practice, we do not suppose that automated reporting represents an acceptable alternative gold standard. Furthermore, we made a specific distinction between major abnormalities, which are generally easily distinguished,³ and minor abnormalities, which are generally harder to distinguish. We also pointed out that patients with a murmur will require echocardiography because patients with valvar heart disease may have a normal echocardiogram; this may explain part of the difference between Khandekar and colleagues' and our findings (in our service, referrals for assessment of murmurs were not encouraged and few such referrals were received).

We accept Simon Sanderson's comments about predictive values and prevalence, although we think that his qualifications strengthen our case. One of our chief findings was the exceptional negative predictive value of the electrocardiogram (that is, a normal electrocardiogram virtually excludes chronic heart failure secondary to left ventricular systolic dysfunction). This was subsequently confirmed by data from the coronary artery surgery study's registry.⁴ Sanderson's recalculation of our results on the basis of a lower prevalence yields an even more exceptional negative predictive value of 99.9%.

We are pleased to see that Gregory Y H Lip and colleagues are so far in agreement with our findings that they have extended them to acute heart failure in hospital practice. One of our reasons for publishing our findings in a general medical journal was the fact that, while they may do little more than "confirm a longstanding clinical impression," they do confirm it and provide evidence for it. They are therefore of interest to a wider audience than general practitioners alone.

ANDREW P DAVIE
Lecturer

MICHAEL P LOVE
Research fellow

JOHN J V McMURRAY
Consultant cardiologist

University of Glasgow,
Glasgow G12 8QQ

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Inequality in income and mortality in US

Lower mortality in Hispanic population may have affected findings

EDITOR,—In their study on inequality in income and mortality in the United States, George A Kaplan and colleagues discuss the fact that many of the states in which the proportion of total household income received by the less well off 50% was low were those with a considerable proportion of African American residents.¹ Since African Americans have a higher overall mortality they questioned whether the strong correlation that they found between inequality of income and mortality simply reflected those states having a higher proportion of African American residents. They dismiss this as a possible confounder, however, since they found virtually identical correlations between household incomes and mortality in both the white and African American populations.

What the authors failed to address was the possible effect that the Hispanic population in a

state had on this correlation. Although a higher proportion of the Hispanic population than the non-Hispanic population in the United States lives in poverty, the Hispanic population has a lower mortality.^{2,3} Thus the correlation between inequality of income and mortality could be affected in states with a high proportion of Hispanic residents. We note that the seven states with the highest percentage of Hispanic residents (New Mexico (38.2), California (25.8), Texas (25.5), Arizona (18.8), Colorado (12.9), New York (12.3), and Florida (12.2)) had among the lowest age adjusted mortality per total household income in the study, as shown in the authors' figure 1.⁴

This suggests that the Hispanic population, which is overwhelmingly immigrant, may have some sociocultural characteristics that somehow blunt the effects that inequality of income has not only on mortality but on various other health outcomes. If this is so then the overall solution to the poorer outcomes associated with the inequality of income must include not only policies that address distribution of income and wealth but also actions that preserve protective sociocultural traits.

PATRICK T DOWLING
Professor

Department of Family Medicine,
Harbor-UCLA Medical Center,
Torrance, CA 90502,
USA

JOSEPH M ALLEVATO
Medical student

UCLA School of Medicine,
Los Angeles, CA 90095,
USA

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Authors' reply

EDITOR,—Patrick T Dowling and Joseph M Allevato suggest that our report of an association between inequality of income and mortality in the United States may be incomplete because we did not consider the proportion of Hispanic people in each state. We recognise the apparent protected mortality status of Hispanic people, although controversies about the validity of the numerator, denominator, and mortality linkage used in calculating Hispanic mortalities are unresolved.^{1,2}

While the states that Dowling and Allevato mention as having the highest proportion of Hispanic residents do tend to have a mortality below the median (five of the seven do so), eliminating these states from the analyses makes little difference to the results. For all states, the correlation between our measure of inequality of income and all cause mortality in 1990, adjusted for median income, was -0.59 ($P < 0.0001$); when the seven states with the highest proportions of Hispanic residents were excluded the correlation was -0.65 ($P < 0.0001$). Contrary to Dowling and Allevato's suggestion, the association between inequality of income and mortality was considerably higher when only those seven states were considered, although one should be cautious in interpreting a correlation based on only seven points.

We agree that it is important to examine sociocultural characteristics that protect groups against health risks. It is also important, however, to note that macroeconomic factors and their consequences may make it more or less difficult for groups to maintain these protective charac-

teristics over time. It will be interesting to see whether the well documented increasing inequality of income in the United States³ will put at risk the protective traits to which Dowling and Allevato refer.

GEORGE A KAPLAN
Chief

JOHN W LYNCH
Research associate

RICHARD D COHEN
Senior research associate

JENNIFER L BALFOUR
Graduate assistant

Human Population Laboratory,
California Department of Health Services,
2151 Berkeley Way,
Berkeley, CA 94704,
USA

ELSIE R PAMUK
Health statistician

National Center for Health Statistics,
Centers for Disease Control and Prevention,
Hyattsville, MD 20782,
USA

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Monitoring may need to be prolonged in patients given warfarin and amiodarone

EDITOR,—B Cheung and colleagues report a case from Hong Kong illustrating a potential latent interaction between warfarin and amiodarone.¹ They detail the pharmacokinetics of amiodarone and how these may have contributed to the problem but do not discuss the pharmacodynamics of warfarin, which may also be relevant.

Warfarin has a relatively long elimination half life (average about 35 hours for the racemate) and takes at least a week to reach steady state plasma concentrations.² The half life for the biological effect varies for the different vitamin K dependent coagulation factors, and changes in the activity of these factors lag behind changes in the warfarin dose by one to three days. Chinese patients are more sensitive to the anticoagulant effect of warfarin, and the mean maintenance dose is about 3.0 mg daily in Chinese patients,^{3,4} compared with 6.1 mg in white patients. The reason for this is unclear and may be a combination of both pharmacokinetic and pharmacodynamic effects. The metabolism of many drugs differs between Chinese and white patients, but detailed studies have not been conducted with warfarin. There are also racial differences in clotting factors: fibrinogen concentrations, for instance, are about 20% lower in Oriental than white people.

Recent studies have shown that the warfarin dose required in Chinese patients, as in white patients, has a negative correlation with age, decreasing from a mean of 4.0 mg daily in patients aged 31-40 to 2.3 mg daily in patients aged over 70.⁵ As Cheung and colleagues indicate, less than half the usual dose of warfarin may be required with concomitant amiodarone treatment, so it could be predicted that the elderly patient on whom they report would require a maintenance dose of ≤ 1 mg daily if he were Chinese.

In Chinese patients we usually give a loading dose of 5 mg warfarin daily for two days and then continue with an average of 2-3 mg daily depending upon the international normalised ratio on day 3. Cheung and colleagues do not seem to have used a loading dose in their patient, and a steady state is unlikely to have been reached after only five days' treatment (fig 1). Similarly, the appropriate maintenance dose

could not be reliably predicted from the international normalised ratio obtained over that period. Despite the small reduction in the warfarin dose on day 6 the international normalised ratio might have been expected to continue to rise over the following days even if the patient had not been exposed to accumulating concentrations of amiodarone.

Fig 1—Changes in international normalised ratio after start of treatment with warfarin

An alternative lesson of this case is that, in the absence of an appropriate loading regimen, the international normalised ratio should be monitored beyond the usual five to six days because of the delay in reaching a steady state effect.

BRIAN TOMLINSON
Professor

ROBERT P YOUNG
Assistant professor

THOMAS Y K CHAN
Associate professor

JULIAN A J H CRITCHLEY
Professor

JULIANA C N CHAN
Associate professor

Department of Clinical Pharmacology,
Chinese University of Hong Kong,
Prince of Wales Hospital,
Shatin, Hong Kong

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Continuing rise in emergency admissions

Visiting elderly patients at home immediately after discharge reduces emergency readmissions

EDITOR,—Simon Capewell suggests various reasons for the rising tide of emergency admissions to hospital, including increased multiple readmissions and decreased support for elderly people in the community.¹ We wish to draw attention to our research into readmission and support on discharge for elderly people.

We evaluated a community based hospital discharge scheme for people aged over 75 and followed up 903 patients for 18 months in a randomised controlled trial; half of the patients received care under this scheme and half received standard discharge care.² The scheme

consisted of support from a care attendant on the day of discharge and for a maximum of 12 hours a week for two weeks after each discharge for every patient discharged home (a total of three hours' care was given on average). The care attendants' remit was to provide personal care and help and encouragement with rehabilitation and to ensure necessary continuing support. The scheme aimed to provide a safety net for patients, including those assessed as not needing care, and to check gaps in provision or failure to implement services. The care attendants also reported providing emotional support to over half of the patients. This age group of patients has a high readmission rate, with half being re-admitted at least once within a year. Those receiving care under the discharge scheme had significantly fewer multiple readmissions (7% v 14% were readmitted twice or more within 18 months).³ This significantly reduced patients' average number of days in hospital over the subsequent 18 months, particularly for the half who lived alone (17 days v 31 days). The scheme was costed at £66 000 per 250 000 population, with short term savings of £287 000 (1985-6 values) and much higher long term savings. Early readmission rates (within three months) were significantly higher for those initially admitted as emergencies (26%, compared with 12% after planned admission), but those receiving care under the discharge scheme were significantly less likely to be readmitted as an emergency.³

In the three months after discharge the patients' median functional and cognitive ability improved significantly (equivalent to their being 5-10 years younger), the greatest improvement being for patients with heart disease. This suggests an average loss of at least this amount over the period relating to the admission and shows the patients' relative frailty at discharge and the potential for rehabilitation.

This study shows that providing at least one home visit immediately after discharge in addition to the care provided after formal assessment would benefit patients over 75 and be cost effective to health and social services. Similar schemes are being implemented in the North Thames region.⁴

JOY TOWNSEND
Director

Centre for Research in Primary and Community Care,
University of Hertfordshire,
Hatfield AL10 9AB

ANDREW FRANK
Consultant in rehabilitation medicine

Northwick Park Hospital,
Harrow HA1 3UJ

MARY PIPER
Acting health strategy and policy adviser

Directorate of Health Care,
HM Prison Service,
London SW1P 4LN

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GPs' low morale is contributing factor

EDITOR,—Simon Capewell describes the diverse and numerous factors associated with the continuing rise in emergency admissions.¹ He fails, however, to mention one of the most important underlying reasons why general practitioners may have a lower threshold than previously for admitting patients to hospital—namely, their low morale.

Out of hours work has been identified by general practitioners in a succession of surveys as one of the more potent causes of perceived stress.^{2,4} The necessary follow up home visits are time consuming, but, in addition, keeping ill patients out of hospital requires doctors to absorb worries about the responsibility and management of the clinical condition, the concerns of the patient and carers, and the fears of litigation if all does not go well. This is emotionally draining work on top of a far busier and more exacting daily workload for general practitioners than a decade ago. If individual general practitioners' morale is low it is not surprising that they take the easier management option and have a lower threshold for sending sick patients to hospital rather than monitor and treat them at home.

A continuing rise in emergency admissions is only one area where the consequences of general practitioners' declining morale is proving costly.

RUTH CHAMBERS
Senior lecturer in primary health care

University of Keele,
Stoke Health Care Centre,
Stoke on Trent ST4 7JB

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Reduce time from referral by GP to first outpatient attendance

EDITOR,—The fact that elective admissions are increasing at a lower rate per year than emergency admissions¹ suggests that part of the solution is to increase elective admissions, day case procedures, and outpatient appointments in order to reduce what will otherwise probably become arguably inappropriate "emergency" admissions. Patients admitted as emergencies while awaiting admission or an outpatient consultation are likely to receive treatment that is more expensive in staff time and less efficiently delivered than would be the case if it was delivered in the way planned. It may be less effective, but this is not clear. When out of hours teams deliver medical care that would otherwise be provided in normal hours this must reduce the service to other patients whose problems are undoubted emergencies.

As a general practitioner, I think that the most obvious factor to concentrate on is the length of the cycle from referral by a general practitioner to the first outpatient attendance. Locally this seems to be about eight weeks, and the advice from at least one specialist medical department is that if this is too long then the patient should be admitted as a (general) medical emergency. I cannot see any part of the administrative process of organising an outpatient appointment that could not be run as well on a six week cycle as on an eight week cycle. The effects of this change would include a reduction in extra calls to general practitioners (often by relatives out of hours, and not to the patient's own general practitioner, which is a situation well known to encourage admission). We cannot ignore patients' expectations in the health service. Citizens are unwilling to wait eight weeks and will generate more work if we do not react to this.

ADRIAN MIDGLEY
General practitioner

Homefield Surgery,
Heavitree,
Exeter EX1 2QS

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