects of whole tobacco smoke, and the role of the separate constituents must be inferred, in part from animal studies. It is possible that the constituents act together in the pathogenesis of at least some of the diseases associated with smoking.

1.2 Cigarette smoke consists of a gas phase and of a complex tar, containing over a thousand compounds, from which nicotine alkaloids can be separated. The evidence on the significance to health of tar and nicotine is examined in detail in the Royal College of Physicians' report "Smoking and Health Now" (January 1971)** in which a full list of references is given.

* Membership
Chairman – Dr R H L Cohen (Deputy Chief Medical Officer; DHSS)
Members – Dr H R Bentley (Imperial Tobacco)
Professor C T Dollery (Royal Postgraduate Medical School)
Dr J C Gilson (Medical Research Council)
Mr G W Moore (Carreras)
Professor Lynne Reid (Institute of Diseases of the Chest)
Professor G A Rose (St Mary's Hospital Medical School)
Mr J O'G Tatton (Laboratory of the Government Chemist)

Dr R W J Williams (Carreras)
Mr W D K Wilson (Gallaher)
Secretariat – Dr F Fairweather (DHSS)
Dr J Dawkins (DHSS)
Miss M E Stuart (DHSS)

** Pitmans Medical and Scientific

1.3 The Royal College of Physicians' Report concluded that there is good presumptive evidence that the deposition of tar in the lungs of cigarette smokers is an important factor in causing cancer of the lung and that it contributes to chronic bronchitis and emphysema. A dose response relationship exists in man between the incidence of cancer of the lung and the amount smoked, and more recent studies with filter-tipped cigarettes have suggested that the risk of developing lung cancer may be reduced by smoking low tar-delivery cigarettes.

1.4 Evidence for the role of nicotine in causing direct damage to health is less conclusive though it is reasonable to deduce that it may play a part in cardiovascular disease. Its most significant role may be that it is a source of satisfaction to the smoker and contributes to the development of dependence on cigarettes and to the attendant difficulty in giving up the habit.

1.5 The vapour phase of cigarette smoke contains irritant gases and carbon monoxide which may contribute to pulmonary and cardio-vascular disease respectively.

2. Publication of the Tar and Nicotine Yields of Packeted Cigarettes

2.1 The Committee considers that there is sufficient evidence to act on the view that cigarettes with a low tar yield are less dangerous than those with a high yield and that there would be merit in encouraging smokers to change to lower tar-yield cigarettes if the risks of continuing to smoke are made clear to them and if they cannot stop smoking altogether. The evidence about the effects of nicotine is less conclusive, but in any case tar and nicotine content tend to be reduced together although not necessarily pro rata.

2.2 The Committee recommends that details of both the tar and nicotine yields of all the important brands on sale in the UK should be made available to the public so that smokers can make an informed choice of which brand to use. Details of the brands which should be included are given in Appendix B, together with a suggested method for dealing with new brands.

2.3 Any published data should be accompanied by an explanatory note by the appropriate Government agency about the known effects of tar and nicotine. It should emphasise that changing to low tar and nicotine cigarettes is only a means of reducing risk; such cigarettes are not safe.

2.4 While encouraging smokers to choose cigarettes with both a low tar and nicotine yield, the note should concentrate especially on tar.

2.5 Consumers should be informed that small differences between brands in tar yield, that is differences of the order of 2 mg per cigarette, might be the result of temporary fluctuations in the constituents or of limitations in the method of analysis.

2.6 Because the smoker can vary his own intake of tar and nicotine by the way he smokes whichever brand he chooses, he could, without realising it, nullify any beneficial effects from a change to lower-tar yield cigarettes. The publication should give warning of this and include hints on less dangerous smoking techniques.

2.7 The explanatory note should also make it clear that tar and nicotine are not the only harmful constituents and a paragraph should be added on the vapour phase of cigarette smoking which contains irritant gases and carbon monoxide which could contribute to chronic bronchitis and cardiovascular diseases respectively.

2.8 Appendix A sets out in more detail the Committee's views on publication. The Committee has given much thought to the need to present the data to the consumer in a form which would help him to interpret it and select a cigarette which might carry less risk. The Appendix therefore includes some suggestions about methods of presentation as well as content which may be used as a basis for consultations with publicity experts, and tobacco manufacturers where appropriate.

2.9 The Committee* favours not only the publication of tabulated figures with explanatory notes but also the division of brands into broad groups according to their tar yield.

2.10 There was general agreement that there would be great technical and administrative difficulty in printing on each packet an accurate estimate of the tar and nicotine yield of the cigarettes in the packet. However, the majority of members* felt that a voluntary agreement should be sought with the tobacco manufacturers so that an indication of this grouping, in descriptive terms, could be shown on packets; they thought that any agreement reached should ensure that all packets of

*Carreras dissented on this point on the grounds that grouping would over simplify the information contained in the tables and would lead to it being used incorrectly.

brands included in the publication should be marked – not just those with a low tar delivery. The Committee was not in a position to assess all the practical difficulties of doing this.

It was also recognised that it might be difficult to secure agreement in respect of any imported brands included in the publication.

2.11 It was felt important that the manufacturers should agree that no figures for tar and nicotine, or broad descriptions of the levels of these, would be used in any publicity either for existing or new brands in advance of the first publication of figures by the Government.

3. Method of Determining the Tar and Nicotine Yields of Cigarettes

3.1 The amounts of tar and nicotine found on laboratory examination vary according to many factors including the type of machine, the precise technique and the smoking specifications used (for example the duration of the puff, the number of puffs and the interval between them, and the length of butt which remains unsmoked). For this reason the Committee considers it essential that all the tests should be carried out on one type of machine by one laboratory under uniform conditions.

3.2 The Laboratory of the Government Chemist seemed the most appropriate body to carry out these tests, and would be acceptable to the industry and the public. So that no time should be lost should publication become the Government's policy, the Government Chemist has been approached and has agreed to undertake this work.

3.3 The Committee was advised that the determinations of tar and nicotine should be made using a machine of the Phipps and Bird type which incorporates the facilities and exhibits the qualities considered desirable by the International Organisation for Standardization's Technical Committee 126. One such machine has been obtained by the Government Chemist from Cigarette Components Ltd., who make this type of machine in the UK under licence from Philip Morris Inc of the USA: it will be paid for by the Department of Health and Social Security for the Government Chemist's use.

3.4 Appendix B sets out in more detail the Committee's recommendations for the method of undertaking the sampling of the cigarettes and the determination of their tar and nicotine yields.

4. Summary of Recommendations

4.1 The tar and nicotine yields of all important brands of packeted cigarettes sold in the UK should be published twice a year.

4.2 Analyses should be undertaken by the Laboratory of the Government Chemist.

4.3 The published figures should be accompanied by information which will educate the public about the effects of tar and nicotine and encourage smokers to change to brands with a lower tar yield. Advice should be sought from publicity experts on the best method of presenting this.

4.4 The published figures should be divided into broad groups according to their tar yield and agreement should be sought with the tobacco manufacturers for a description of these groups to be indicated on packets of all brands included in the table.

APPENDIX A

Publication of the Tar and Nicotine Yields of Packeted Cigarettes

1. If publication is to have an effect on health it should be in a form which combines the maximum useful information with simplicity. Most of the following suggestions have advantages and disadvantages and it is suggested that the advice of publicity experts should be sought so that the approach which would be most readily understood by the public can be adopted.

2. The explanatory text should make it clear that tar delivery is of primary importance and should seek to influence smokers to choose those brands which yield significantly less tar. Encouragement to smokers to choose lower nicotine brands should be secondary to this.

3. Brands should be listed in order of tar deliveries.

4. Figures for tar yield should be reported to the nearest milligram and for nicotine yield to the nearest 0.1 milligram per cigarette.

5. Yields for nicotine should also be included because nicotine may affect health as well as leading to dependence on cigarettes. Moreover the public will expect to see nicotine listed since they are better acquainted with it than with tar. Although the techniques used measure nicotine alkaloids and not nicotine as such it is felt that publications should, as in other countries that publish figures, refer to 'nicotine' to avoid confusing the public unnecessarily.

6. The tar and nicotine yields of all important brands bought by British consumers should be published (see paragraph 4 of Appendix B).

7. Special arrangements will be required for new brands; these are discussed in detail in paragraph 5 of Appendix B. Manufacturer's estimates should be added as a separate section of the table and headed:– 'New brands not yet analysed by the Government Chemist; estimates by the manufacturer'.

8. It seems doubtful whether the simple tabulation of tar and nicotine yields, even with explanatory notes, would make it easy enough in practice for the individual smoker to make an informed choice. This could perhaps be achieved if brands were to be divided into broad groups according to their tar yields and given a description which could be printed on the packet; the feasibility of this should be discussed with the manufacturers.

9. The Committee considered a number of different ways of presenting the table and of descriptions and symbols which could be used on the packet. It felt that the two groupings set out below were the best possibilities and that the views of publicity experts should be sought as to which of these would be most effective in helping people to switch to a lower tar-yield cigarette. Some revision of the groupings in terms of mg ranges may be necessary in the light of the first set of results produced by the Government Chemist.

	Grouping	*Description on packet*
(i)	5 groups:–	
	∠ 15 mg	Low tar
	15 – 19.9mg	Medium low tar
	20 – 24.9mg	Medium tar
	25 – 29.9mg	High tar
	30 +mg	Very high tar
(ii)	3 groups:–	
	∠ 20 mg	Low tar
	20 – 24.9mg	Medium tar
	25 +mg	High tar

10. Each of these possible alternatives is open to the objection that it is arbitrary and raises problems which must be carefully handled if the presentation is not to be misleading. One difficulty is to avoid repeated changes in the brand ranking order due to normal manufacturing, experimental and sampling variations. The Committee therefore feels that the group in which a brand appears on the table or the marking on the packet should not be altered unless the change in content since the preceding publication is statistically significant.

11. The Committee also considered what description of the cigarette should be included in the tabulation, for example – weight, length, type of filter and price. It decided that cigarettes should simply be described as plain or filter but that the possibility of including price should be further considered as it might help the consumer to select a lower tar cigarette which he could afford.

12. The Committee recommends that this information should be publicised in all suitable forms; the following are suggested:–

(a) on posters – at retail outlets and elsewhere.

(b) in the press.

(c) ratings should be included on all cigarette packets and cigarette advertisements.

(d) rating cards should be available to the public – probably at retail outlets.

(e) television coverage should be given to the fact that data has been published but should not cover the actual figures for brands since this would inevitably involve some latent advertising.

(f) in health care establishments and chemists' shops.

13. Press notices etc accompanying each publication after the first could point out the numbers of brands which have significantly increased or decreased their tar yield. It should be considered whether it would be helpful to add to the published data the statistically significant changes in the tar delivery since the last publication. This could be done on the same lines as published share prices (ie + or – xmg) after any brand in which there had been such a change.

14. The first publication should be accompanied by information showing how much tar delivery has been reduced by the manufacturers over the years since this will show that consumers can accept lower tar delivery cigarettes and have in fact done so.

Publication of Data: Accompanying Explanation

The table shows the amounts of both 'tar' and nicotine which were obtained from samples of the various brands of cigarettes purchased in retail outlets during the previous 6 months when smoked on a machine in the Laboratory of the Government Chemist.

The figures in the table are averages obtained from samples of 150 cigarettes of each brand. Differences between brands of the order of

2 mg of 'tar' could be due to sampling and experimental errors and can generally be ignored.

It should be emphasised that the level of 'tar' yield is more important to health than the level of nicotine.

Cigarette smoke 'tar' is known to contain substances which can cause cancer and is thought to be also a major factor in causing bronchitis and emphysema. There are good grounds for believing that those smokers who choose to continue smoking are rather less likely to damage their health if they smoke cigarettes with a low 'tar' yield.

Nicotine is known to have an effect on the heart and may help to cause heart disease.

Cigarette smoke also contains irritating gases which may contribute to bronchitis and emphysema and carbon monoxide in quantities which might damage the heart and blood vessels; these gases may not be reduced by filters. Smokers should therefore seek other ways of reducing the amount of smoke taken into their lungs.

Our advice is:

STOP SMOKING. If you cannot, the following steps reduce the risk:—

(i) Smoke a brand of cigarettes with a 'tar' yield lower than the brand you smoke at present ie move to a brand in a lower 'tar' group; and aim progressively to reduce still further.

(ii) Smoke fewer cigarettes.

(iii) Take fewer puffs from each cigarette.

(iv) Do not inhale.

(v) Leave a longer "stub" — the 'tar' and nicotine become more concentrated as the cigarette is smoked.

(vi) Take the cigarette out of your mouth between puffs.

APPENDIX B

Methods of Sampling and Determining the Tar and Nicotine Yields of Packeted Cigarettes

A. Sampling

1. The method suggested below is the simplest which will produce statistically reliable results:—

(a) A sample size of 150 cigarettes of each brand should be

adopted initially; subject to reconsideration of the accuracy of the resulting mean estimates.

(b) Samples of 90 packs of 20 cigarettes for each brand should be collected from retail outlets (with quick turnovers) throughout the country rather than direct from factories. Special arrangements will be necessary for brands only available from restricted outlets.

(c) Sampling should take place continuously throughout the year.

(d) Samples should be reconditioned before testing to eliminate some of the variations resulting from different conditions of storage.

(e) Samples should be split and one-third sent to the Government Chemist for analysis; one-third to the TRC, and one-third to the manufacturers for comparative purposes.

2. A reputable agency should be employed to undertake the sampling.

3. Published data should relate to the analysis of samples collected over the preceding six months.

4. All important brands of cigarettes sold in the UK should be included. These would consist of:—

(a) all brands manufactured in the UK which appeared on the price-lists of Imperial, Gallaher and Carreras/Rothmans. The use of the price-lists would mean that brands which were marketed for short periods for trade mark purposes and those which were being test-marketed (ie for periods of not more than one year) would be excluded.

(b) Any brand of cigarettes which has estimated sales of 10,000,000 or more per year which is manufactured in the UK by a firm other than Imperial, Gallaher and Carreras/Rothmans.

(c) Any brand which any manufacturer requests should be included in the publication, subject to the discretion of the Government Chemist concerning the number of brands which can be analysed in the time available.

(d) Any imported brand of cigarettes which are estimated to have achieved sales of 10,000,000 or more per year.

5. For new brands which are brought onto the market after the sampling has begun for the next publication (ie after 'month one' in

the cycle) manufacturers should use their own estimates of the tar and nicotine yields of the brand in advertisements and on packets and should submit the figures for inclusion in the next published table in a separate section dealing with manufacturer's estimate. However this should only apply to figures obtained from laboratories whose techniques had been shown by inter-laboratory comparisons to be in line with that of the Government Chemist. Small manufacturers wishing to have a new brand included in the publication would thus have to arrange for one of the three large manufacturers to undertake the analysis for them or to make other arrangements for example with the TRC laboratories, the Huntingdon Research Centre or a similar concern. Special consideration would be needed of figures from a laboratory which had been shown to be consistently out of line with those of the Government Chemist and other laboratories. No figures for tar and nicotine yields should be used by manufacturers in advance of the official publication of the first set of results.

B. Determinations

6. Determinations should be carried out by the Government Chemist's Laboratory using a Phipps and Bird type machine conforming to the recommendations of ISO/TC 126.

7. International standards should be used wherever possible but some modification for British habits might need to be made, for example in the standard butt length used.

8. Average butt length – the butt length used internationally (although not yet formally adopted) is that based on the American butt length; this is known to be considerably longer than the average British butt length. Since the length of butt used during the analysis is known to affect the relative ranking of brands, the Committee thinks the British butt length should be used as this would result in figures which were more relevant to the British smoker. The TRC are at present engaged in a survey to determine the average butt length in the UK and the Committee would like to reserve its final position on this until the results are known and can be compared with the butt length adopted by the International Standards Organisation. It is thought that both these figures should be available soon.

9. The Committee recommends that tar should be tested as particulate matter, water and nicotine free, rather than wet since this gives a more reliable picture of relative ranking. The US figures are determined on this basis but the Canadian figures (and those published in *'Which'*) were based on wet tar measurements.

10. Figures given for "nicotine" really refer to nicotine alkaloid; the Committee recommends that measurements for nicotine alkaloid should be made for the present and that measurements for nicotine uniquely (which involves the more complicated gas chromatographic method) should be considered at a later date if cigars or air-cured tobacco were to be included in the analyses. In the meantime the publication should refer to nicotine rather than "nicotine alkaloid" to avoid confusing the public.

11. Tar should be published by weight rather than in terms of specific carcinogenicity since the latter is not practicable at the moment as several thousands of mice would be needed to test each brand each year.

12. The Government Chemist should provide figures which are accurate to 0.1mg of tar and 0.01mg nicotine but published data should report tar to the nearest mg and nicotine to the nearest 0.1mg.

13. A paper should be published in the scientific press setting out in detail the methods used in the determinations and should include data on standard errors, confidence limits, within-brand variability etc. Reprints of the article should be readily available.

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