and implementation groups have yet to complete even this primary task. The fact that examples of "best practice" exist merely serves to show that changes can be achieved given sufficient commitment.

Junior doctors have been angered by claims of success in reducing hours below a weekly average of 83. These claims have been based, almost without exception, on payroll data; it is relatively simple to reduce the number of units of medical time that will be paid for any job while relying on the good will of juniors to perform additional, uncontracted out of hours work to cope with an unchanged workload. Juniors were further angered by the flagrant delay imposed on the release of the review body's supplementary report, which created great suspicion about the government's commitment to the new deal.[4]

It is now 10 years since district working parties were called on to reduce all junior doctors' hours below 84 a week. By Ross's own admission this has not yet been achieved even in Wessex, the region recognised to have done the most in reducing hours in that initiative. There can be little wonder that many junior doctors consider that the new deal, though potentially a great advance in reducing hours, is currently little more than a paper exercise.

Junior doctors' representatives clearly reflected these concerns when they called for a ballot to be performed. Well aware of the potential ethical implications, they have called for a form of protest action—24 hour emergency only cover at selected sites—an imposition on the NHS already occurring all too frequently as a result of its chronic underfunding.

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1 Ross APJ. Junior doctors on the warpath. *BMJ* 1992;**304**:385. (8 February.)
2 Dillner L. Junior doctors on the warpath. *BMJ* 1992;**304**:270. (1 February.)
3 NHS Management Executive. *Junior doctors: the new deal.* London: NHS Management Executive, 1991.
4 Review Body on Doctors' and Dentists' Remuneration. *Second supplement to twenty first report.* London: HMSO, 1991. (Cm 1759.)

SIR,—Luisa Dillner's editorial[1] accepts the possibility of strike action by junior doctors without even a mention of whether such action is a legitimate weapon for medical practitioners. This is of major concern for many who believe that strikes are not an option available to those who have the privilege of looking after patients.

The public does not look kindly on the use of the sick as a bargaining counter, despite the protestations by the strikers that the action is in the public interest. The likely response from the press can be judged from the tone of a recent editorial in the *Times* commenting on the current dispute between solicitors and the government. It stated that it was as unthinkable for a solicitor to strike against his client as it was for a surgeon to strike against his patient. Nurses have already learnt this lesson, with the result that the Royal College of Nursing does not countenance strike action. Junior doctors should recall the disastrous effects of the last such action, from which it took many years for doctors to recover their image as a dedicated and caring profession putting the welfare of their patients above all else. It must be remembered that the status of a doctor in society, and the relatively high financial rewards and job security at a time of national recession, are not a right but depend on public and political support.

In March the council of the British Medical Association has to ratify the junior doctors' recommendation before the ballot can proceed. Should it do so, it must not be surprised if doctors who cannot countenance strike action follow the example of likeminded teachers who broke away from the existing unions to form the Professional Association of Teachers.

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1 Dillner L. Junior doctors on the warpath. *BMJ* 1992;**304**:270. (1 February.)

SIR,—Luisa Dillner's editorial concerning the alleged slowness of reform of junior doctors' hours is welcome but too simplistic in its approach to the problem.[1] The fact that junior doctors' hours have not yet fallen is not due, as Dillner implies, solely to a lack of information on the number and intensity of hours worked by juniors or to the inability of some task forces to produce good questionnaires to improve the accuracy of such information. Indeed, immediate reductions in hours cannot be realised if changes in working habits are to be achieved and, particularly, if we are to ensure that junior doctors' training is not jeopardised in the process.

Trent's regional task force has been in "top gear" since it was formed last July. We decided that a small team, which included both a senior clinician and a junior doctor, should visit each hospital unit, spending one day in most hospitals and two days in the larger teaching units. At each visit the team has talked to both consultants and management but especially to as many junior staff as possible. Attention has focused on the actual, rather than the contractual, hours worked by junior doctors as well as the conditions of their working environment such as the hospital mess and on call facilities, the availability of electrocardiography and phlebotomy services, the extent of the role of the nurse, and the provision of a bed finding service, all of which have been highlighted in a questionnaire before the visit.

To date 95% of the acute units in Trent, the second largest health region, have been visited. An agreement has been reached between management and the senior and junior medical staff of each specialty on the way in which hours are to be reduced to reach the required targets within available resources while at the same time safeguarding the safety and standards of medicine for the community we serve and the training and educational opportunities of our junior doctors.

The lack of an immediate reduction in junior doctors' hours is therefore to be expected because, certainly in the Trent region, our concern is to address every aspect of the problem. We are determined, however, to make progress as quickly as possible consistent with our commitment to doing the job properly.

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1 Dillner L. Junior doctors on the warpath. *BMJ* 1992;**304**:270. (1 February.)

SIR,—In her editorial Luisa Dillner suggests that in the 12 months since the ministerial group agreed a timetable for reducing junior doctors' hours "little or nothing has changed."

This is certainly not our view in Trent region. The first and main battle in reducing doctors' hours was always going to be persuading those with power—that is, consultants and managers—that it was a problem that had to be addressed. In this regard we have seen a fantastic change in Trent region over the past year. It is only once a problem has been acknowledged that changes will be made. It is because of this clear change in attitudes in Trent that we did not think that a ballot on industrial action was appropriate.

Dillner accuses some of the task forces of being incompetent. We believe that Trent's regional task force has been far from incompetent—probably largely because, rather than waste time producing questionnaires that have only a poor response rate and produce some dubious information, it has visited almost every unit in the region and seen for itself where the problems are.

We believe that it is precisely because of this policy of making direct contact with consultants and managers in their hospitals that we have been able to impress on them the absolute necessity to get all juniors' hours in line with the agreement, not by the end of 1994 or 1996 but as soon as possible.

Other task forces may consider that questionnaires are the way forward. We believe that our task force has been more effective by taking a slightly different approach.

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1 Dillner L. Junior doctors on the warpath. *BMJ* 1992;**304**:270. (1 February.)

Bronchodilator treatment in asthma: continuous or on demand?

SIR,—We wish to express concern regarding the design of Constant P Van Schayck and colleagues' study and the interpretation of the results.[1]

It is surprising that, despite the breadth of evidence that smoking, bronchial responsiveness, and diagnosis (asthma, chronic obstructive pulmonary disease) influence the decline in forced expiratory volume in one second (FEV_1),[2-5] these findings were not reproduced in this study. Additionally, when these factors are considered, it is unfortunate that the study was conducted in a mixed population. The study would have gained credibility if a homogeneous population had been studied and stricter criteria applied to the measurements of FEV_1—for example, intervals between measurements, timing to avoid diurnal variations, and standardisation of bronchodilators before measurements. Lack of control of these variables makes it impossible to conduct an explanatory analysis and will render the results meaningless.

As peak expiratory flow rate is a valuable tool for monitoring the severity of disease or response to treatment, or both, was the daily flow rate recorded and, if so, did it differ from the measurements of FEV_1?

The linear regression model chosen to evaluate the decline in FEV_1 assumes a linear structure in the data. In addition, autoregression analysis assumes linearity and equally spaced time points. Clearly, time points were not equally spaced in this study, nor were the assumptions of linearity verified.

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1 Van Schayck CP, Dompeling E, van Heerwarden CLA, Folgerin H, Verbeek ALM, van der Hoogen HJM, *et al.* Bronchodilator treatment in moderate asthma and chronic bronchitis: continuous or on demand? A randomised controlled study. *BMJ* 1991;**303**:1426-31. (7 December.)
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function in chronic airflow obstruction. *Am Rev Respir Dis* 1986;**134**:276-80.
3 Burrows B, Bloom JW, Traver GA, Cline MG. The course and prognosis of different forms of chronic airways obstruction in a sample from the general population. *N Engl J Med* 1987;**317**:1309-14.
4 Taylor RG, Joyce H, Gross E, Holland F, Pride NB. Bronchial reactivity to inhaled histamine and annual rate of decline in FEV1 in male smokers and ex-smokers. *Thorax* 1985;**40**:9-16.
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SIR,—It has recently become fashionable to question the value of continuous treatment with β agonists in asthma. Constant P van Schayck and colleagues' study is one of few studies supporting a nihilistic attitude towards this principle of treatment and extends it to other bronchodilators.[1] The authors conclude that bronchodilators should be used only on demand, with additional corticosteroid treatment if necessary. The study, however, shows a very small decline in forced expiratory volume in one second (FEV_1) in the continuously treated groups (salbutamol and ipratropium bromide). This decline borders on significance ($p=0·05$) when confounding factors are considered, and it is stated that the decline was 0·029 (SE 0·036) l/year less during the year in which salbutamol was used than during the year in which ipratropium bromide was used; this must mean that no significant decline occurred during salbutamol treatment (the combined analysis showed a decline of 0·072 l/year during continuous treatment and 0·020 l/year during treatment on demand. Did the statistical power of the study really permit the inference that the two drugs had equal effects in this respect?

We also believe that there are methodological problems with the study: firstly, a fairly heterogeneous group of patients was studied, with about two thirds having chronic bronchitis; secondly, the drop out rate was high as only 144 out of 223 patients were included in the key analysis; and, thirdly, baseline FEV_1 in the groups receiving continuous and on demand treatment differed more than did the yearly changes observed (approximately 0·2 litres in favour of the group receiving on demand treatment). The only possible difference with regard to histamine sensitivity was a transiently reduced sensitivity in patients with asthma treated on demand. This does not seem logical.

The authors' main conclusion, that continuous treatment should not be used, is thus not supported by convincing data. A study by Sears *et al*, which is quoted in support, cannot be properly evaluated owing to a lack of primary data in the published paper.[2] Current opinion in Sweden and other countries favours the use of continuous treatment with β agonists only in combination with inhaled steroids. Thus van Schayck and colleagues' main conclusion is based on weak data from a study not designed according to presently accepted treatment strategies. Their warning against using long acting β stimulants (see their discussion) seems even more far fetched: they were not even studied.

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1 Van Schayck CP, Dompeling E, van Heerwarden CLA, Folgerin H, Verbeek ALM, van der Hoogen HJM, *et al*. Bronchodilator treatment in moderate asthma and chronic bronchitis: continuous or on demand? A randomised controlled study. *BMJ* 1991;**303**:1426-31. (7 December.)
2 Sears MR, Taylor DR, Print CG, Lake DC, Li Q, Flammery EM, *et al*. Regular inhaled β-agonist treatment in bronchial asthma. *Lancet* 1990;**336**:1391-6.

AUTHORS' REPLY,—In their letter[1] about our article[2] C J Hilton and R W Fuller report an improved FEV_1 in 55 patients who received 200 μg salbutamol regularly for 12 months. They claim that continuous use of salbutamol does not decrease lung function. We wonder what daily dose of salbutamol these 55 patients actually received. Our 83 patients who were treated on demand used an average daily dose of 240 μg salbutamol for two years. The decline in FEV_1 was only 0·020 l/year. The 61 patients who were treated continuously in our study received 1600 μg salbutamol daily for two years and had a decline in FEV_1 of 0·072 l/year ($p=0·05$). We assume that the 55 patients reported on by Hilton and Fuller received considerably less than 200 μg salbutamol eight times a day. To support the claim that regular use of salbutamol alone does not worsen the disease a randomised comparison should be made with treatment on demand, preferably over a period long enough for effects on the decline in lung function and not the immediate effects of giving the drugs to be studied.

Hilton and Fuller suggest that the difference between their and our findings may be related to the effect of stopping anti-inflammatory drugs. Previous treatment was not, however, a confounder in our randomised trial. The patients who stopped using anti-inflammatory drugs were equally distributed over the two treatment regimens. Hilton and Fuller further suggest that our results can be explained by more severe asthma in our continuously treated patients, but the decline was corrected for potential confounding variables such as initial FEV_1 and symptoms. After this correction the decline in continuous treatment remained three to four times greater than that in treatment on demand. The estimated influence (β) of stopping anti-inflammatory drugs on the decline in lung function in patients treated continuously (−0·015 l/year) was comparable with that in patients treated on demand (−0·016 l/year).

In Hilton and Fuller's study the number of patients who dropped out seems comparable with the number in our study who used an average dosage of 240 μg salbutamol daily and dropped out after 12 months: eight out of 63 (13%) in their study versus 14 out of 110 (13%) in our study.

Andy Lawton and Maria Teresa Lopez-Vidriero are probably unaware of our other article, which shows the influence of, for example, bronchial hyperresponsiveness on decline in lung function.[3] This study was carried out in the same study population as that used in our study reported in the *BMJ*.[2] The two groups of patients—51 asthmatic patients and 93 patients with chronic bronchitis—were analysed separately, and thus each group was homogeneous. There were similar intervals of six months between measurements, and FEV_1 was always measured at exactly the same time of the day to avoid diurnal variation. Bronchodilator drugs were stopped for at least eight hours before the start of the measurements.

Our article shows that the measurements of FEV_1 clearly fit a linear model. This model explained a variation of more than 70%. We did not use autoregression analysis except afterwards to reanalyse our data. In doing this we took only equally spaced time points.

We are surprised that Kjell Larsson and Paul Hjemdahl consider the decline in FEV_1 in the continuously treated group to be very small. The crossover design for the two drugs and the parallel design for the two treatment regimens does not allow a simple comparison as suggested. Both drugs were given to all 144 patients for one year and compared within patients. There was no significant difference in the decline in lung function between the two drugs ($p=0·41$).

Only 23 patients dropped out from the study for reasons unrelated to the drug treatment, such as lack of motivation. This is low for a two year study. Forty patients dropped out because the treatment with bronchodilators was not sufficient. In this group twice as many patients were treated continuously. This is an important finding.

Our findings seem to support the current opinion in Sweden that continuous β_2 agonists should be used only in combination with inhaled steroids. We showed that patients receiving continuous bronchodilator treatment were unaware of an increased decline in lung function. Therefore we suggested that continuous bronchodilation without anti-inflammatory treatment masks the decline in lung function and suppresses the subjective need for additional anti-inflammatory treatment. As long acting β_2 agonists seem even more effective in suppressing symptoms such as morning dyspnoea we suggest that patients may be more misled by the apparent wellbeing produced by these long acting bronchodilators.

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1 Hilton CJ, Fuller RW. Bronchodilator treatment in asthma: continuous or on demand? *BMJ* 1992;**304**:121. (11 January.)
2 Van Schayck CP, Dompeling E, van Herwaarden CLA, Folgering H, Verbeek ALM, van der Hoogen HJM, *et al*. Bronchodilator treatment in moderate asthma and chronic bronchitis: continuous or on demand? A randomised controlled study. *BMJ* 1991;**303**:1426-31. (7 December.)
3 Van Schayck CP, Dompeling E, van Herwaarden CLA, Wever AMJ, van Weel C. Interacting effects of atopy and bronchial hyperresponsiveness on the annual rate of decline in lung function and the exacerbation rate in asthma. *Am Rev Respir Dis* 1991;**144**:1297-301.

Coronary heart disease

SIR,—J McMurray and H J Dargie put forward a compelling case for including heart failure in the initiative *The Health of the Nation*.[1] They point out that the Framingham study shows that the annual incidences of heart failure in subjects aged 65 and over and subjects aged under 65 are only slightly lower than those of myocardial infarction and higher than those of stroke. The Framingham study was begun in 1949 and refers to an American population in which the causes (particularly hypertension) and the treatment of heart failure were different from those today. There is a dearth of epidemiological information on heart failure not only in the United Kingdom but throughout the world, largely because epidemiologists have concentrated on coronary heart disease manifest by sudden death, myocardial infarction, or angina. We recently studied the prevalence of heart failure in three general practices[2] and the impact of heart failure on workload in a district general hospital.[3]

The prevalence of heart failure in a population of 30 204 people in north west London was 0·4%.[2] The prevalence was 0·06% in those aged under 65 and 2·8% in those aged 65 and over (mean 73). Heart failure was determined by an analysis of prescriptions for diuretics and a clinical definition. Hypertension at any time was identified in only 6% of those with heart failure.

In Hillingdon Hospital, which serves roughly 155 000 patients, 2877 patients were admitted to the medical and geriatric services over six months.[3] Of these, 140 had heart failure as the main reason for admission, of whom 15 had heart failure as a complication of myocardial infarction. Twenty nine patients were aged under 65. Sixty two patients died within one year of admission. By comparison, during the same six months 89 patients were admitted to the coronary care unit with acute myocardial infarction and 52 with unstable angina. Of the patients with myocardial infarction, 55 were aged under 65. A few patients with these conditions might have been admitted directly to the wards, particularly the geriatric wards.

In his response to McMurray and Dargie, Hugh Tunstall-Pedoe is reticent about the importance of heart failure for four reasons.[4] Firstly, the main problem is in patients over the age of 65; that is