6-page handout distributed by Richard Peto to all journalists at the 10 Dec 1980 press launch of HJ Eysenck's book entitled "The causes and effects of smoking" in Committee Room 1, Inst. of Education, Bedford Way, WC1

Request to journalists

The large majority of doctors and scientists who have examined the evidence that smoking causes lung cancer have found it wholly convincing. Professor Eysenck now claims to have refuted so much of this evidence that, in his own words (p.32), the "facts" he sets out "are quite incompatible with the 'smoking causes cancer' hypothesis". Inevitably, these conflicting conclusions on a matter of substantial public importance are newsworthy, and for the purposes of selling a book almost any publicity is good publicity. Indeed, the best publicity of all for the book might be newspaper articles suggesting that "experts now disagree". However, what is good for the sales of this book might be bad for the public health. The substance of Eysenck's various arguments concerning smoking and lung cancer is trivially wrong (not wrong for subtle, complicated reasons, but wrong for simple, straightforward reasons that, once pointed out, should be clear to most ordinary non-scientists as well as to specialists). It is therefore undesirable that articles asserting that experts disagree as to whether smoking causes lung cancer should appear throughout the public press (like the articles in 1975/6 when these same fallacious arguments were first propounded by Burch). The request to journalists is simply this:

1. Please examine the attached evidence that smoking causes lung cancer.

2. Please examine the attached reasons for rejecting Professor Eysenck's assertions on smoking and lung cancer.

3. Please see whether Professor Eysenck can defend the relevant parts of his book against these criticisms to your satisfaction.

4. If, as a result of this, you are convinced that Eysenck's assertions are indeed clearly wrong, please for the sake of the public health avoid giving your readers the impression that experts disagree as to whether smoking causes lung cancer.

The Minister for Health recently stated in the House of Commons that about one in four young men who smoke cigarettes regularly will be killed before their time by tobacco. If this is indeed approximately true, then you as journalists have a responsibility to do what you can not to misinform the public. It may be easier (and perhaps even more newsworthy) to say "experts disagree" and not to get yourselves immersed in details, but you should on this occasion refuse to be used by Professor Eysenck and his publishers.

The evidence that cigarette smoking causes lung cancer includes

1. Cigarette smoke droplets can cause skin cancer in animals

Cigarette smoke consists of a mixture of gases and tiny droplets. If cigarettes are smoked into a machine and the droplets are collected, and the resulting tarry cigarette smoke "condensate" is smeared in the same place every week onto the backs of laboratory mice (or onto various other species) cancers will arise in the repeatedly-treated area of the back. If various internal organs of animals are exposed to certain of the chemicals in cigarette smoke condensate, cancers may likewise be elicited. The ability of these agents to cause cancer seems to be a common effect on many different types of living tissue.

2. Animals that have been exposed for longest are at greatest risk of cancer

Mice which start regular treatment with extracts of cigarette smoke early in life are at much greater risk in old age than those whose treatment starts a little later. For example, if 2 groups of mice start regular weekly treatment either at 10 or at 25 weeks of age, then when the cancer-free survivors in both groups are both 75 weeks of age the rate of onset of new cancers would typically be about ten times greater among the early starters (from Brit.J.Cancer 1975, 411).

3. Prolonged regular cigarette smoking gives the greatest risk in humans

Among people of a given age (e.g. 60), those who started to smoke cigarettes earliest are likewise at much the greatest risk of lung cancer.

Example:

Lung cancer risks among US cigarette smokers (of 20-39/day) aged 55-64

Started in early teens: risk ≃ 33 x nonsmoker risk
" " late teens: risk ≃ 22 x nonsmoker risk
" " early 20's: risk ≃ 15 x nonsmoker risk
" " after age 25: risk ≃ 8 x nonsmoker risk

(from NCI monograph 19)

This implies that:

CURRENT RISKS AT	DEPEND STRONGLY ON YOUNG PEOPLE'S
AGES 35-44	HABITS 25 YEARS EARLIER
" 45-54	" 35 " "
" 55-64	" 45 " "
" 65-74	" 55 " "

Failure to appreciate that this should be the case if smoking causes lung cancer accounts for about half of Eysenck's errors.

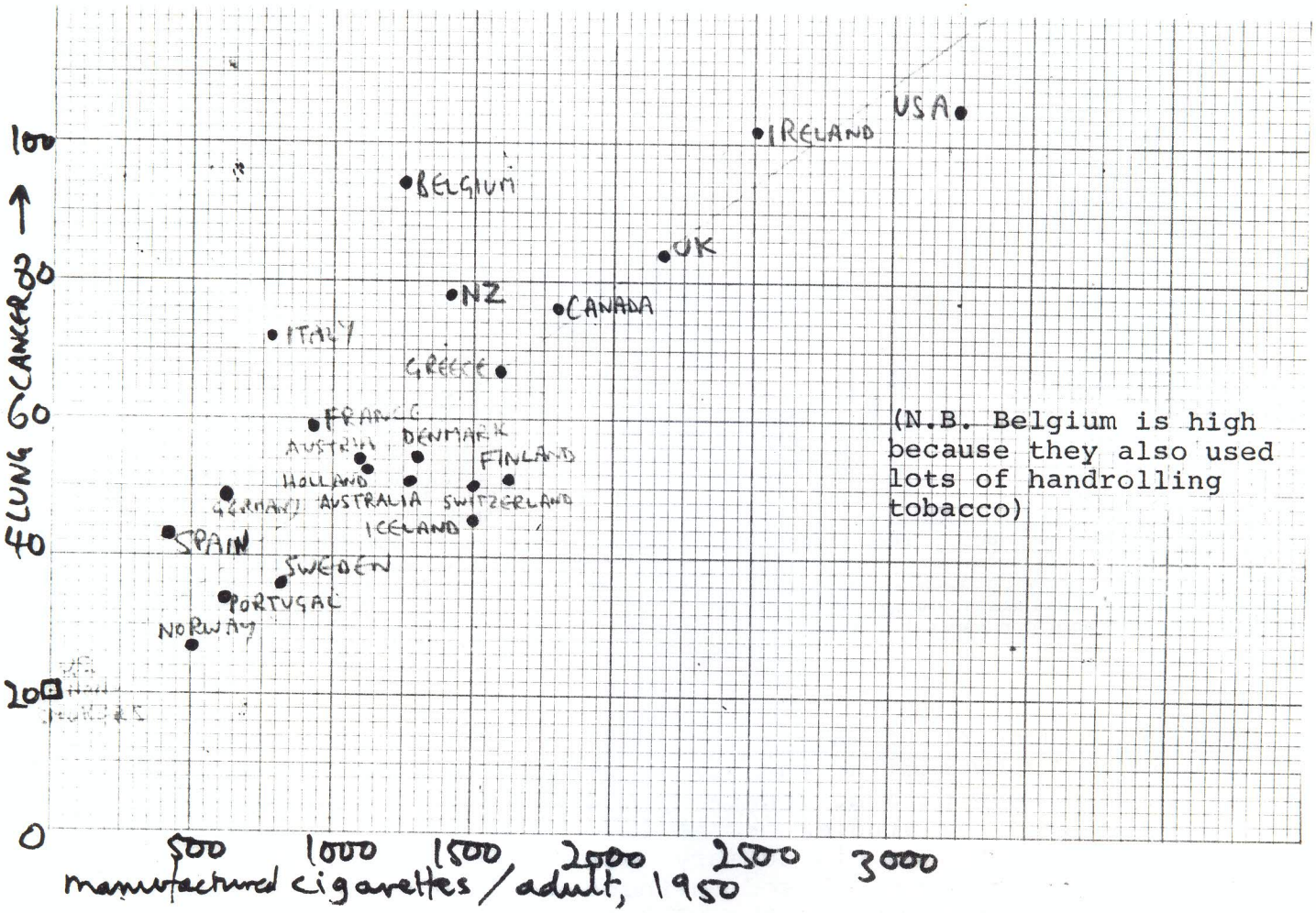
4. International correlations

From the above, it follows that national cigarette smoking habits in 1950 should correlate with recent national lung cancer death rates at ages 35-44 in 1975, and they do.* Eysenck's failure to find a correlation between these same 1950 cigarette smoking data and lung cancer rates among old people in 1960 is uninteresting; ask a silly question, and you get a silly answer.

(*see picture on p.3)

21 "Western" countries (i.e. developed, with European populations)

1950 cigarettes/head (adult) versus 1974-5 lung cancer rate per million (M & F, 35-44)



5. Benefits of stopping smoking

It is impossible to forgive Eysenck for holding forth at length about inhaling, trends in mortality and so on among British doctors without taking the trouble to seek out the definitive report on that study which was published in 1976 (Doll & Peto, Brit.Med.J. 2, 1525-36); a simple telephone call to any serious scientist remotely connected with this field would have led him to this paper. All the points about trends, inhaling, etc. which he repeats from other authors are replied to there. Contrast the data on relative decreases in smoking and in lung cancer reported there with Eysenck's conclusions from preliminary analyses of this very study.

The actual data: Doll and Hill's 34,000 doctors reduced their smoking from 88% to 37% of the national average, and their lung cancer rates decreased relative to the national average.

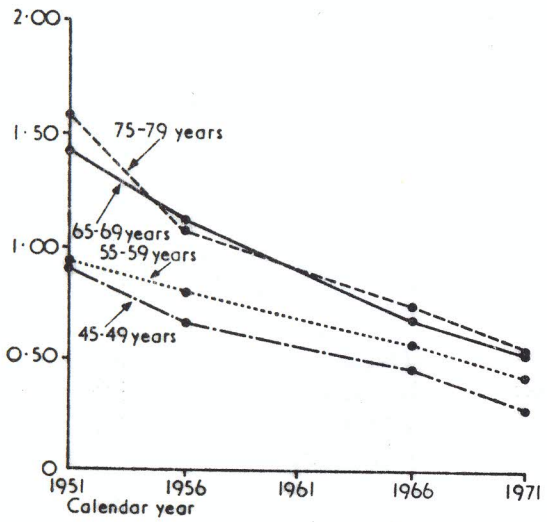


FIG 1—Trend in numbers of cigarettes smoked by male doctors as fraction of numbers smoked by all British men of same ages 1951-71—four age groups: 45-49 years, 55-59 years, 65-69 years, and 75-79 years (from table II).

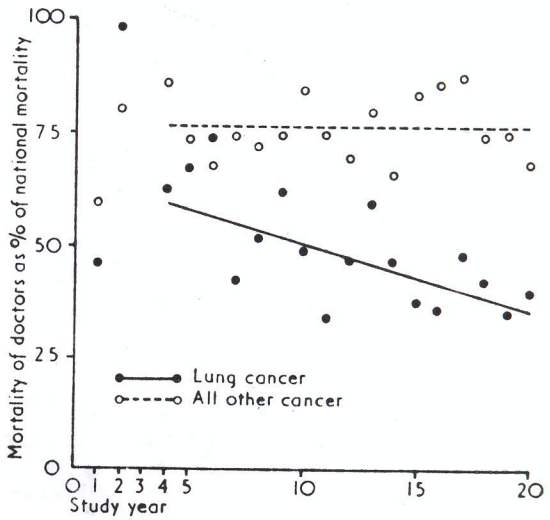


FIG 2—Trend in number of deaths certified in male doctors as percentage of number expected from experience of all men in England and Wales of same ages. Results are given from second to 20th years of study for (*a*) lung cancer (459 deaths observed *v* 931·9 expected) and (*b*) all other cancers (1238 deaths observed *v* 1630·7 expected). Regression lines on time were calculated from data for fourth to 20th years of study (regression coefficients: —1·4 for lung cancer and 0·0 for all other cancers).

Eysenck's account of this study (p.53): "both doctors and general population show similar changes in smoking" - REALLY? He then discusses these data at length (pp.52-57) (not discussing any of the mass of other studies on the effects of stopping smoking at any length), and then in his summary (p.137) he jumps somehow to the conclusion, presumably based on these data, that "effects of giving up smoking do not support the view that giving it up protects against lung cancer". This claim would be refuted by the very study he has chosen to examine, had he examined the full data.

6. Time trends in U.K. data

Contrast the following actual data with Eysenck's account of them.

England & Wales: Lung cancer death certification rates per million people aged 55-59

Period of observation	(a) male	(b) female	(c) ratio M/F
1911-15	62	31	2x
1921-25	87	34	3x
1931-35	348	78	4x
1941-45	924	135	7x
1951-55	2018	206	10x

(Similar patterns exist in other age-groups, of course.)

The increases in female lung cancer death certification rates over this period are largely artefactual (due to increasing ability to diagnose lung cancer, and better medical services), but as Eysenck says (p.34), "changes in diagnostic accuracy would affect men and women equally, thus preserving the sex ratio observed prior to the increase in lung cancer diagnoses". Quite so. The large increase in the ratio of male to female death certification rates must therefore represent an increase in the ratio of real death rates, i.e. just what one would expect because men started to smoke before women did.

EYSENCK DENIES THAT ANY MATERIAL CHANGE IN THE SEX RATIO HAS OCCURRED!!

e.g. (i) p.32: "pattern of sex distribution has not changed since the 19th century".

e.g. (ii) p.32: "increase of smoking in men not mirrored by any increase in their proportion of lung cancer". (His error here may be to have expected an immediate increase; but as we have seen, rates at these ages depend on smoking habits 40 years ago, so large increases in rates will come 40 years after large increases in smoking.)

e.g.(iii) p.32: "increases and decreases for the two sexes occur pari passu, and are completely in step". Nonsense: the rate of change of male lung cancer has consistently exceeded that of female lung cancer during 1920-1950, as should be expected, and as is seen in Eysenck's own figure (p.33).

These errors are repeated in his summary (p.136), and form his chief reason for denying that any real increases have occurred.

7. Dose-response data

Contrary to what Eysenck asserts, reasonable dose-response relationships between the risks to people of a given age and their daily cigarette consumption exist (see below, from Doll & Peto, 1978 and NCI 19).

	Non	Light (15/day)	Heavy (25/day)
per 10,000 men aged 50-54	1	5	10
per 10,000 men aged 60-64	2	20	40
per 10,000 men aged 70-74	3	50	100

From this relationship, no material effect of dose on mean age at onset of disease need be expected (just as in the case in animal experiments with weak carcinogens), and Passey's failure to find one is unsurprising.

Inhalation

This too was dealt with in the final report of the Doll and Hill study (Brit.Med.J. 25.12.76) which Eysenck has not consulted. Briefly, the real difference between heavy smokers who say they don't inhale and heavy smokers who say they inhale is in reality that one group inhales slowly and the other group inhales fast. Both groups get nearly the same amount of smoke to the edge of their lungs (Thorax 1978, 201). Many animal carcinogens are in the cigarette smoke droplets, and it is not a priori clear whether quick inhalation or slow inhalation will deposit more of the noxious chemicals on the upper airways, which is where lung cancer chiefly starts. Obviously real non-inhalation must be protective, and although both fast and slow inhalation are dangerous, slow inhalation seems slightly worse than fast inhalation. So what? That isn't a paradox, as Eysenck would have known had he read the final report of the study which he chiefly cites.

SUMMARY

The evidence that smoking cigarettes causes lung cancer includes:

(1) Association between regular application of a carcinogen to one place in the body and cancers arising at that place. This biological plausibility makes the observed association much stronger evidence for a cause-and-effect relationship than (for example) association between alcohol use and lung cancer would be.

(2) The strength of the association; it's easy to get weak associations without cause-and-effect relationships, but difficult to get strong ones.

(3) The increase in real lung cancer death rates, first among males and now among females, in Britain (and in many other countries).

(4) The dose and time relationships (just like in animal experiments: high dose-rate or early starting lead to high risks, as do high-tar cigarettes).

(5) The international correlation between cigarette smoking in 1950 and lung cancer among people aged 35-44 a quarter of a century later.

(6) The relative decrease in lung cancer among British doctors caused by their relative decrease in cigarette consumption.

(7) The rarity of lung cancer among religious groups or occupations which discourage smoking.

(8) The flat age-distribution of lung cancer among ex-smokers.

Richard Peto

10 December 1980