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Re: "Occupational cancer: Where now where next?".

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Refers to the following text of the Journal: [1985;11\(3\):181-187](#)

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Re: "Occupational cancer: Where now and where next?" by FJC Roe. Scand J Work Environ Health 11 (1985) 181–187

Dr Francis JC Roe's review "Occupational cancer: Where now and where next?," presented at the XXI International Congress on Occupational Health and printed in volume 11, number 3, of the *Scandinavian Journal of Work Environment & Health*, calls for a few comments, lest the reader be left (as many of those attending the Dublin meeting must have been) with the impression that occupational cancer is today a minor issue in occupational health and that most methods to investigate it are so complicated and vulnerable to biases as to become dismally hopeless.

As to the burden of occupational cancer, one may accept at face value the figure of 4 %, quoted by Dr Roe from Doll & Peto (1), for the proportion of cancer attributable to occupation out of all cancers in the United States, disregarding, for the sake of simplicity, the qualifications that such an aggregate estimate would require, based as it is mainly on indirect evidence. If this figure of 4 %, which refers to the *whole* population, is assumed correct, then the implication also follows that in the large segments of the adult population in which these cancers almost exclusively occur, ie, manual workers in mining, agriculture and industry, broadly taken, who numbered some 31 million out of a population, aged 20 years and over, of 158 million in the United States (3), a sizable fraction (about 20 %) of cancers may be attributable to occupation. It also follows that this proportion must be even higher within the specific occupational branches most affected by actual carcinogenic exposures.

What is even more relevant, however, is that these proportions fail to put cancer in perspective from the occupational health viewpoint. In occupational health the pertinent consideration is not the burden of cancers of occupational origin in respect to cancers of any origin, but the burden of occupational cancers in respect to the total burden of occupational diseases, a class of conditions eminently preventable. Within this domain cancer occupies a prominent position if for no other reason than of its nature of a serious and often lethal disease. As Doll & Peto commented:

Occupational cancer, moreover, tends to be concentrated in relatively small groups of people among whom the risk of developing the disease may be quite large, and such risk can usually be reduced, or even eliminated, once they have been identified. The detection of occupational hazards should therefore have a higher priority in any programme of cancer prevention than their proportional importance might suggest [p 1245].

However, detecting occupational hazards appears almost beyond practical reach, if one were to follow Dr Roe's suggestions. He strongly cautions about the interpretation of short-term mutagenicity tests, as well as long-term animal carcinogenicity experiments, and lists a number of circumstances capable of producing false-positive or false-negative results in either type of test. We do not know of *any* test in biology, including toxicology and cancerology, that is not affected by false-positive and false-negative results, and the issue at stake, which is left completely untouched in Dr Roe's review, is how false results can be reduced to a minimum by a specification of the most appropriate conditions of use for tests aimed at identifying carcinogens.

Epidemiology fares even worse in Dr Roe's cursory picture, being conceded a plausible role only under special and uncommon circumstances like those which led, through a "retrospective epidemiology" approach, to the recognition of the asbestos/mesothelioma or the woodwork/nasal cancer associations. For all its limitations there is much more scope for valid epidemiology than just this, as the examples of the recognition of carcinogenic hazards like aromatic amines, asbestos (for lung cancer), benzene, and a good number of others (2) clearly show. Maybe Dr Roe sees some role for "prospective epidemiology," as he states that "...the most important functions of the work's medical officer is to look for patterns of health changes in groups of workers and to relate these to accurate information on exposure collected by the hygienist [p 186]." However, "retrospective" and "prospective" epidemiology share problems of interpretation which are common in nature though different in degree, and one cannot virtually reject one while retaining the other.

More basic than the strengths and weaknesses of epidemiology or, for that matter, of experimental carcinogenesis, is the principle that constant criteria should be applied when the evidence for or against a causal relation between an exposure and cancer occurrence is assessed. This principle appears flatly contradicted by a statement like: "It is undoubtedly true that people in the Western World increase their risk of developing cancer by eating too much, particularly by eating too much fat [p 185]." Indeed, this may well prove to be the case, as Doll & Peto point out (p 1235); but to say that "It is undoubtedly true" betrays the very point Dr Roe is trying to make throughout his paper in respect to occupational carcinogens, namely, the need

and the difficulty to separate what *may be* from what *is* a carcinogen — or should rigorous standards of scientific evidence be applied only to occupational carcinogens?

Dr Roe states at the beginning of his review that he has “chosen to address philosophical issues which might provide some guidance as to where we should go in the future [p 181].” The philosophy expressed in his review (with the exception of the right emphasis placed on good environmental hygiene and good record keeping) may easily guide one towards a cavalier attitude, or frank nihilism in respect to the detection and prevention of occupational cancers. This result would be wholly unjustified by the weight of the problem and by the status of knowledge about it.

References

1. Doll R, Peto R. The causes of cancer: Quantitative estimates of avoidable risks of cancer in the United States today. *J Natl Cancer Inst* 66 (1981) 1191–1308.
2. International Agency of Research on Cancer. Chemicals, industrial processes and industries associated with cancer in humans (IARC monographs, volumes 1–29). Lyon 1982. (IARC monographs on the evaluation of carcinogenic risk of chemicals to humans, supplement no 4).
3. International Labour Office. Yearbook of labour statistics. Geneva 1982.

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Author's reply

The objectives of my review “Occupational Cancer: Where Now and Where Next?” (*Scand J Work Environ Health* 11 (1985) 181–187) were, first, to provide a perspective for viewing occupational cancer against the much broader background of all causes of cancer, most of which are nonoccupational, and, second, to stress the difficulties of epidemiologic and laboratory research in relation to cancer etiology. I did not in-

tend to leave the impression that occupational cancer is an unimportant subject or that epidemiologic investigation and laboratory experimentation are so flawed as to be useless. Clearly, I failed in my first objective as far as Dr Saracci and his cocorrespondents are concerned. They apparently did not hear me say that “Even if the proportion of cancer deaths attributable to occupation is only 2 %, it provides no basis for complacency. Two percent of all cancer deaths still represents a lot of deaths and a lot of suffering [p 183].” In so far as they do not, in their letter, dismiss out-of-hand Doll & Peto’s (1) estimate of the contribution of occupation to the causation of cancer in the United States, it may seem that I was preaching to the converted on this topic. But that was not true for all members of the audience at my lecture in Dublin. After my lecture one member of the audience, to my amazement, announced that, in his opinion, if any working person develops cancer it should be *presumed* that his/her cancer is of occupational origin. It has always been my view that an occupational cause should routinely be *considered* for every case of cancer whether occurring in an actively working person or in a pensioner, but to *presume* that all cancers are work-associated is, in my opinion, nonsensical.

I do not disagree with some of the additional perspectives to occupational cancer which Dr Saracci and his cocorrespondents seek to provide in their letter, but it worries me that, by confining their comments to occupational causes of cancer, they once again draw attention away from nonoccupational causes which, overall, are at least an order of magnitude more important.

I take more hardly the criticism that I left untouched the question of how false results can be reduced to a minimum in laboratory tests. Surely, from what I said on page 185 of my paper, it was possible to deduce that false results in carcinogenicity tests in animals could be reduced by the avoidance of overfeeding and by the provision of diets that are correctly balanced in respect of mineral content? If not, then may I be permitted to direct attention to other papers that I have written on this important and complex subject (3, 4, 5, 6). Since I am not an epidemiologist, I hesitate to advise on how that profession can do better research than now. Nevertheless, I permit myself to be horrified every time I hear, as I not infrequently do, of recently started epidemiologic studies aimed at defining occupational lung cancer risks while little or no attempt is being made to gather information on smoking habits.

Since my first involvement in the field of cancer prevention during the 1950s and 1960s (2), I have been conscious of the need not only to set priorities for research, but also to keep such priorities under constant review. For the reasons stressed by Dr Saracci and his cocorrespondents, occupational cancer merits a higher priority in relation to cancer prevention than its overall contribution to the human cancer burden may suggest. Nevertheless, it would be wrong to leave

the general public with the impression that the complete elimination of occupational cancer would radically change the present cancer scene.

References

1. Doll R, Peto R. The causes of cancer: Quantitative estimates of avoidable risks of cancer in the United States today. *J Natl Cancer Inst* 66 (1981) 1191—1308.
2. Raven RW, Roe FJC, ed. The prevention of cancer. Butterworths, London 1967, pp 1—397.
3. Roe FJC. Are nutritionists worried about the epidemic of tumours in laboratory animals? *Proc Nutr Soc* 40 (1981) 57—65.
4. Roe FJC. Testing *in vivo* for general toxicity and car-

cinogenicity. In: Gorrod JW, ed. Testing for toxicity. Taylor and Francis Ltd, London 1981, pp 29—43.

5. Roe FJC. Testing for carcinogenicity and the problem of pseudocarcinogenicity. *Nature* 303 (1983) 657—658.
6. Roe FJC, Tucker MJ. Recent developments in the design of carcinogenicity tests on laboratory animals. *Eur Soc Stud Drug Toxicity* 15 (1973) 171—177.

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