

QUALITY IMPROVEMENT REPORT

A general practitioner and nurse led approach to improving hospital care for homeless people

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▶ Effect of a "Lean" intervention to improve safety processes and outcomes on a surgical emergency unit (*BMJ* 2010;341:c5469)

Problem Long term homelessness is characterised by "tri-morbidity" (the combination of mental ill health, physical ill health, and drug or alcohol misuse). This results in frequent and prolonged unscheduled admissions to hospital with annual costs that are eight times the local average.

Design Qualitative study. A needs assessment was conducted over three months to inform the design of a specialist support service.

Setting Inner city teaching hospital in the United Kingdom.

Key measures for improvement To improve the quality of care for homeless patients while monitoring the impact on duration of hospital stay.

Analysis and interpretation Homeless patients often felt that they were being treated differently, and the networks and understanding necessary for care coordination were not in place. The complexity associated with tri-morbidity is compounded by complicated legal rights of access to housing and social care and the need for a person to prove repeatedly that they have an association with a local area in order to receive help.

Strategies for change Development of a specialist support service in the hospital (general practitioner (GP) and nurse led); rapid establishment of rapport by demonstrating a clear understanding of the problems facing the homeless patients; weekly multiagency meetings to coordinate care, with GP advocacy in complex cases.

Effects of the change Homeless patients felt more cared for, and hospital and community staff, through better support, provided better integrated care. The strategy resulted in a total reduction of 1000 bed days (30% reduction) in the first full year of service delivery and commensurate cost savings.

Lessons learnt A partnership between a GP and a hospital nurse can improve the qualitative and quantitative value for homeless patients in secondary care.

In 2005 the governing board of trustees of University College Hospital in central London, UK, began to seek a new approach for the 500 homeless people admitted each year, with an annual average of 700 admissions. The board invited a general practitioner specialising in the health of homeless people and a nurse experienced in encouraging patients to be involved in deciding their own healthcare to develop a service that would improve the quality of care for homeless inpatients.

The problem

Long term homelessness is characterised by "tri-morbidity" (the combination of mental ill health, physical ill health, and drug or alcohol misuse). This can make clinical management challenging. Good care, incompletely integrated, is always diminished. But people's access to all community services (from primary care, through mental health and drug and alcohol services, to housing and social

care) is regulated by complex and contradictory rules that require proof that they are connected to the chosen locality. General practitioners in homeless health learn from their patients how to coordinate and advocate for holistic care, but such GPs are a scarce resource.

These barriers to care result in more medical emergencies. Homeless people in England attend emergency departments five times as often as those who are not homeless, are admitted 3.2 times as often, and stay in hospital three times as long. This results in unscheduled secondary care costs that are eight times higher than for patients who are not homeless.¹ Nevertheless, healthcare staff are still reluctant to accept homelessness as a healthcare matter. Homelessness is associated, however, with an average age at death of 40.5 years² and significantly increased mortality rates.³ A study in Glasgow found that a homeless patient admitted with a drug related problem was seven times as likely to die over the next five years as a patient with the same drug related diagnosis who was not homeless.³ Despite high expenditure on unscheduled care for homeless patients the clinical outcomes are generally appalling.

Key measures for improvement

The primary outcome for this intervention was to improve the interaction between homeless patients and hospital staff and enhance the patient experience. An important secondary outcome was to reduce the total number of days for which beds were occupied by unscheduled admissions for homeless patients.

Gathering information

During the needs assessment period (June to August 2009) data on homeless patients admitted to the hospital were gathered via regular GP ward rounds and nurse visits to all the medical and surgical wards. Fifty seven patients were identified as homeless (including those who slept outside, hostel dwellers, and "sofa surfers" (people who moved around sleeping on friends' sofas)), and the duration of their hospital stay was recorded. All patients were visited at the bedside and their concerns and problems identified. All front line staff working with homeless patients were interviewed and asked for their views on matters associated with homeless patients and for possible solutions. Staff consulted included specialist drug and alcohol workers coming into hospital from the community, liaison psychiatry staff, social workers, housing advice workers, staff from the local primary care service for homeless people, staff from centres for local housing options, and street outreach workers. Once the service was established, referrals increased and outcomes were recorded for all patients seen. This supported a comparison with standard care during the needs assessment, and long term monitoring of outcomes for service development.

Analysis and interpretation

Thirty four (60%) patients were admitted to the hospital from the local boroughs of Camden, Islington, and Westminster; the proportions of patients from different areas have remained broadly similar over time. However, this did not mean that they could prove they had a “local connection” under the Housing Act 1996 or that they were “vulnerable and of priority need” and so entitled to housing. Single homeless people have no automatic right to housing in England; they need to show that they are more vulnerable than the “average person” and also prove that they have lived in the district of the local housing authority (in this case the borough) to which they are applying for housing for six of the past 12 months or three of the past five years.

Many of the patients had originally lived outside London but were unwilling to return to their home area. Six patients (11%) had “no recourse to public funds” (that is, they were not entitled to state benefits or local authority help to find housing). People who have no recourse to public funds include UK citizens returning from long periods overseas (who have to show a “settled intention to remain” before the state will support them); citizens of the European Union (who are entitled to seek work in the UK and access its healthcare but are not initially entitled to benefits or housing); and people whose claim for asylum has been rejected.

The homeless patients were admitted under 36 different specialty teams—two thirds under the medical directorate and one third surgical. The hospital staff caring for them believed that the problem lay with the patients and not with clinical care, but they had little understanding of services available for this group. Housing support workers described hospital admission as a “black hole” from which patients emerged without a coordinated care plan. The homeless patients expressed a range of concerns. Immediate practical problems included how to replace soiled or worn out clothing and shoes before discharge; how to contact community key workers to ensure that a hostel bed is not given away to someone else; problems with benefits; how to pay for bedside television (£7.50 (€9.40; \$12.20) a day and important for isolated people, rarely visited); where to go after discharge; and how to continue their treatment in the community. The patients also cited clinical problems: delays in staff instituting methadone treatment for heroin withdrawal or symptomatic control of alcohol withdrawal; inadequate analgesia; and a common feeling that they were not treated the same as other patients.

The drive across the NHS to discharge patients as soon as they no longer need urgent medical intervention means that substantial practical problems are often overlooked—typically, how to coordinate care for a patient whose best hope is a hostel bed, which will be allocated only after discharge and if the patient can provide proof of his entitlements. It often seemed unclear who was taking ultimate responsibility for the consequences of a decision to discharge. Hospital staff often assumed that the hospital social worker should resolve these matters. But social workers are usually employed by local authorities, not hospitals, and have other priorities. They work only with patients able to show that they are “ordinarily resident” in that local authority area (an obscure common law concept, different from housing’s “local connection”) and who have a level of care need that

might warrant funding for personal care. Social workers do not consider it their role to resolve benefits or housing problems if the person has no major care needs.

Consequently the networks necessary for arranging community services for homeless people were not established, and the many teams and individual workers involved with this patient group worked in isolation and without proper avenues for communication.

As a result of the needs assessment, a GP led care coordination service was proposed: to support the patient and their specialist clinical teams; to encourage patients to stay and complete each episode of care; to avoid premature discharge without community support in place; and to reduce the risk of repeat admission.

Strategy for change

Showing the need and the benefits

We took a “plan, do, study, act” approach for each development. At every stage, funding for the developing innovation was a key concern, requiring emerging quality improvement data to justify the next step. An initial grant from a charity related to the hospital, UCLH Charity (www.uclhcharity.org.uk/), funded the first needs assessment with a part time secondment of the GP and nurse. We then presented basic data showing the scale of the problem to NHS Camden and NHS Westminster. Both these primary care trusts provided one-off grants to fund a 12 month pilot service from August 2009, and further data gathering, including an evaluation of early outcomes. Anecdotal data of improved patient and staff satisfaction was helpful, but most important was what seemed to be a reduction in average length of hospital stay.

On the basis of the average cost of unscheduled admissions for this patient group, we calculated that the potential savings were greater than the staffing costs for the innovation. These data supported a successful application for financial support from the independent healthcare charity Health Foundation that started in spring 2011. Furthermore, full year data confirming a reduction in bed days led to funding from University College Hospital for the nurse post on a permanent basis. A combination of funding streams was necessary to provide the space and time to develop our service and show the benefits before seeking permanent mainstream funding.

How the service works

Developing the service

The seconded GP and nurse, with honorary hospital contracts, worked together to develop the service. The service was modelled at the level of hospital diabetes or pain teams; the nurse worked full time and the GP provided four half-day sessions each week. (The homelessness team offers an additional patient centred, community oriented resource to help with management on the ward and to plan for discharge.) Nursing and other staff groups were informed of the new service, with posters on all the wards. The GP or the nurse visited every ward daily and invited referrals. Each morning they scanned the computerised admission records for the acute medical unit, looking for patients (searching for “no fixed abode”) and familiar names and hostel addresses. Once the service was

established, over 80% of patients were referred directly within 48 hours of admission.

The nurse negotiated easier access to the hospital's charitable "Samaritan fund" to allow small purchases such as clothing, shoes, and travel tickets. Previously this fund had been managed by the local social work department, which restricted access to the minority of homeless people who had a social worker. Now the homeless service works directly with the fund administrators and a cash float is kept in the patient affairs office.

Running the service

The GP and the nurse work the same hours they worked while developing the service. At the bedside the nurse rapidly establishes a rapport by showing a clear understanding of the problems facing the patient and completes an interview sheet, which includes information on medical condition, mental health history, drug and alcohol problems, benefits and earnings, five year housing history, and care needs. The nurse asks the patient to consider what they would like to gain from this admission. For many homeless people this may be a rare moment of relative calm in a frenetic existence, an opportunity to consider with a clear head what they would like to do on leaving hospital. The GP ward round takes place four times a week, with the GP reviewing goals and care plans, discussing and explaining medical findings, and planning with the patient their discharge.

A particular role of the GP is to advocate with authority for the patient in complex situations in which health service, housing, and social care staff need to collaborate about a patient for whom none of them really wants to take responsibility. For example, the GP can:

- Explain to a housing officer why a particular condition renders a person vulnerable and so is entitled to housing while summarising a housing history that suggests a local connection under housing law
- Summarise for a social worker why a combination of diverse problems results in care needs
- Explain to a consultant why a longer period of hospital recovery may be needed before discharge to a hostel than before discharge home.

The clinical area most often needing direct intervention is around alcohol withdrawal and methadone substitution for heroin dependent patients, especially when the patient has no current association with a drug team. Negotiations with hospital medical and surgical teams are often focused on the fact that, although the patient may be medically fit for discharge, the discharge will not be safe without additional provision for community support. Explaining that the costs of unplanned readmission within 30 days will fall to the hospital is often useful. Complex cases are discussed at the weekly multiagency meeting.

The nurse identifies the patient's community key workers and seeks permission to contact them. For people sleeping outside, they consult the CHAIN (Combined Homeless and Information Network) database, a computerised record maintained by the London charity Broadway, to establish where the patient has been sleeping and any recorded contact with street outreach workers. This helps to establish which borough should be approached to seek

housing support. For those from outside London or outside England, the patient is offered help to return home: the hospital "Samaritan fund" may be used, or help obtained from community charities set up to help with "reconnection" (helping homeless people return to their home area), such as Scotscare or Thamesreach Reconnections. Finally, for patients with no rights to housing in London who choose to stay, the hospital homelessness team establishes links with charitable hostels run by volunteers, although sometimes the best the service can do is keep a person in hospital until they are well enough to return to living on the street.

Multiagency meetings

A key recommendation of the needs assessment was to hold a weekly multiagency meeting to coordinate care, but enthusiasm for this varied among the front line agencies that we approached. Their main fears were time constraints and a concern that most patients discussed would not be on the case list for the worker at the meeting. At this stage, having the backing of a senior hospital mentor willing to meet equivalent leaders in other agencies meant that meetings were well attended. After a few weeks of experiencing a patient centred, collaborative approach, with minutes circulated and meetings never running over an hour, the front line workers were motivated to attend regularly. Meetings are now attended by a local housing options manager, a social worker, drug and alcohol workers, a liaison psychiatrist, street outreach workers, hostel key workers, and ward staff, as well as the members of the homelessness team. Every member is encouraged to provide an opinion, even if the patient does not come on to their case load. In this way an "ideal" multiagency plan can be sketched out for the homelessness team to develop.

Effects of change

We sought opinions on the qualitative impact of the service from patients and colleagues (box). Twenty patients supported by a trained peer (person with experience of homelessness) completed simple questionnaires, and members of the homelessness team requested written feedback from 10 colleagues from various disciplines involved in the management of homeless patients. No negative feedback was received.

An objective, quantitative outcome measure was defined by the number and duration of admissions for homeless patients. We defined homeless people as those who moved frequently, from rough sleeping to temporary and then longer stay hostels, or squats, "sofa surfing" with friends, and back to the streets. At admission an old address may be given or recalled by the hospital computer system. All admitting staff are encouraged to ask "do you have an address where you can safely return on discharge?" and to refer to the homeless team if there is doubt.

Our first dataset compared the 57 patients identified during the needs assessment with 57 consecutive patients treated by the new team a few months later, during October and November 2009. The average length of hospital stay decreased, but the number of patients staying 6-10 days doubled; the proportion of patients staying more than 30 days fell from 14% (8) to 4% (2). We interpreted this as more patients being encouraged to stay and complete treatment,

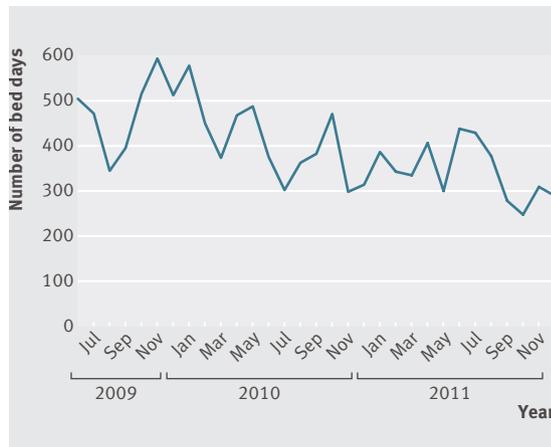


Fig 1 | Bed occupancy in University College Hospital by patients referred to the homelessness team, 2009 to 2011

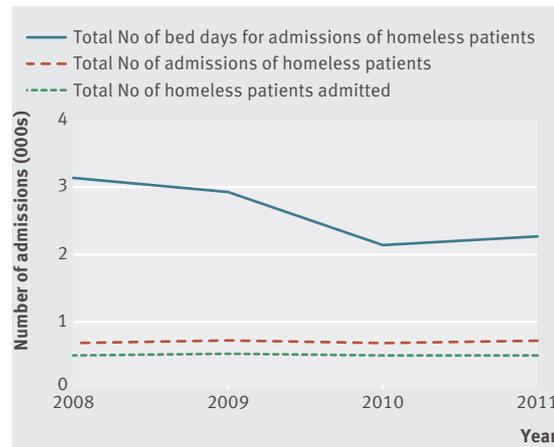


Fig 2 | University College Hospital admissions of all homeless patients from the boroughs of Camden, Westminster, and Islington, 2008-2011

Some opinions received on the qualitative impact of the service

Patients (via completion of questionnaire)

“You were the only ones that felt my life was worth saving. I am now back with my family. A family I have not seen for ten years.”

“I’ve never stayed in hospital as long as this [two weeks] but I know you are really going to help me, I trust you, that’s why I’m staying.”

“Why do you want to help me? No one has wanted to help our kind before. You have saved me, thank you so much.”

“With me being so ill I was grateful there was someone to speak on my behalf when sorting out my housing, you always went that extra mile.”

“I very rarely talk to people about my situation but I can talk to you. You give the time and you don’t judge so it is a relief to be able to unburden some of my problems without a feeling of shame.”

Colleagues (via written feedback)*

“The change in the service for homeless people has been tangible. The patients’ views are sought, and there is a joint solution to the issue. Having witnessed the open dialogue that occurs with the homeless people and the homelessness team, I am impressed with the empathy, trust, and openness of the relationship.” (University College Hospital)

“The joint working relationship between Camden Council’s Housing Options Team and UCH [University College Hospital] has greatly improved the customer care experienced by homeless clients by providing them with a prompt and individually tailored service. Early notifications of a potential hospital discharge and our joint working protocols have enabled the Housing Options Team to quickly identify suitable accommodation, preventing both delayed discharge and a return to the street.” (Housing Options Team)

“The homeless team provide the vital link between the hospital ward and community client support workers. This has supported completion of medical treatment, provided consistent management of opiate dependent clients, and ensured better communication with support services. Joint working and information sharing with the weekly meetings have helped support completion of treatment and reduce recurrent readmissions.” (CRI Camden, a health and social care charity)

*The three quotes come from senior colleagues at University College Hospital, the local authority housing department, and a local charity.

with multiagency collaboration leading to the reduction of the few very prolonged admissions. These data were sufficient to justify continuing the pilot and collecting more data.

We summarised the number and duration of admissions by the number of bed days associated with homeless patients referred to the homelessness. We began monitoring this in June 2009 and continued the process after the service was launched in October 2009 (fig 1). The data suggest a downward trend in bed occupancy in 2010 and 2011.

These encouraging trends are open to other interpretations. We could be suspected of being selective in the patients whom we accept as homeless cases and record on our database, or the downward trend could be associated with a reduction in homeless patients presenting to the hospital for external reasons.

To explore these possible interpretations, we searched the hospital database for four full years: 2008 (before the service began); 2009 (when the service started in the last quarter); 2010; and 2011. Using standard hospital data, we considered a patient to be homeless if “no fixed abode” or a hostel address was entered in the address field or if a specialist GP for homeless patients was entered in the GP field. These data were already routinely recorded whether or not our service was involved. This system-wide measure was objective and consistent over the four years (2008-11) (fig 2). We found that the numbers of homeless patients admitted and the total admissions each year remained virtually unchanged. The total number of bed days shows a significant downward trend with a reduction of 1000 annual bed days (30% reduction) from 2008 to 2011. We attribute this to improved case coordination and discharge planning resulting from multiagency working. With a conservative estimate of £200 a day, this results in net savings of £100 000 a year. We then considered the possibility that this change reflected an underlying downward trend in the duration of all admissions. Figure 3 compares the average length of stay for all unscheduled admissions to University College Hospital with that for homeless patients. The diverging trend and the step change as the service was introduced all support our assertion that this service reduces length of stay.

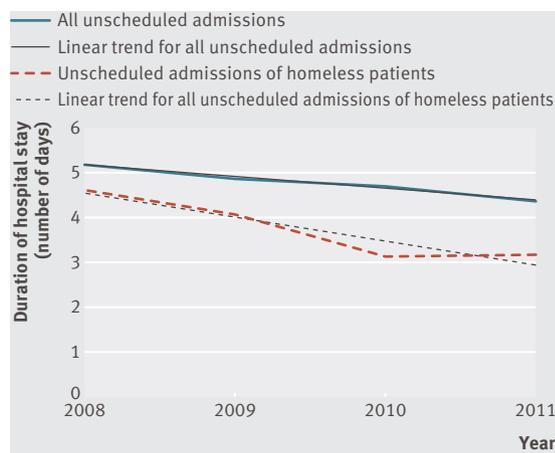


Fig 3 | Comparison of average duration of stay for all unscheduled admissions to University College Hospital with unscheduled admissions for homeless patients, 2008 to 2011

Next steps

We have learnt that a partnership between a GP and a hospital nurse can create improved qualitative and quantitative value for homeless patients in secondary care. The model we have developed can be adapted for any secondary care setting. We have set up a charity, Pathway (until recently, known as London Pathway), to promote this approach (www.londonpathway.org.uk). The charity is developing a team of “care navigators”—people with experience of homelessness who provide peer support on the ward and for a time after discharge. Care navigators are recruited from voluntary sector homeless organisations and employed through Pathway but have honorary hospital contracts requiring the same recruitment checks as all other hospital staff. We are exploring the

possibility of developing a community “sanctuary” for homeless people with complex needs—modelled on the US “respite care” approach.⁴ For people without a current home to return to, this would provide convalescent care with the aim of reducing readmission rates.

We have identified an increasing role for the nurse and care navigators in supporting homeless patients in the emergency department, which we are exploring with funding from the new charity. A two centre randomised controlled trial of the Pathway approach, funded by the National Institute for Health Research, is under way at the Royal London Hospital and Brighton and Sussex University Hospital with the aim of further evaluating the objective and economic outcomes of this model, while the Royal Free Hospital in London is funding a pilot project through a local “invest to save” process using our continuing improvement data. We will encourage more hospitals to adopt this approach and adapt it for other vulnerable groups.

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A PATIENT'S JOURNEY

Constrictive pericarditis

Ian Oliver,¹ Tom Treasure²

After progressing through several specialties, Ian Oliver was diagnosed with constrictive pericarditis. He underwent a successful pericardiectomy, but has been uncomfortable with subsequent drug treatment

In April 2010 I noticed that almost overnight I had developed a beer belly. As I do not drink much alcohol and am normally slim I began to worry. About this time I also became breathless and easily fatigued, and I developed swollen ankles caused by fluid retention. My general practitioner referred me to my local hospital for an ultrasound, which indicated that I had a swollen spleen and liver.

For the previous six years I had been under annual observation for a blood condition—originally described

to me as myelodysplasia, but later identified as chronic myelomonocytic leukaemia. This condition did not cause me any discomfort, and I mention it only because I have been told that it can produce similar symptoms to constrictive pericarditis.

Initially, I was referred back to the consultant haematologist, who concluded that my condition was unlikely to be blood related. He referred me on to a cardiologist, who sent me for a series of tests and examinations over the succeeding months. These tests included the extraction of bone marrow, an angiogram, computed tomography and magnetic resonance imaging scans, and referral to a tropical medicine specialist, who in turn arranged for two tests to see if I had tuberculosis (QuantiFERON-TB Gold and Mantoux). Both these tests were negative.

The cardiologist eventually made a diagnosis of constrictive pericarditis, which he said was a rare condition that some doctors may not recognise. He also said that few

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A DOCTOR'S PERSPECTIVE

When an operation is as uncommon as a pericardiectomy, when the surgery is only undertaken after painstaking investigation, and when a great deal of thought and careful decision making has gone on between cardiologist and surgeon, it is difficult to make statements about what usually happens. I was not involved in Ian Oliver's clinical care but will put his account into context.

The basic anatomy and physiology are no mystery. The heart is normally able to move within a lubricated fibrous sac—the pericardium—which, because of disease, can become thickened and shrink to strangle the heart. The heart cannot fill to normal capacity so blood is dammed back, causing fluid to accumulate—hence Ian Oliver's swollen stomach and ankles. In constrictive pericarditis this is characterised as chronic inflammation, but the underlying cause is often unidentified, as in Ian Oliver's case. Tuberculosis is the cause in nine out of 10 patients operated on in India, but it is the explanation for fewer than one in 10 patients in the UK.

Among the thousands of people who go to a doctor with heart failure, would Ian Oliver's symptoms and clinical signs have led a doctor to consider pericardial constriction rather than one of the more common causes? More often the diagnosis is made by chance through echocardiography. Even when a thickened pericardium is observed, it is far from easy to judge whether the circulatory changes are entirely attributable to pericardial constriction, and we cannot reliably predict that the heart will respond well to surgical release. Mechanistically, the operation is simple to explain: cut away the pericardium and all returns to normal—

but that's easier said than done. The operation itself is hazardous. The inflammation usually obliterates the normal free space and the thickened and often calcified pericardium has to be painstakingly freed, millimetre by millimetre, from the beating heart.

After these events Ian is pleased to be well, and is grateful to his doctors. But two things niggle him. One is his lengthy use of β blockers and the other is his protracted treatment with tuberculosis drugs. His questions about his drug treatment form an important part of his account. People vary in their anxieties and doctors should respect their opinions. Ian Oliver clearly states two preferences: one is that he prefers not to take any more than the minimum necessary number of tablets, and, secondly, that he likes to have full and logical explanations for decisions made by doctors.

For some patients too much detail is a problem but it is infrequent, in my experience, for patients to complain about having had too much explanation. More often they welcome repetition by doctors and nurses, plus a written copy to take away. Although Ian Oliver defers to his consultants' advice, the explanations for the use of medication have proved insufficient for him to accept that the clinical decisions were well founded. As a consequence he is left with some reservations. He expects decisions to be securely based in logic and numeracy. I agree with him on this point, but the route taken in decision making is not always obvious. Explaining how the available data lead to the recommended course of action, in a way that the patient understands, can be difficult. Nevertheless, it's our job.

Tom Treasure, professor

data were available on this condition and that its cause was known in only 50% of cases, of which 15% were found to be tuberculosis related. Thereafter, I was referred to a specialist in respiratory medicine, who said that I had probably been exposed to tuberculosis in my youth—when I was a child, in the 1940s and 1950s, the disease was very common. I was told that I needed to undergo drug treatment for six to nine months to prevent the occurrence of tuberculosis as my immune system was compromised. The term chemotherapy was used, which caused me some anxiety, but this was alleviated by a description of the antibiotic treatment being prescribed.

After the diagnosis of constrictive pericarditis, I was referred to a cardiothoracic surgeon who told me I needed an operation to remove part of the hardening pericardium and reduce the constriction on my heart. The surgeon informed me that the operation carried a mortality rate of 10-15% and, although the choice was left to me, I inferred that it would be seriously debilitating and unwise if I did not have the operation.

Within two weeks I was admitted to an infirmary and underwent a successful pericardiectomy. I was kept in hospital for a fortnight and lost almost two stone in weight. I also developed a significant sleeping problem to the point that after discharge I dreaded going to bed, and for many weeks I had to sit up with the light on. It took me four months and the reluctant use of zopiclone to overcome the disturbance to my sleep pattern.

I was informed that the operation had induced arrhythmia and that a cardioversion was necessary to correct this. The consultant surgeon suggested that this should be done

within a few days of the pericardiectomy, but I was told that the cardiologist preferred to delay this procedure. I was placed on a warfarin regimen and took other drugs including amiodarone, bisoprolol, furosemide, and iron capsules. Later, after I finished the warfarin regimen, I had to take isoniazid and vitamin B₆ to prevent the possibility of tuberculosis developing. Isoniazid reacts badly with amiodarone, and so I had to wait two months after stopping the warfarin and amiodarone before I could start the tuberculosis regimen.

My initial appointment for a cardioversion was cancelled after pre-admission tests showed that I was not sufficiently anticoagulated. It was another six weeks before I had a successful procedure, which brought my heart rate down from over 100 beats per minute to around 50. However, out of what he described as a need for caution, the cardiologist requested that I remain on bisoprolol indefinitely, and that the dose be raised from 1.25 mg to 5 mg daily. I prefer not to take medication if possible, and was disappointed that I was required to continue with β blockers after having a successful procedure to restore my heart to sinus rhythm. Occasionally, my heart rate would drop to as low as 38 beats per minute and I assume that this was because of the medication. I also experienced the side effects of a persistent runny nose and some fatigue.

I am not medically qualified and have to respect the opinions of consultants, but I remain to be convinced of the need to continue with β blockers for months after a successful cardioversion. I am also dubious of the need to take drugs to prevent tuberculosis when I have not had the disease, and both tuberculosis tests and an analysis of the part of my pericardium that was removed indicated that my condition

was not related to the disease. I would not arrogate what has to be a professional medical judgment, but I remain puzzled as to how my heart rhythm can have been identified as being stabilised in sinus rhythm if I was still taking β blockers. I would have preferred to see how my heart progressed without that precautionary treatment. Nevertheless, I accept medical advice.

Soon after my pericardiectomy, I was invited to attend a 10 week cardiac rehabilitation course and the doctors recommended that I increase my daily exercise. However, I made limited progress because of the arrhythmia, and it was not until a week or so after I had the cardioversion that I began to feel a significant improvement in my physical condition.

Throughout this whole period there was a lot of frustration, particularly for my wife, as there seemed to be limited explanations for long delays. For example, it was three months before I had an angiogram, and often I failed to grasp fully what the various procedures and tests were intended to achieve.

Despite the apparently low causal association between tuberculosis and constrictive pericarditis (I have been informed it is one in 10 in the United Kingdom) doctors accepted this as the likely cause of my condition. Regardless of the negative test results, the consultant in respiratory medicine insisted that there was overwhelming evidence for a link. He said the fact that I had pericardial constriction, and that during one of my x rays a calcified spot had been identified on each lung, indicated contact with the disease. In my lay opinion that appears to be circumstantial evidence, but I have to accept what a medical expert says.

Perhaps the regimen of tuberculosis drugs was an additional precaution because my work has taken me to some global hotspots, but at the time this was not stated as a reason for the treatment.

From the outset an operation was mentioned as a possibility, but it was not until well into the course of the diagnosis that this was confirmed as the best option. Of course the possibility of death was present, but it was not something that particularly worried me and my wife. More important to us was the fact that our lives were on hold for an indefinite period. Furthermore, there was no guarantee that I would return to a normal level of fitness and have the ability to resume the extensive travelling that was associated with my work and with a charity that my wife and I run in Zimbabwe. Of course, I understand that there was no way the consultants could have offered me any certainty of outcome.

Two years after my initial symptoms developed I now feel very well and am grateful for the care I received. I believe that I am as healthy as it is possible to be at the age of 72, and the cardiologist has agreed that I do not need to continue with any medication. As far as I am aware, the chronic myelomonocytic leukaemia remains benign and was not related to the pericardial constriction.

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ANSWERS TO ENDGAMES, p 48 [For long answers go to the Education channel on bmj.com](#)

ANATOMY QUIZ

Magnetic resonance imaging of the axial structures of the brain

- A: Thalamus—right
- B: Head of caudate nucleus—right
- C: Anterior horn of lateral ventricle—left
- D: Putamen
- E: Posterior limb of internal capsule
- F: Posterior horn of lateral ventricle—left

STATISTICAL QUESTION

The normal distribution

Statements *a*, *b*, and *d* are true, whereas *c* is false.

PICTURE QUIZ Post-traumatic swelling

- 1 The causes of generalised swelling can be broadly divided into two categories: swelling caused by accumulation of fluids or an accumulation of gas. The first category includes heart failure, renal failure, nephrotic syndrome, hypoalbuminaemia, thyroid disease, and drugs. Anaphylaxis can result in diffuse angio-oedema over the course of several minutes. In the second category, massive subcutaneous emphysema can cause generalised swelling.
- 2 The computed tomogram shows a left sided pneumohaemothorax. There is pneumomediastinum with extensive gas throughout the subcutaneous tissues. One left sided posterior rib fracture can also be seen.
- 3 Subcutaneous emphysema is usually caused by pneumothorax, a blocked chest drain, or trauma to the chest, but it can result from any puncture of the gastrointestinal or respiratory systems. In the intensive care setting it can be caused by barotrauma to the lungs during positive pressure ventilation, when a peripheral alveolar rupture results in dissection of the air into the parenchyma and vascular sheaths of the lung. It is known as surgical emphysema when caused by a surgical procedure. Subcutaneous emphysema can also occur as a result of necrotising fasciitis. It typically presents with painless distension of the skin and crepitations on palpation. Life threatening complications include swelling and occlusion of the airways, which result in respiratory compromise.
- 4 Oxygen, insertion of a chest drain to resolve the haemopneumothorax, followed by radiography to assess the positioning of the chest drain within the pleural cavity, cardiac monitoring, and monitoring of oxygen saturations. Consider prophylactic antibiotics and analgesics for pain.