

New insights from the British doctors study

Risks for persistent smoking are substantially larger than previously suspected

The cause of the sharp increase in lung cancer rates that began early in the last century was not well established until Richard Doll and colleagues presented the initial findings from the British doctors study exactly 50 years ago.¹ That paper and the updates that followed provided irrefutable evidence showing the extraordinarily adverse health consequences of cigarette smoking. The current report represents far more than a celebratory milestone in public health.²

With the extended follow up of the British doctors cohort, this new report provides critical new information and convincingly shows that the risks for persistent cigarette smoking are actually substantially larger than had previously been suspected. Indeed, this study shows that about half to two thirds of all persistent cigarette smokers will eventually be killed by their habit. This study shows that with successive age cohorts, reflecting earlier ages at initiation, the death rates among persistent smokers climb dramatically. The probability for a 70 year old lifelong non-smoker to reach age 90 increased from 12% in the first decade of the study (to 1961), to 33% in the most recent decade. In contrast, the corresponding likelihood among cigarette smokers actually declined, from 10% in the first decade to 7%. Thus all of the benefits for increased longevity over the past half century are completely abrogated among smokers. The authors estimate that during the 50 year follow up, about 6 million British citizens were killed by tobacco use.

These data are all the more ominous because the typical age at smoking initiation has continued to decrease. In the 1950s many men took up smoking in adulthood or even middle age. In contrast the most common age at initiation now is the early teen years. In the developed countries, only a small fraction of individuals initiates smoking as late as age 20. The accumulating data on the extra health burden imposed by early initiation means that the current generation of persistent smokers will face even higher excess mortality. It is ironic that the emergence of these findings coincides with serious cutbacks in the modest support for government efforts in the United States to help smokers quit and keep children from starting.

Good news also emerges from this analysis. Doll et al document the steady attenuation of adverse effects among quitters. Quitting at any age confers benefit compared with persistent smoking, but early quitting is necessary to approximate death rates among never smokers. Nonetheless, the authors estimate that even a 60 year old smoker could gain at least three years of life expectancy by stopping.

In the half century of the British doctors study a remarkable shift in worldwide smoking patterns has occurred. At the start of the study, only 17% of the British doctors were lifelong non-smokers. Since then the social gradient has shifted, with a much higher prevalence of smoking in the lower socioeconomic strata. Smoking among women became much more common, and the epidemic has swept over developing countries. Richard Peto has estimated that current worldwide smoking patterns will cause about one billion tobacco deaths in the current century unless there is widespread cessation.

This report also shows the immense value of continuing new data collection and follow up for successfully established, long term, large cohorts. Had the British doctors study ceased, even after a long run of two decades, much valuable information would not have become available. Because incident rates for many chronic diseases increase exponentially with age, continued follow up leads to more end points and greater precision in estimates. With a larger number of end points, fluctuations due to chance tend to disappear, and the underlying patterns become plainly visible, even within subgroups. Only large cohorts with long term follow up can assess the full impact of exposures that may require decades to become fully manifest. The marginal increase in the costs for extending follow up tends to be small so the increasing information emerges at a bargain. This study provides a shining example of the ability of cohorts with very long term follow up to assess latency and the impact of exposures at different ages. Other long term cohort studies, such as the Framingham heart study and the nurses' health study (modelled directly from the British doctors study) provide additional compelling examples of this value. The 50 years of the British doctors study provide us with a much richer and more fully accurate picture than would be possible with a truncated follow up. The two Sir Richards have been world leaders in the study of the health effects of smoking, and this latest contribution represents a stunning achievement.

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- 1 Doll R, Hill AB. Lung cancer and other causes of death in relation to smoking. A second report on the mortality of British doctors. *BMJ* 1956;233(ii):1071-6.
- 2 Doll R, Peto R, Boreham J, Sutherland I. Mortality in relation to smoking: 50 years' observations on male British doctors. *BMJ* 2004;328:1519-28.