

# Heart failure: across the interface and beyond

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Heart 2002;88(Suppl II):ii28–ii32

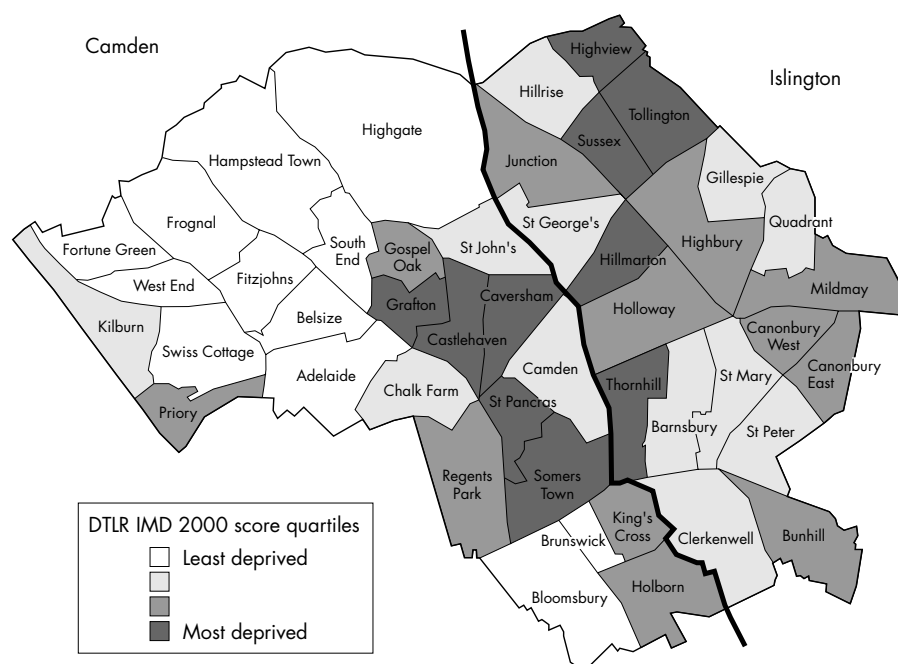
The initiatives described below have developed in a particular way, reflecting the local environment including its history, and recent clinical advances and imperatives in the field of heart failure. These initiatives are part of a much broader range of innovations, some of which are at an early stage in their development. Others have been in place for many years reflecting a longstanding local commitment to address the issues of consistency and continuity of optimal cardiovascular care, research and education, across primary, secondary and tertiary care domains in and around the Whittington Hospital, London (and more recently the Whittington University College London campus).

Only through an understanding of the local context will it be possible for others to assess the applicability of the described models to their own practice. The Whittington Hospital provides cardiovascular care for a local population of some 220–240,000 people for whom Camden and Islington, and Enfield and Haringey have historically been the main commissioners. The population characteristics shown for Camden and Islington in fig 1 illustrate the pronounced social divides within this health authority.<sup>1</sup> It is relevant that the predominance of the population served by the Whittington Hospital come from those areas with the two highest social deprivation quartile ratings, which reflect characteristics such as high levels of unemployment, various ethnic groupings with limited English, and an above average prevalence of mental illness. Similar demographics apply to many of those within Enfield and Haringey served by the Whittington Hospital. For this local population, social deprivation, a well described marker for adverse outcome from cardiovascular disease, has historically been compounded by an under provision of cardiovascular services including a low ratio of cardiologists to patient population,<sup>2</sup> inadequate access to diagnostic services, and long waits for both emergency and

elective intervention. Furthermore there has been no local subspecialty interest in, or provision of, heart failure services.

Thus the incentive to address the local need has been considerable and motivation high. Long before the advent of the National Service Framework for coronary artery disease,<sup>3</sup> there was a local recognition of the imperative to optimise cardiovascular care in a manner that ensured optimal and consistent standards, irrespective of the healthcare domain the patient happened to be using or needing. A joint initiative embracing the university (University College London), National Health Service trust (the Whittington), and industrial charitable trust (Glaxo-Wellcome), resulted in the creation of a consultant post as senior lecturer in cardiology with an interest in community cardiology as early as 1995. This post and the forward thinking environment in which it developed have been important factors in developing “heart failure services across the interface”. While recognising the importance of this component of heart failure services, it is increasingly evident that many patients with a diagnosis of heart failure have little understanding of their condition and as such are subject to the vagaries of their local health care systems. Were they empowered through interventions allowing them to develop a sense of self efficacy in the control of their heart failure, substantial improvements in both morbidity and mortality of these patients and the wellbeing of their carers (partners and/or spouses and/or others) might ensue. Hence this paper will allude to initiatives designed to address heart failure services across the interface and beyond.

A philosophy of the cardiovascular department has long been to work with the local primary care physicians (and other healthcare providers) to facilitate optimal delivery of cardiovascular care. Open access electrocardiography has been available for 25 years, a service now used by more than 400 general practitioners (fig 2).<sup>4</sup> These data have been stored



**Figure 1** Indices of deprivation<sup>1</sup> score quartiles for the London health authority of Camden and Islington. Much of the population served by the Whittington Hospital Trust comes from those wards with the two highest social deprivation quartile ratings. Reproduced with permission from Dr Robert Kyffin, Camden and Islington Health Authority.



Whittington  
electrocardiography service

- Open access 25 years
- Electronic storage 15 years
- Database of 230 000 ECGs
- 15 000 per year open access
- Service used by > 400 GPs

**Figure 2** An early ECG being performed, circa 1905.<sup>4</sup> Alongside are listed the features of a modern ECG service, nearly 100 years later.

electronically for the last 15 years giving a database of over 230 000 ECGs, any of which can be accessed for comparison whenever the patient re-presents, a facility which in specific circumstances can be invaluable. Access to echocardiography, 24 hour blood pressure and ECG recording, and exercise testing has been available to local general practitioners through an accreditation scheme since 1990. The accreditation course, which is run once or twice a year, is designed to facilitate optimal use of these investigations.<sup>5</sup> Additional support comes through a more recent initiative, the “GP cardiology help-line” which was established in 1995 to allow access to a consultant cardiologist to discuss cardiovascular queries relating to specific patients or investigations, irrespective of whether or not those patients had been referred to the hospital.<sup>6</sup> The timing of this facility is designed to coincide with busy surgeries.

A number of other factors which have influenced our ability to respond to recent opportunities for improving the care offered locally for patients with heart failure also deserve mention. These include some very responsive local practitioners, an active multidisciplinary audit advisory group (MAAG) undertaking work on coronary artery disease since 1997, the establishment in 1999 of the Camden and Islington multidisciplinary cardiovascular disease reference group (and a cohort of subgroups), the presence of the centre for health informatics and multiprofessional education (CHIME) at the UCL Whittington campus, and a host of individuals including members of the hospital management who were keen to work innovatively with us to develop local health care.

### DEVELOPING HEART FAILURE SERVICES

In 1999 there were no established heart failure services locally; from the outset there seemed to be three main groups of patients who might present in slightly different ways and thereby might trigger help from different health care providers. These were:

- patients presenting to their general practitioners with a possible new diagnosis of heart failure
- patients in the community with an existing diagnosis of heart failure (and others as yet undiagnosed)
- patients admitted to hospital with usually more severe heart failure.

It is, however, fundamental to the emerging services that such distinctions are for the patient largely irrelevant and the components described within this article are designed to ensure that in time all patients can trigger “best care” whenever and wherever they require it.

### RAPID ACCESS HEART FAILURE SERVICE

It is well recognised that not all patients with a diagnosis of heart failure will even have had an echocardiogram and the

diagnosis is often far from robust. While these issues need to be addressed it seemed logical to ensure that all patients presenting with a possible new diagnosis should have access to a rapid and accurate diagnosis and early optimisation of care thereafter. We have therefore established a rapid access heart failure clinic which currently operates on four days a week and which, in many respects, is similar to other models (table 1). This is run as a “one stop” clinic by a heart failure clinical nurse specialist and cardiologist. Patients are seen ideally within 24 hours of referral, or as soon as possible thereafter, and undergo full clinical assessment, and standard investigations including a chest x ray, ECG, echocardiogram, and usual blood tests. This has immediate resource implications, which have been met through a variety of avenues. Many of these have required an ability to respond very rapidly to government invitations to bids for funding.

In June of 2000 the outpatient waiting time for routine echocardiography oscillated around six months and “emergencies” waited for up to two weeks. Like many other units we had been unable to recruit adequate numbers of technicians with sufficient expertise to run this service, and a single increasingly aged echo machine compounded this problem. Central funding opportunities have subsequently allowed us to replace the existing machine and purchase a second.

### ESTABLISHING AN INNOVATIVE TRAINING PROGRAMME FOR CARDIAC TECHNICIANS

In order to address the technical limitations we worked with local management to recruit a clinical scientist (to head the service) and then establish a novel training programme for cardiac technicians designed to attract and then retain high quality staff (table 2). The programme was designed to overcome recognised problems. Conventional programmes recruit staff to very junior posts, which are then reflected by very modest salaries. Following a period of training the perception (and often reality) of gaining promotion involves a move to a different institution. Moves may also be precipitated by a desire to gain expertise in a field not offered by the recruiting institution. At the senior end of the scale remuneration is often inadequate with a paucity of clinical scientist posts for highly trained staff who increasingly move to industry and elsewhere. We aimed to recruit highly motivated graduates to a programme that would offer intensive practical and theoretical training and an early opportunity to undertake an MSc in a cardiovascular related subject. Trainees are also expected to obtain conventional qualifications and accreditation from relevant societies. The trainees would undergo early and regular reassessment with a view to upgrading commensurate with their rapidly changing skills. It is envisaged that successful retention of these graduate trainees will require a transfer to the clinical scientist career structure. We are at an early stage in this programme but early indicators auger well. The initial advertisement provoked a response of about 180 applicants from which we successfully recruited two excellent graduates who compliment

**Table 1** Essential features of the rapid access heart failure clinic. Patients are referred using a dedicated referral form and subject to capacity patients with chronic heart failure can also be seen within the clinic

- One stop fast track heart failure clinic for referrals from primary care
  - nurse specialist/consultant cardiologist
  - echocardiography
  - brain natriuretic peptide (BNP)\*
  - diagnosis: clear treatment strategy and referral back to the community at an early stage

\*BNP (brain natriuretic peptide) is measured as part of a research initiative as described in the text.

**Table 2** Key features of a training programme for cardiac technicians, which has been recently established at the Whittington Hospital, London

- Recruitment of clinical scientist to establish programme
- Five year training programme for graduate trainees
- Trainees will obtain conventional training, qualifications, and membership of relevant societies at an early stage
- Trainees are expected to undertake an MSc in a cardiovascular related subject and adequate support is provided for this
- A commitment by the trust to frequent reappraisal and upgrading commensurate with skills
- Anticipated transfer to clinical scientist career structure

the existing multidisciplinary department, learn quickly, have enrolled in MSc programmes, and who are now approaching their first reappraisal.

These changes have produced a substantial reduction in waiting times for echocardiography, which now oscillate around two weeks for routine services, while urgent studies are usually performed on the day that they are requested. These improvements have been achieved at a time when we have ensured sufficient slots are reserved to allow the rapid access heart failure clinic to function as a one stop service, and have established a daily open access chest pain clinic with a consequent rise in electrocardiography and exercise testing.

The funding for the heart failure nurse specialist came through our input into a successful bid with Camden and Islington Health Authority for health improvement programme funding. We committed ourselves to a number of heart failure initiatives and their assessment in our local context. One of the issues being addressed in the context of the rapid access heart failure clinic is the reliability of brain natriuretic peptide as a rule-out test for use in patients with possible new heart failure. Although initial results have been promising,<sup>7</sup> there is a need for a larger more pragmatic study in circumstances more likely to reflect every day usage than has been reflected in the literature to date.<sup>8</sup> We are one of four centres actively recruiting to this end. Once patients have been assessed for the presence or absence of new heart failure in the one stop clinic, rapid feedback to their referring practitioners is essential and it is our intention to refer back into the community, with a clear treatment plan for subsequent management. This is feasible because of earlier work initially undertaken with a number of local general practitioners, but subsequently adopted extensively by the local community.

### COMMUNITY WIDE GUIDELINES FOR HEART FAILURE

The starting point for this development was a small amount of funding which allowed us to recruit up to a dozen local general practitioners for three series of three, two-hour workshops to address various different areas of cardiovascular need, including heart failure. Participating general practitioners were invited on the basis that we would provide an update on best practice and then work with them to develop guidelines which were clinically relevant for their practice and which would subsequently inform developing or existing hospital guidelines. Each participant was also committed to educating other members of their practice. These same practices have acted as pilots for the emerging heart failure and chest pain services. The opportunity, for these guidelines to be adopted more broadly within the community, was afforded through my involvement with both the MAAG coronary artery disease initiative and the Camden and Islington cardiovascular disease reference group. This allowed discussion and modification of the guidelines by a broader cohort of local practitioners and a

**Table 3** Mechanisms by which the community wide guidelines for the management of patients with heart failure were developed locally

- Initial educational grant from Camden and Islington Health Authority
- Nine local general practitioners involved
- Three consecutive intensive sessions
  - education component
  - end point a seven page document and algorithm
  - fast track referral format for pilot practices for patients with heart failure\*
- Guidelines endorsed by multidisciplinary health authority reference group, local hospital trusts: available from the MAAG coronary artery disease resource pack
- URL: [www.chd.org.uk](http://www.chd.org.uk)

\*The fast track service was piloted in the participating practices before being extended as a service to all referring general practitioners.

range of other health care professionals, including health authority pharmacists and cardiologists from adjoining hospital trusts. Now accepted across Camden and Islington (as the first cardiovascular health authority wide guidelines) they are accessible via the local MAAG coronary artery disease website<sup>9</sup> (table 3). Funding for many of these initiatives has been via Camden and Islington Health Authority, but in translating them into practice there have been no health authority based restrictions and the original cohort of general practitioners were not restricted to any given health authority. For these guidelines to be fully effected within the community additional support will need to be realised.\* However, these community heart failure guidelines, which drew on existing evidence and best practice,<sup>10 11</sup> have informed the Whittington Trust guidelines for the management of heart failure to ensure continuity of care across the primary–secondary care interface.

### PATIENTS ADMITTED TO HOSPITAL WITH HEART FAILURE

Patients admitted to hospital with heart failure represent the more severe end of the spectrum of disease with implications for prognosis, which tends to be poor. The cost of providing care for these patients with heart failure is considerable and, with changing demographics, set to increase. Much of the estimated 1–2% of the total NHS budget attributed to patients with heart failure can be accounted for on the basis of prolonged and repeated hospital admissions. Heart failure similarly carries a substantial burden for individual patients, and their carers, in terms of morbidity and mortality.<sup>12–15</sup> The readmission rates are high for these patients and especially so during the first 90 days following a hospital admission. The potential role of the nurse specialist in being able to modify these patterns is an exciting concept and is one that has been developed in a number of health care systems. The idea that we might reproduce locally, for example, the Adelaide model was particularly appealing because of its favourable impact on hospital readmissions and mortality in response to a single home visit by a nurse and pharmacist within a week of discharge.<sup>16</sup> Furthermore, economic analysis suggested this provision appeared to be self supporting through savings related to avoided hospital admissions. However, the level of background health care provision in Australia in general and Adelaide in particular are not reflected here, either nationally

\*The first stage of some much needed additional community work may come through a recent award from the NHS modernisation agency to the "north central coronary heart disease collaborative" to support a number of initiatives (with SH as the lead clinician for heart failure).

or locally. To a lesser extent this also applies to the recently published work from Glasgow<sup>17</sup> where the nurse led intervention, which was much more intensive, was superimposed on the heart failure management available in a (Scottish) centre renowned internationally for its excellence in this field. While these and other nurse led interventions, which are often resource intensive, can improve outcome in heart failure, the literature gives little information on the exact nature of the interventions although terms such as education and counselling are frequent. Furthermore, existing models do not as yet appear to have optimised the role of the patient in improving their outcome.

Rather than inhibiting our intention to establish a nurse led intervention, these hesitations emphasised the need to develop an intervention which might empower the patient, would not be unduly resource intensive, and yet function within the local context. It was also clear that we needed to carefully define and then assess the nature of the proposed nurse led intervention. Largely funded through the health improvement programme award, the intervention is being assessed as a randomised controlled trial in collaboration with Professor Stan Newman (University College, London) and Professor Martin Cowie (Imperial College, London). This research will support students working towards higher degrees in health psychology and health services research.

Most models of nurse led interventions follow the admission of patients under the care of a cardiologist, a model with both resource and general medical training implications. In the ongoing study the patients remain under the care of the admitting physician, but standard care for all patients now involves shared care with a cardiologist and management according to the newly developed guidelines, including early echocardiography to confirm or refute the clinical diagnosis. All patients are stabilised on optimal treatment before leaving hospital and given standardised information about their condition (using a heart failure leaflet developed recently at the Whittington in collaboration with Jane Wilson). Before patients admitted with heart failure are allowed home they need to be clinically and biochemically stable for a 48 hour period during which there have been no treatment changes. Patients are recruited to the study and randomised during the run up to this period. All patients receive follow up with a cardiologist within 6–8 weeks of discharge. These strategies have been adopted for all patients to reflect best practice and in turn impact upon the likelihood of improved outcome, including hospital readmission rates and patient mortality and morbidity.

## RANDOMISED CONTROLLED TRIAL OF A NURSE LED INTERVENTION

The principle of the intervention is of a self management model using a problem solving approach designed to overcome the usual barriers to recommended treatment (in the broadest sense). Problem solving is a class of cognitive-behavioural therapy.<sup>18</sup> This approach is a useful management in which the therapist (in this instance a nurse trained in the technique) and patient work together to identify these barriers or difficulties and ways of overcoming them. The model, which needs to be described in sufficient detail to allow it to be reproduced by other healthcare professionals but with enough flexibility to be relevant to individual patients, will be published in greater detail elsewhere.

Patients with heart failure are required to follow a complex behavioural regimen which usually includes taking considerable numbers of different medicines, making dietary changes, monitoring for signs of fluid retention, and taking exercise, among others. The aim of our intervention, however, is to target the behaviours which patients need to modify on a daily basis in order to adhere to these recommendations and to identify at an early stage signs of worsening heart failure—a

prerequisite to taking appropriate action. Although this will involve providing patients with information about heart failure and its treatment, and in this respect the intervention may not be dissimilar from work undertaken elsewhere, the intervention is not one in which patients are simply given advice about what they should do. Advice alone is not usually enough to change behaviour. Most published studies suggest non-compliance following such advice be of the order of 50%. Instead patients will be encouraged to be actively involved in first recognising and then addressing any difficulties they have in making and maintaining the behavioural changes required to adhere to their treatment. The factors, which prevent patients from making the required behaviour changes, may be practical and/or psychological and can be tackled using the problem solving approach. This encourages patients to break down their barriers to behaviour change into more manageable tasks and identify ways of dealing with them as an iterative process. An individual's beliefs about their heart failure and treatment are important since they in turn may raise barriers to dealing with their illness. The intervention is therefore designed to help the patient modify any unhelpful beliefs that are identified, while beliefs that facilitate self management and a sense of self efficacy are encouraged.

It is anticipated that this intervention will improve patients' adherence to treatment, including their ability to self monitor, so that the patient will identify worsening heart failure, at an earlier stage. This will allow them to take action and obviate the need for unplanned hospital admissions, related to either poor compliance or deterioration for other reasons. This in turn should further enhance the patients' confidence in their ability to modify their outcome favourably. The success or failure of this randomised intervention is being assessed in the usual way using a variety of primary and secondary end points.

This paper describes a number of initiatives, many of which are at a relatively early stage; it is implicit that other components of a comprehensive heart failure service have yet to be funded and put in place. Nonetheless, local heart failure services have been transformed in recent years. The extent to which this has already been achieved is testimony to a longer term local commitment to improving cardiovascular care across the (primary–secondary care) interface. While this has always included extensive multidisciplinary working, the more recent initiatives are additionally designed to optimise the role of the patient in modifying their own outcomes.

## ACKNOWLEDGEMENTS

I should like to acknowledge the work of all those involved in these initiatives. The heart failure programme has been made possible through a health improvement programme award to Camden and Islington Health Authority. Conflict of interest: none.

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## QUESTION AND ANSWER SESSION

**Question:** How long does it take to train a graduate to do echocardiography?

**Dr Hardman:** The answer depends on how much time you get! We have been able to persuade our trust to appoint clinical staff to lead this programme and to appoint these people at a higher intake than would otherwise be. The down side is that the minute they start on day 1 you lose all of your locum technicians who have been supporting the service. So you then have to get them to join the training programme and do ECGs and 24 hour tapes. The answer to the question is, it depends on how much time they have available to train in echocardiography, but it is certainly quicker than usual and I have been very impressed so far.

**Question:** How do you view this balance between open access specialist investigations, which are in heavy demand by primary care colleagues, and a specialist opinion such as you are offering through your fast track heart failure clinic? Ultimately what patients need is a diagnosis, not necessarily a test.

**Dr Hardman:** What patients need is something that is going to make them better—that sometimes follows a diagnosis, but not invariably so. I think the answer is that whatever sector of health care you are in, whether it is primary, secondary or tertiary care, some people are better at delivering in some areas than others—what one GP requires for his patient will be quite different from what the next person needs, and one of the very rewarding aspects of working very closely with community and primary care physicians is that one very rapidly learns the differences in their needs. So I'm quite prepared to provide a service which you could argue could be performed in primary care for one GP, but for another I'm happy to give an opinion and then often have telephone discussions about how the management should be changed depending on how they feed back to me. I don't think there is a simple answer.

**Question:** Can you clarify in the outpatient clinics exactly what the consultant does and what the nurse does? You said that the nurse and consultant are both present.

**Dr McIntyre:** The nurse will arrange anywhere between 5 and 10 patients which he or she sees—they may be people he or she has already seen and they may need titration of a  $\beta$  blocker and so on—equally anyone who has been referred internally will come to the clinic and be reviewed by the nurse. He or she will call me in to say “hello” and I will book them as a new patient. So I aim to see every patient as a new patient as soon as possible, particularly after their discharge, irrespective of age.

I think there is a joining-up issue here—we have primary care and secondary care and a hole in the middle. The nurse is about trying to

fill the hole in the middle. I've chosen to come at it from secondary back to primary because the patients come to the specialist because they need the tests and the diagnosis. But then you need some structure that devolves them back into risk factors and up titration or whatever in a structured manner. To my mind it's about a bridge that the nurse provides.

**Dr Hardman:** The heart failure clinic is within the context of a general cardiology clinic and we have ring fenced slots for new referrals. Within the same clinic I will see a lot of patients with heart failure but those patients who come to those heart failure slots will be assessed for standard history, chest x ray, ECG, and echocardiogram. At some point in that process I will see the patient, ideally when they have had all those things and when we can pull it all together. Sometimes I will see them at the beginning but always towards the end of that process. We've only just set up this clinic and I envisage this as being a process where our heart failure nurse specialist is able to take on a larger role as she gains expertise.

**Question:** Earlier we heard that many of those referrals from primary care won't actually have heart failure. What do you do with those people?

**Dr Hardman:** We refer them back to the community, but remember that we may have picked up other problems along the way through the investigations. We are not offering a one stop service to sort out the shortness of breath or whatever it was that brought them in. It really is to confirm (or otherwise) their heart failure, and if they have heart failure to ensure that their care thereafter is optimal.

There is a risk that GPs will lose confidence in diagnosing heart failure if most of their patients are returned, but I hope that as time goes by the GPs will learn how the system works. They may choose to use it more selectively. I also hope that 15 months on some of those patients won't come near us if they have had a BNP test.

There is always a danger with these fast track clinics that GPs become less selective about who they refer.

**Dr McIntyre:** By contrast, in our service the nurse tends to take the follow up, so having come in once and had the problem sorted out patients tend to go through the nurse until they are stable. If I've referred somebody from a ward who needs up titration of an ACE inhibitor and monitoring of electrolytes, then I will communicate to my nurse who is in an adjacent room, so we tend to hold on to them. I think Richard Hobbs made an important point—that while a third may only truly have systolic heart failure, another third probably have left ventricular dysfunction. I see a lot of elderly patients with stiff hearts, atrial fibrillation, and swollen ankles. They don't tend to have classic heart failure but they are huge management problems. I aim to stabilise them through the clinic, put them on drugs and watch the renal function until its relatively stable, and then try and get them back to the care of their GP. We tend to hold on more—I don't know whether it's a good thing or not, but carrying that package out into the community is the goal.

**Question:** I was interested in the amount of work that your clinic is doing and the number of attendances that the patients have. Have you any type of patient-held record that contains the latest test results, doses and so on as means of liaising between primary and secondary care?

**Dr Hardman:** The Whittington campus of UCL is one of two demonstrator sites in Europe for the electronic health care record, and the two areas in which we are moving forward on coronary heart disease and heart failure. We haven't yet got to that stage but it is very much on the agenda.

**Dr McIntyre:** We have used a computer based pro-forma which was provided by a sponsor as part of a small research study, so we actually have a standard clinic letter pro-forma that states the medication at the beginning, the duration of medication, and any changes in medication and so on. We have tried to address that with a piece of stereotyped documentation which, if we had the resource, we would make into some kind of audit database that we could also interrogate. We are working on it.

**Question:** Since most of these patients are elderly, many have other problems and some don't have heart failure, how do you see geriatricians being involved in this?

**Dr McIntyre:** I am a geriatrician. The average age of the patients we have is 79 in one of our audits. That, to some degree, is my point. While these people may not have true heart failure, they have difficult complex problems with heart function, hence the heart function clinic. I think that anyone who is going to try and address this has to accept the rough with the smooth and accept that in the real world these patients are not people with isolated hearts that don't have good systolic function—they are complex patients with multiple problems and that is part of the reason I think that we have frequent attenders.