risk. In many cases the equipment, if issued after certain dates, must comply with agreed European or national standards.

These new regulations will operate alongside some of the existing legislation, such as the Control of Substances Hazardous to Health Regulations, which already require employers to protect employees from such hazardous substances as glutaraldehyde, anaesthetic gases, infected blood, and other body tissues.[4] Accident and emergency staff who do not wear suitable personal protective equipment may therefore be in breach of new health and safety legislation, specifically the Personal Protective Equipment at Work Regulations and, generally, the Health and Safety at Work, etc, Act 1974 and the proposed "general provisions" regulations. It is rumoured that when the general provisions regulations are finally agreed they will be renamed the Management of Health and Safety at Work Regulations, which would put the onus of compliance for health and safety on management.

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## When to stop a clinical trial

EDITOR,—Stuart Pocock's article on when to stop a clinical trial should be essential reading for anyone embarking on a large clinical trial.[1] Pocock asks many of the most important questions regarding the size and need for regular review of a trial and supplies many of the answers.

I am surprised, however, by the cursory manner in which he deals with smaller trials. Even in these days of multicentre "megatrials" only a select few workers have the facilities to organise and run such studies. Many new forms of management are first assessed in a small study, which may be ethically more controversial than the subsequent larger study based on it. In such circumstances the closed paired sequential design of trial described by Armitage,[2] to which Pocock barely refers, can be most useful.

Briefly, this is a graphical representation of the study as it progresses, the x axis representing the number of experiments and the y axis depicting whether the "new" (positive) or "old" (negative) treatment shows an improvement in outcome. Initially the statistical power required for the study is estimated and the borders plotted according to Armitage's calculations.[2] The observers performing the study can be blind to both the treatments and the results, depending on the study's design. One person, however, must have immediate access to all results, which are plotted according to the results of each individual experiment. The experimental plot starts at the origin of the graph, and the study ends when the plot crosses one of the predetermined borders. If the medial border is crossed first a significant difference is unlikely to be found between the two treatments, no matter how long the study continues. On the other hand, if the upper (lower) border is crossed first the new (old) treatment is likely to be significantly better.

The advantage of a statistical tool such as this is that it allows for continuous monitoring of the trial, which then ends as soon as a likelihood of a significant result is achieved. This can be helpful when seeking ethical approval as a minimum number of patients are exposed to the less advantageous form of management. The method would have been ideally suited to the randomised trial comparing extracorporeal membrane oxygenation with conventional medical treatment in newborns with persistent pulmonary hypertension cited by Pocock.

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1 Pocock SJ. When to stop a clinical trial. *BMJ* 1992;**305**:235-40. (25 July.)
2 Armitage P. *Sequential analysis.* 2nd ed. Oxford: Blackwell Scientific, 1975.

EDITOR,—Properly designed and executed randomised controlled clinical trials are the most powerful tool we have to establish the effectiveness of a new treatment and to persuade doctors to adopt that treatment. A meta-analysis of several trials is even more persuasive. Lau *et al* estimated that cumulative meta-analyses would have allowed the efficacy of intravenous thrombolytic treatment in myocardial infarction to be accepted by 1973, after only eight trials.[1] The results of the next 25 trials, which enrolled an additional 34 542 patients, had no effect on the odds ratio establishing efficacy but merely narrowed the confidence interval.

Patients must not, however, be recruited into a clinical trial unless both they and their doctors are honestly ignorant of the relative merits of the two or more arms of the trial. Stuart J Pocock acknowledges the ethical dilemmas of communicating interim results of a trial to the doctors who are participating (and, of course, to the general public).[2] He recommends, however, either the O'Brien-Fleming rule that up to five analyses should be made at yearly intervals, the p values ranging from $<0{\cdot}00000001$ for the first to the $<0{\cdot}009$ for the last, or the Peto-Haybittle rule that a flexible number of interim analyses should be made, the p value being fixed at $<0{\cdot}001$. If the first analysis shows $p=0{\cdot}01$ the trial should continue. I doubt, however, whether doctors and patients can maintain their ignorance of the relative merits of the treatment regimens if they are told that there is a 99% chance that regimen A is better than regimen B.

Perhaps the rule should be that the trial coordinating committee should keep the results of interim analyses secret.

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## Exposure to radon

EDITOR,—D P B Miles discusses whether radon causes lung cancer.[1] I am writing to identify some of the key documents on the subject.

There is conclusive evidence, from epidemiological studies of miners and experimental studies on animals, that products of radioactive decay of radon induce lung cancer,[2,3] and there is a clear indication that the doses of radiation to the lung in miners and other groups are comparable.[4] The collective results of epidemiological studies of lung cancer and domestic exposure to radon being conducted in Europe and the United States may eventually lead to refinements in the present coefficients of risk.

Against this background, international authorities have developed recommendations for protection against radon at work and in the home,[5,6] which are reflected in developments in the United Kingdom.[7,8] What informs these moves is the desire to prevent high exposures to radon and keep the risk of lung cancer within reasonable bounds in various circumstances.

Government policy on radon in the home is strongly focused on the most affected areas in the United Kingdom[9,10]: new houses are required to have preventive measures, measurements are made free for householders, technical advice is given on remedial measures when the radon concentration exceeds the action level of 200 Bq/m$^3$; and grants for necessary work are available in cases of need.

Unlike employers, householders are not obliged to take action. Rather, they must be persuaded that the risk is real but easy to reduce.

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3 International Commission on Radiological Protection. *Lung cancer risk from indoor exposures to radon daughters.* Oxford: Pergamon Press, 1987. (ICRP publication 50.)
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9 Department of the Environment. *The householders' guide to radon.* 2nd ed. London: HMSO, 1991.
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## Poliomyelitis in developing countries

EDITOR,—The World Health Organisation's commitment to eradicating poliomyelitis from the world by 2000 is based on the assumption that the disease is a serious problem in developing countries.[1] We have challenged this assumption because the paralysis described as poliomyelitis in the tropics differs fundamentally from the classic disease and the diagnosis is retrospective, based on surveys of lameness rather than on observation of the children in the acute phase of the disease.[2,3] Furthermore, estimated incidences derived from these surveys of lameness are 30 times greater than recorded incidences in Malawi and South Africa before vaccination was introduced.[3]

Recently there have been reports from China of an acute paralytic disease that differs from poliomyelitis[4] and may be similar to a syndrome described in Mexican children.[5] In the Mexican children postmortem examination showed a neuronopathy that was not poliomyelitis despite isolation of the virus; this led to the comment that "the mere presence of poliovirus in the intestinal tract is no proof that the paralytic disease was caused by the virus."[6] This statement supports our conclusion that isolation of the virus on its own is not diagnostic and that an accurate history must be taken, a clinical examination performed, and the cerebrospinal fluid examined before a definitive diagnosis can be made.[3] In a report on a child in Bangladesh who developed an illness similar to that reported in China the authors suggested that "Asian paralytic syndrome" may be a more appropriate name for these diseases, implying that