licence in the same group of patients until being linked to increased mortality and withdrawn.¹⁰ Should we not learn from history? And should we not use this opportunity to discuss the ethical aspects of advocating new and unproved indications for drugs in review articles as well?

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- 1 Parke TJ, Stevens JE, Rice ASC, Greenaway CL, Bray RJ, Smith PJ, *et al*. Metabolic acidosis and fatal myocardial failure after propofol infusion in children: five case reports. *BMJ* 1992;305:613-6. (12 September.)
- 2 Matthews AJ. Sedation, muscle relaxation, and analgesia in PICU. *Care of the Critically Ill* 1991;8:34.
- 3 Brockmeier V, Steen PA. The use of propofol in Norwegian hospitals. *Tidsskr Nor Lægeforen* 1992;112:2663-5.
- 4 Imray JmcG, Hay A. Withdrawal syndrome after propofol. *Anaesthesia* 1991;46:704.
- 5 Bivirkningsnaevnet. Diprivan (propofol) bivirkninger. *Ugeskr Laeger* 1990;152:1176.
- 6 Trotter C, Serpell MG. Neurological sequelae in children after propofol infusion. *Anaesthesia* 1992;47:340-2.
- 7 Field L, James I. Respiratory support. *Current Paediatrics* 1992;2:26-40.
- 8 Saint-Maurice C, Hamaza J. Sedation techniques in paediatric anaesthesia. *Current Opinion in Anaesthesiology* 1992;5:392-7.
- 9 Rodgers EM. Diprivan intensive care sedation in children. *Br J Anaesth* 1991;67:505.
- 10 Ledingham IMcA, Watt I. Influence of sedation on mortality in critically ill multiple trauma patients. *Lancet* 1983;i:1270.

Audit and research

EDITOR,—It is unfortunate that confusion persists about the important distinction between research and audit.¹ Research aims to extend scientific knowledge. Clinical research examines what difference a particular clinical intervention will make in which patients. In other words, it tests the links between the processes and the outcomes of care and generates knowledge that is transferable—the results of research must be valid as facts that apply in every clinical practice.

Audit, however, aims to extend practitioners' knowledge about their own practice. Audit examines whether the right intervention is being made in the appropriate patients with the expected success. Thus audit tests process and outcome independently, in the knowledge that the link has been established. Audit does not continually re-examine whether or not a particular intervention is efficacious. Instead it examines how effectively an intervention of proven efficacy is applied.

Because research must establish facts that stand in all similar circumstances, it treats the study population as sample. Thus the numbers of patients are crucial for statistical analysis of expected variation between one sample and the next.

Audit reveals facts (results) that apply only to the patients examined in the project (even though the lessons learned may be applied to other patients in the practice). Because analysis does not treat an audit study population as a sample the number of patients involved is not statistically important—audit can be done on one patient alone. (This may be qualified—the number of patients audited should broadly represent the clinical practice so that, were a hundred cases seen a week, more would be audited than if one were seen a year. But the audit of that one would be valid. Also, a standard that is expressed as a proportion can only be audited on sufficient patients to allow statistically valid estimation of the proportion achieved within the practice.)

The use of scientific (research) methods to develop knowledge about disease and the efficacy of different clinical interventions has transformed health care over the past 100 years. The use of scientific (audit) methods to ensure effective practice through widespread application of that burgeoning knowledge could have an effect that is

equally profound. The opportunity should not be lost because of failure to understand the differences between the principles and methods of each activity.

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- 1 Smith R. Audit and research. *BMJ* 1992;305:905-6. (17 October.)

Italian NHS

EDITOR,—We read William Ward's news item from Italy with surprise.¹ Ward must be either uninformed, or a supporter of those who are trying to disqualify and possibly disband the Italian NHS.

Leaving aside its malevolent tone—with its reference to "Soviet style commissions" when Ward writes of the Unite Sanitaria Locales and its description of the Italian health care reform as "infamous"—the piece is full of inaccuracies: absurd estimates of the health expenditure of local governments, the alleged frequency of medical consultation of the population, and hospital porters threatening senior consultants. It is astonishing that a journal like the *BMJ*—known to have had a fundamental role in the analysis and defence of the British NHS with properly documented contributions—can accept such gossip as the sole contribution to knowledge of another health service.

Reliable, easily accessible information on what is at stake is widely available, even to a freelance journalist writing from Rome. For a sober outlook on the Italian NHS readers may wish to refer to a commentary to be published shortly.²

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- 1 Ward W. Italian medical system faces demolition. *BMJ* 1992; 305:849. (10 October.)
- 2 Garattini S. National health service intact but charges rise. *Lancet* (in press).

Junior doctors' hours

EDITOR,—C J K Bulstrode and colleagues propose a plan for reducing junior doctors' hours in which two of the solutions are reducing inappropriate duties and reducing work after midnight.¹ Unfortunately, neither approach is as simple as the authors seem to suggest, and no attempt is made to quantify the impact such measures might have.

Reducing inappropriate activities requires identification of tasks that could be done by someone else. For example, it may be more appropriate for some tasks undertaken by house officers, such as obtaining consent for surgery, to be undertaken by consultants in preadmission clinics. Agreement must then be sought with those who it is hoped will take over the task. For example, the reference to training nurses to administer intravenous drugs ignores the complexity of the relationship between doctors and nurses and the unwillingness of many nurses to accept delegation of tasks without a transfer of the associated decision making.²

Reducing work done after midnight is equally complex. Identification of those tasks that can be postponed safely entails balancing any risks of delay with those of being managed by a tired and often unsupervised junior doctor.³

It is disappointing when authors fail to draw on scientific research to shape policy. Managers often complain that health services research does not address contemporary policy issues and thus fails

to help resolve management dilemmas. While such complaints are often well founded, it is just as frustrating for researchers to see scientifically based evidence ignored in debates on policy. In this instance such evidence does exist.^{4,9}

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- 1 Bulstrode CJK, Gray AJM, Anderson M, Hawke CI. New deal for doctors' hours: how to achieve it. *BMJ* 1992;305:1203-5. (14 November.)
- 2 McKee M, Lessof L. Nurse and doctor: whose task is it anyway? In: Robinson J, ed. *Policy issues in nursing*. Buckingham: Open University Press, 1992:60-7.
- 3 McKee CM, Black N. Does the current use of junior doctors in the United Kingdom affect the quality of medical care? *Soc Sci Med* 1992;34:549-58.
- 4 Dowie R. *Patterns of medical staffing: overview*. London: HMSO, 1991.
- 5 Turnbull NB, Miles NA, Gallen IW. Junior doctors' on call activities: differences in workload and work patterns among grades. *BMJ* 1990;301:1191.
- 6 McKee CM, Ginzler M, Priest P, Black NA. How can the work of junior paediatricians be reduced? *Arch Dis Child* 1991;65: 1085-9.
- 7 McKee CM, Ginzler M, Priest P, Black N. Can out of hours work by junior doctors in obstetrics be reduced? *Br J Obstet Gynaecol* 1992;99:197-202.
- 8 McKee CM, Ginzler M, Priest P, Black N. The appropriateness of tasks performed by pre-registration house officers. *Med Educ* 1992;26:51-7.
- 9 McKee M, Ginzler M, Priest P, Black N. Which general surgical operations must be done at night? *Ann R Coll Surg Engl* 1991;73:295-302.

EDITOR,—The article by C J K Bulstrode and others¹ and the letters by C J McCullough² and B N Summers and J S M Dwyer³ exemplify why many of us believe that the new deal cannot work without an increase in the number of senior house officers. For a full shift system a minimum of five doctors is needed, but this is "very unsatisfactory"; for a partial shift four are needed, but at the cost of inadequate teaching time; and for an on call rota a minimum of five doctors are needed.

In many district general hospitals these numbers of doctors are not available. Most units are too busy to contemplate cross covering others, and an influx of senior house officers from the teaching centres has not occurred (and would cause problems in the teaching hospitals if it did). Furthermore, if this number of doctors was available I suspect that most would prefer to be on a 1 in 5 rota rather than any of the alternatives.

The Junior Doctors Committee was unfortunately duped by the Department of Health and the hierarchy of the BMA into accepting a plan that cannot work. Neither the department nor the BMA wants to see an increase in the number of doctors—the department for reasons of economy, and the BMA because it has always been acknowledged (though rarely stated openly) that the fewer doctors there are the more they can each demand in salary.

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- 1 Bulstrode CJK, Muir Gray AJ, Anderson M, Hawke CI. New deal for junior doctors' hours: how to achieve it. *BMJ* 1992;305:1203-5. (14 November.)
- 2 McCullough CJ. Partial shifts. *BMJ* 1992;305:1297. (21 November.)
- 3 Summers BN, Dwyer JSM. Partial shifts. *BMJ* 1992;305:1297. (21 November.)

EDITOR,—I am uncertain whether this government is capable of reacting to a plea to change its position. Junior doctors must work shorter hours.¹ They must receive a good postgraduate medical education. They must have a goal to achieve—that is, adequate numbers of worthwhile senior posts to be filled at the end of their training. A service that already requires enormous expenditure on agency and other locum staff simply to survive with a 1 in 3 rota cannot expect to be adequately