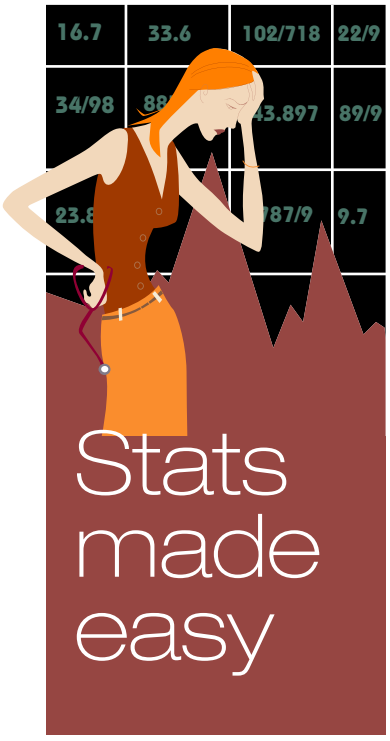

Looking forward: cohort studies

Following last month's explanation of case control studies, which look back, now learn about forward-looking cohort studies

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In a nutshell, the difference between the two most common types of observational studies is that case control studies look backwards from the disease to the risk factors (as we saw last month) while cohort studies start with groups of patients who do and do not have the risk factors (such as smoking) and then follow them forwards to see how many develop the disease (in the case I am discussing here, lung cancer) in the future.

I referred last month to the landmark cohort study from the 1950s recently reprinted in the *BMJ*.[1] (The paper is freely available on the *BMJ*'s website and, if you are not already familiar with it, I would strongly recommend downloading it for reading.)

The paper describes beautifully the method and results of comparing doctors in the UK according to their smoking levels, and measuring the numbers who developed lung cancer in each group. If smoking had no effect, you would expect the proportion of each group developing cancer to be the same. It was not – those who smoked more had a higher incidence of lung cancer, and this was unlikely to have arisen by chance.

When combined with the results of the follow-up studies, the last of which was also reprinted in the same recent edition of the *BMJ*,[2] this association is shown to persist, even to the degree that stopping smoking at almost any age is related to a subsequent lowering of lung cancer risk.

Since it will never be possible to randomise people to be smokers or non-smokers, there will always be voices claiming that this is not a causal association (including from the tobacco industry), but the weight of evidence puts it beyond reasonable doubt that smoking causes lung cancer, and that stopping smoking reduces the risk. The alternative view that somehow those who are prone to lung cancer have more of a tendency to take up smoking (and not give it up) seems to me very tenuous! (See the box on selection bias.)

This brings to an end our brief tour through some observational study designs, and next time we will turn to experimental study design, in particular the randomised controlled trial.

Selection bias

In a fair experiment, the only difference between two groups being compared should be the risk factor (smoking, for example) or the treatment being studied. One of the inherent weaknesses of observational studies is that the participants choose whether they smoke or not; there may be important differences between those who choose to smoke and those who do not. This was a problem in the early observational studies on HRT in which the women who chose HRT looked after their health better and therefore had less heart disease. So it looked as though HRT protected against heart attacks. When randomised studies were carried out this apparent benefit disappeared, and may even be reversed. This is a good example of selection bias altering the outcome of the study results.

REFERENCES

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