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Counting the dead in China

Measuring tobacco's impact in the developing world

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Purely descriptive statistics on the numbers of people dying from different causes at various ages can be of enormous importance. But it is not enough merely to count "who dies of what disease": the causes of those diseases, particularly in large populations, need also to be reliably measured and their evolution monitored. In rich countries the established vital registration systems, in some cases dating back over 100 years,[1] can be used to assess disease patterns and trends, while decades of epidemiological research have identified some of the principal causes of such trends, particularly tobacco use.[2 3] In poorer countries, however, vital registration systems are not yet sufficiently well developed to document disease trends and cannot support large scale studies of the avoidable causes of disease.[4]

To assess the main patterns of mortality and the main avoidable causes of premature death in large developing populations, innovative, robust epidemiological methods are needed, and China has been particularly ingenious in this respect. This week Liu et al report the world's largest analytical study of tobacco deaths, showing that in China smoking is already causing about 750 000 deaths a year and predicting that this will rise to three million a year by the time the young smokers of today reach middle and old age (p 1411).[5] Also in this week's issue, Niu et al confirm these conclusions by a large prospective study of smoking and death (p 1423)[6] set in China's nationwide system of disease surveillance points.[7] These studies are important both for their concordant conclusions about tobacco and for their epidemiological methods.

During the past decade the establishment of a nationally representative system of 145 disease surveillance points covering only 1% of the Chinese population has yielded reliable statistics on death and disease for the entire country, at relatively low cost.[7 8] A typical surveillance point covers a defined population of about 100 000, in which a team of workers, including a doctor, investigate each death and assess the underlying cause from medical records and interviews with family members. This system could be extended to other countries and is particularly useful for prospective studies such as that of Niu et al.[6]

Prospective studies, however, take years to mature, whereas the novel retrospective methods of Liu et al require little more than reliable statistics on cause of death for adult populations plus reports from families of the smoking habits of the deceased. Proportional mortality analyses then reveal the excess of smokers among those dying from neoplastic, respiratory, or vascular diseases, using deaths from other diseases as controls. Thus, for example, the excess of smokers among those dying of lung cancer is used to infer the excess of lung cancer among smokers. (Similar estimates of tobacco attributed mortality are obtained if surviving family members are chosen as controls.)

The validity of such proportional mortality analyses[5] is confirmed by the large prospective study,[6] which ascribes an identical proportion (12%) of male adult deaths in 1990 to tobacco. This percentage will, however, probably more than double over the next few decades,[5] as a delayed effect of the large increase in cigarette consumption among men over the previous few decades.

But, although the overall risk of death may well become about as big for Chinese as for Western smokers, the detail is surprisingly different. In China tobacco causes far more deaths from chronic lung disease than from vascular disease (indeed in China smoking causes about as many deaths from tuberculosis as from heart disease), causes widely different lung cancer risks in different Chinese cities, and causes many deaths from cancers of the oesophagus, stomach, and liver.[5]

Similar retrospective methods could be used to monitor the hazards of tobacco in many other populations where cause of death data can generally be obtained for adults. The routine reporting of smoking status on the new South African death certificate[9] is of particular research interest as this might obviate the need for follow up interviews of family members.

These two new studies provide the first nationwide evidence of tobacco's effects in a developing country. The hazards are already substantial and they cannot be limited to China. Worldwide, by the turn of the century, cigarettes will already be causing about 4 million deaths a year, half in rich countries, half in poor countries. But if current smoking patterns persist then by about 2030 this will have risen to 10 million deaths a year, 70% of them in the developing world.[10]

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Safer non-cardiac surgery for patients with coronary artery disease

Medical treatment should be optimised to improve outcome

How best to manage patients with coronary artery disease who undergo major non-cardiac surgery is an increasingly important issue as the population ages. Such patients, particularly those with easily induced ischaemia, are at increased risk of perioperative cardiac complications and death.[1] Various pre-emptive interventions have been considered to minimise this risk, but often their precise role is poorly defined.

Coronary artery bypass grafting is effective but carries its own risks, and overall survival benefit is seen only in patients who warrant bypass surgery independently of their major non-cardiac operation.[2] These patients, although few, are a well defined[3] population who should be offered prophylactic coronary revascularisation. The role of percutaneous transluminal coronary angioplasty is less well defined because, even in the wider population of patients with coronary artery disease, no prospective randomised trial has shown a prognostic benefit for angioplasty over medical treatment. Use of preoperative angioplasty should therefore be restricted to patients with readily inducible ischaemia, in whom a single coronary stenosis subtends a large area of viable myocardium.[4]

Most patients with coronary artery disease presenting for elective major non-cardiac surgery do not have disease severe enough to justify the risks of prophylactic cardiac catheterisation or coronary revascularisation, and for these perioperative intensification of medical treatment should be more widely considered. Various options are available, including β blockers, aspirin, calcium antagonists, nitrates, α_2 agonists, heparin, and newer agents such as the potassium channel activators. Unfortunately there is only limited direct randomised evidence on the efficacy of these interventions in the perioperative period, although inferences can be made from studies in other fields.

The most compelling direct evidence supports the perioperative use of β blockers. Administered perioperatively they reduce the amount of silent myocardial ischaemia detected by S-T segment analysis of electrocardiograms,[5] and recently atenolol has been shown to reduce mortality and improve event free survival for up to two years after major non-cardiac surgery.[6] In a non-operative setting β blockers reduce the size of, and mortality from, myocardial infarction as well as increasing event free survival in patients with chronic stable angina.[7] β Blockers probably help by obtunding the inotropic and chronotropic effects of excess sympathetic stimulation, thereby reducing myocardial oxygen requirements and, importantly, increasing diastolic coronary perfusion time. Although many patients with coronary artery disease undergoing major surgery are already taking β blockers, the dose is often suboptimal because of concerns over bradycardia during daily living and therefore there will be an opportunity to intensify treatment. Alternatively α_2 agonists could be considered. They modify perioperative ischaemia via their centrally mediated reduction in sympathetic outflow.[8]

Aspirin has not been properly investigated as means of reducing perioperative cardiac complications, but strong indirect evidence supports its use. Aspirin undoubtedly has a major role in the primary and secondary prevention of myocardial infarction.[9] It also reduces the severity of silent myocardial ischaemia in both stable[10] and unstable angina. These effects are mediated through its antiplatelet actions, and because the perioperative period is associated with increased platelet reactivity aspirin may well be particularly useful at this time. Paradoxically antithrombotic treatment is often withdrawn before major surgery because of a perceived increased risk of bleeding. Although aspirin interferes with platelet aggregation induced by thromboxane A_2, it has no effect on that induced by either thrombin or high concentrations of collagen,[11 12] and therefore clinically significant bleeding should not be made worse by perioperative aspirin.[13]

Calcium antagonists, nitrates, and the potassium channel activator nicorandil all delay the onset of ischaemia during exercise testing or reduce the amount of silent myocardial ischaemia recorded during ambulatory monitoring[14] and therefore may be useful perioperatively. However, the evidence for these is less convincing than that for β blockers or aspirin. Also, because they have vasodilating or negative inotropic effects, which may be associated with a reflex tachycardia, these drugs can further compromise coronary perfusion and reduce the patient's ability to cope with major fluid shifts or haemorrhage.

Intravenous therapeutic doses of heparin undoubtedly improve outcome in patients with unstable angina. Heparin's use perioperatively is, of course, complicated by the risk of haemorrhage, but its use postoperatively should not be instantly dismissed, especially in very high risk patients (who have the most to gain from aggressive intervention). Low dose subcutaneous heparin is already widely used to prevent development of perioperative deep vein thrombosis

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