



In retrospect . . .

Continuing a look at study design, this article explains the use of case-control studies

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At the end of last month's article, I suggested that if you were to survey the current smoking habits of patients who have a diagnosis of lung cancer, you might find a surprisingly low smoking rate, and I would suggest that this is because many patients finally quit smoking when they learn of their diagnosis.

What we need to know is how many patients with lung cancer (the cases) have a past history of smoking that might have been a cause of their cancer. We can then compare this history in the cases with the history in a group of control patients who do not have lung cancer. We would then see which group had a greater proportion of people who had smoked.

This study design is known as a case-control one and, by definition, has to be retrospective. For rare conditions, it may be the first type of study carried out, as fewer resources are required than for prospective cohort studies or randomised controlled trials. However, correct results are dependant on patients accurately recalling and reporting information, and recall bias can be a real problem (see box).

Further problems arise in choosing the controls. In 1950, Doll and Hill chose their age-matched controls from patients who were already in hospital for other reasons.¹ At that time, it was not appreciated that smoking might have contributed to the diseases that had hospitalised these control patients. This would have caused an underestimate of the real excess of cigarette smokers in the lung cancer group.

Doll wrote in 1954: 'All these [case-control] studies agree in showing that there are more heavy smokers and fewer non-

Recall bias

Retrospective studies are prone to recall bias, and a good example can be found in a case-control study in *The Lancet* on army recruits in France.³

The researchers tested recruits with audiograms, and asked them about exposure to both personal stereos and ear infections in childhood.

I would suggest that young men who were aware of hearing problems (the cases) are much more likely to recall whether they had childhood ear infections than the controls with normal hearing. Do you know if you suffered ear infections as a child?

This biased recall could account for the higher level of reported childhood ear infections in those recruits who used personal stereos and were found to have hearing loss.

smokers among patients with lung cancer than among patients with other diseases.²

However, debate continued about whether the association with cigarette smoking was a cause of lung cancer, so he planned a prospective study, which he hoped 'should determine the frequency with which the disease appeared in the future, among groups of persons whose smoking habits were already known.'²

We will look more at this landmark prospective cohort study in January's Stats Made Easy.

REFERENCES

1. Doll R, Hill AB. Br Med J 1950; ii: 739-48.
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3. Job A, Raynal M, Rondet P. Lancet 1999; 353: 35.