irrelevant to the current use of tissue plasminogen activator as duteplase is no longer marketed and the heparin given was "too little, too late." The question of the preparation of tissue plasminogen activator is answered by the report on ISIS-3, which showed in a meta-analysis of studies of patency that alteplase and duteplase produce virtually identical effects at 90 minutes.

Relevant to the doubts about heparin is a recent study of the effect of intravenous heparin started immediately after tissue plasminogen activator in patients receiving 250-300 mg aspirin daily.[8] It found a moderate but significant increase in coronary patency (84% *v* 75%) in the heparin treated group. Patients received heparin subcutaneously at the end of the infusion of tissue plasminogen activator (ISIS-3) and after 12 hours (GISSI-2). Whether earlier, more aggressive use of heparin by bolus injection and infusion would reduce the risk of reocclusion in patients treated with tissue plasminogen activator, thereby improving survival, is currently being tested in the global utilisation study of streptokinase and tissue plasminogen activator for occluded coronary arteries (GUSTO). The authors of the report on ISIS-3 suggest, however, that if the heparin regimen was indeed inadequate to prevent reocclusion then more reinfarctions would have occurred in patients treated with tissue plasminogen activator, whereas the opposite happened. Furthermore, a more aggressive regimen may have exacerbated the existing excess of stroke in the patients treated with tissue plasminogen activator, offsetting any gains from improved coronary patency.

Do anistreplase and alteplase have any role in current treatment? The advantage of anistreplase is that it may be given by bolus injection, which makes it more suitable for rapid administration before admission to hospital. A limited but definite role for alteplase exists in the management of reinfarction in patients previously treated with streptokinase. Studies of antibodies to streptokinase after myocardial infarction have shown that titres sufficient to inactivate the conventional 1·5 million unit dose may persist for at least a year.[9,10] The risks of inefficacy and allergic reaction suggest that alteplase should be used for reinfarction unless techniques for rapid analysis of antibodies to streptokinase become available.

Thus the outcomes of ISIS-3 and GISSI-2 have resulted in a policy of no change and a sigh of relief from most British doctors and general managers. Aspirin and streptokinase remain the treatment of choice in myocardial infarction; there seems little justification for adding heparin. The emphasis should now be on audit to ensure that all potentially suitable patients, including elderly patients, receive aspirin and streptokinase and that delays to treatment in hospital are kept to a minimum.

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Audit in general practice

Improves care

Medical audit advisory groups were established just over a year ago, and all general practitioners are now meant to be taking part in audit. Although it is too early to assess the value of these groups, questions have already been raised about their role in ensuring quality. The cost in time and money of audit without evidence that it is the most efficient method of effecting change has been sharply criticised.[1] Experience from the first year shows that audit presently being undertaken in practices is too often limited to collecting data without completing the audit cycle.[2] In their attempts to promote audit members of medical audit advisory groups have encountered varying degrees of interest, ranging from enthusiasm to apathy and even hostility. These groups would therefore welcome guidance on how audit can be used to improve patients' care.

This week the *BMJ* publishes two papers that throw some light on the effectiveness of medical audit (p 1480),[3] (p 1484).[4] The north of England study of standards and performance in general practice, based in 62 training practices, was designed to evaluate the effects of setting clinical standards. Though the overall design of the study was simple, it was large and took 10 years to complete. Preliminary information about process was collected by examining the records of children who had one of five selected conditions: acute cough, acute vomiting, bedwetting, itchy rash, or recurrent wheezy chest. A combination of interviews and questionnaires completed by parents were used to collect information about outcome.

Subsequently 84 trainers from these 62 practices were allocated to 10 groups, each of which set a standard for one of the study conditions. They also participated in four other strategies, one for each of the study conditions for which they had not set a standard. Each combination of condition and strategy was randomised to different groups, and information about process and outcome was collected for up to two years. Standard setting was shown to improve care and, for one condition (recurrent wheezy chest), outcome. Receiving either a standard or information about group performance was not followed by improvements.

Although this is an important study and is likely to have a substantial influence on the development of audit in the

United Kingdom, several reservations should be acknowledged. The basic design was simple but was augmented in several detailed ways that many of those working with medical audit advisory groups could find confusing. Nevertheless, this should not deter them from seeking to understand the conclusions. As the doctors in the groups were trainers it is reasonable to question whether the findings are generalisable to all general practitioners. The study, however, began an eventful 10 years ago, and today's practitioners have had ample time to catch up. Further reports from the study should help to clarify the difficulties encountered by the groups in devising standards. We need to understand how the groups agreed and accepted the use of standards in daily practice and how much support and training the group members required.

Improvement in outcome was confined to one condition, recurrent wheezy chest. The absence of any demonstrable effect on outcome for the other conditions is understandable given the chosen conditions. Acute episodes of cough or vomiting in children are most commonly caused by self limiting illnesses. Itchy rash and bedwetting are also symptoms rather than diagnoses, and for both the connection between care and its outcome is tenuous. Assessment of outcome is notoriously difficult, and its inclusion in audits of other than the simplest clinical procedure is unusual. Rather than regarding the study as a definitive assessment of the role of audit in improving outcome it should be seen as encouraging further research.

All methods that are used to improve the quality of care must be subjected to critical evaluation of their effects on outcome, and audit can be no exception. Audit has progressed since this study was planned in 1982, and it would be unwise to assume that feedback is relatively ineffective because the receipt of information about group performance did not lead to improvements. Recent work has shown that feedback of information about performance can facilitate change.[5] During the past decade audit has also been brought closer to the place of work, the focus having changed from doctors meeting together in peer groups outside their practices to the incorporation of audit into the daily management of practice teams. Several reports have shown the value of audit in this context, when it is seen as a means to an end rather than an end in itself.[6,7] The lessons from this study, however, still apply to standard setting in teams and to the attempts of medical audit advisory groups to initiate projects involving groups of practices.

This study gives helpful advice about implementing audit. Setting standards can improve the performance of the participants in terms of process and probably also of outcome. It is essential that those who use the standards have accepted them and the need for change. Standards that were received without these steps were not followed by improvements. Members of medical audit advisory groups and those leading practice teams will have to design their audits to ensure that participants have the opportunity to claim the standards as their own.

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Thinking through a salaried service for general practice

It may eventually be inevitable

The General Medical Services Committee recently commented that previous arguments for and against a salaried service for general practitioners had been exaggerated.[1] In the recent ballot of general practitioners most favoured a salaried option and more than 10% favoured a salaried service for all.[2]

Until now the idea of salaried general practice has never been accepted by a majority of general practitioners[3] despite the fact that certain groups of general practitioners—in the armed services, in deputising services, and trainees—are salaried.[1] Only the countries of the former socialist bloc opted for salaried doctors as their main front line service, and the poor record of these countries in developing integrated primary care[4] combined with the collapse of their political and economic systems makes an east European style of salaried general practice an unappetising model.

American experience of salaried family doctors working in health maintenance organisations suggests that while there are advantages in integrating care,[5] there are also opportunities for exploiting medical labour in profit driven organisations.[6] In Britain most pressure for a salaried service has come from doctors working in deprived areas with high demands and poor facilities.[7] The revised contract for general practitioners seems to have worsened the circumstances of some doctors, especially women, and has renewed the call for a salaried option.[2,8,9]

Although conceptual frameworks for evaluating the effectiveness of different ways of remunerating primary care doctors have been discussed,[10,11] there is only scanty empirical evidence from trials of a salary versus fee for service payment,[12] and the results are equivocal. Why then did the representative body of general practitioners take this uncharacteristic and unprecedented step of opening debate about a salaried service at a time when the government is attempting to deregulate the NHS and create a mixed economy of health care? And why do so many general practitioners now respond favourably to the idea of a salary?[2]

The answer lies in the political economy of general practice, which is a public sector franchise, rather like the network of sub-post offices that fills the spaces between the directly managed main post offices. Franchising is an economic system in which a central organisation lends its trading name